UK ALLIANCE FOR DISASTER RESEARCH 2022 CONFERENCE PROGRAMME

Disaster research and innovation at a time of global uncertainty

7th & 8th December 2022, Edinburgh

To encourage an inclusive discussion on major global challenges and the role of disaster research and innovation in a time of uncertainty.

Edinburgh Climate Change Institute, University of Edinburgh,
British Geological Survey, Heriot Watt University

Version 1st November 2022

UKADR programme

(Version 1st Nov 2022)

Please note that rooms are subject to change, all rooms are on the ground floor of the ECCI.

Posters will be available throughout the two days.

Contents

Day 1: UKADR Conference 2022

09:30-10:45 Welcome and keynote panel discussion

Key-note Panel: Disaster research and innovation at a time of global uncertainty - stakeholder perspectives

Location: The Conference Room

10:45-11:15 Coffee and Tea

11:15-12:45 First Parallel Sessions

1.1 How can a 'supporting self-recovery approach' to humanitarian assistance realise safer and healthier homes after disaster?

Session leads: Sue Webb (Care International UK); Bill Flinn (CARE International UK), and Charles Parrack (CENDEP, Oxford Brookes University)

Location The Conference Room

Session Description: This session will convene discussion on self-recovery and how it can be successfully supported by humanitarian responses to facilitate the rebuilding of adequate, safer and healthier post-crisis housing. The session will introduce Pathways Home - Guidance for supporting shelter self-recovery. Abstracts are invited on the themes of community-led projects, respecting people's agency, the wider impact of post-disaster responses and how self-recovery can achieve disaster risk reduction, preparedness and climate change adaptation in a period of increasing need and limited resources. Abstracts related to WASH and shelter are particularly welcome, as are examples of self-recovery related to urban and conflict contexts.

Presentations:

Development and dissemination of an inclusive, disaster resilient, shelter guide for informal settlements in Solomon Islands.

Darryn McEvoy, Mittul Vahanvati, Usha Iyer-Raniga and Gemma Sou

RMIT University, Melbourne

Abstract: This presentation will reflect on the development of an inclusive, disaster resilient, shelter guide for informal settlements in Solomon Islands. This was a project funded by the Australian Humanitarian Partnership and administered by Habitat for Humanity (Fiji) and is one of a portfolio of guides covering several Pacific Island Nations. This work also sits alongside a long-term and ongoing project, 'Climate Resilient Honiara', funded by the UNFCCC Adaptation Fund, which engages with five informal settlements in the capital, Honiara. Adopting a highly participatory process, development of the shelter guide was informed by the needs and traditional knowledge of those living in these settlements, and although a focus on self-recovery was not the original intention, a key message that arose from early local engagement processes was an emphasis on 'assisted' self-recovery. This was based on the premise that local community members would be the 'first responders' and their need for technical knowledge, tools and materials to prepare for, and recover from, extreme events. The presentation will cover two aspects of the guide. Firstly, it will highlight some of the key shelter messages relating to the context of informal settlements in the Pacific region; and secondly how the technical guide is now being translated into formats that are more accessible to local community

members. These include highly visual community posters in the local Pidgin language and comic-style story books produced by local artists.

Build back better and self-recovery of the communities affected by the 2015 Gorkha earthquake in Nepal

Rohit Kumar Adhikari, Dina D'Ayala, Tiziana Rossetto

University College London

Abstract: Disasters caused by natural hazards such as an earthquake can impact the lives of the affected communities in a number of ways: casualties, damage to structures, economic impact, impact on livelihood, social impact, amongst others. To build sustainable and resilient communities, building back better and self-recovery are key agenda of reconstruction and recovery plans after the disaster. In this study we present the case study of the 2015 Gorkha earthquake, covering the success stories as well as issues related to the reconstruction and recovery after the event. Calling on insights from several field visits over the last seven years, and with the Nepal government having now completed its recovery and reconstruction program, we will explore the following questions: "have the affected communities in Nepal fully recovered from the diverse impacts?", "are the livelihood and functional needs of the affected households/communities addressed/improved?", and "are these resilient and sustainable enough in the face of pandemics such as COVID-19 and increasing climate crisis such as heat waves?".

Living on "inhabitable" land: the ongoing struggle for recovery around Fuego Volcano, Guatemala

Ana Julia Cabrera Pacheco

University of Edinburgh

The path of recovery that the community of La Trinidad has taken after the eruption of Fuego Volcano in 2018 has been different from that of other affected communities. On June 3rd, pyroclastic flows destroyed the town of San Miguel Los Lotes, 6 km away. The eruption caused the evacuation of 13,000 people and the later declaration of five towns as inhabitable. We take a decolonial perspective on disaster recovery to explore how people in La Trinidad used their experience in negotiating with the Guatemalan government to demand a relocation solution that was in line with their ways of living as gente campesina. This process continues today, four years post eruption. We aim to contribute to a more situated disaster response perspective from the experience of La Trinidad in the aftermath of the eruption, which drew memories from their community history. Our initial work is a collection of this history; briefly, in 1998, they returned to Guatemala after twenty years as refugees in Mexico, struggling to find adequate land to live and thrive. Shortly after settling on the flanks of Fuego, the volcano became active again. Before 2018, their community had become accustomed to living with lahars in the barrancas during rainy seasons, and occasional pyroclastic flows extending to and burning their crops. Now, the volcano's daily eruptions are too close to their collective memories of the war. While they struggle to find new lands, they have returned to Fuego, living in an area that has been declared "inhabitable".

Social Recovery: Post-disaster Resettlement of Vulnerable Community in Nepal

Sanjaya Uprety and Barsha Shrestha

Department of Architecture, Institute of Engineering, Tribhuvan University, Nepal

Abstract: In Nepal, the 2015 Gorkha earthquake caused more than 20,000 landslides resulting in damages to over 299 human settlements and requiring the relocation of 4,720 families. The resettlement policy initiatives to relocate the vulnerable communities largely prioritized economic and

physical recoveries. Scant attention was given to socio-cultural recovery in the development of resettlement sites which has resulted in limited (or non-) occupation of houses built on such sites. This study examined the planning and design dimension of houses in resettlement sites and their socio-cultural implications for the indigenous vulnerable community. For this, the Pani Pokhari resettlement site developed for the relocation of a vulnerable indigenous "Thami" community which is located in one of the worst affected hilly towns of Dolakha district, was studied. Using a mixed method, a survey of 56 affected households was carried out to measure user satisfaction along with the selected long interviews and a focus group discussion. The study found that the organization of the interior and exterior spaces were incompatible with social, cultural, and economic use and appropriation. There is a socio-spatial variation in the user's satisfaction depending upon the differing economic status. The study concludes that the integration of socio-cultural needs in the planning and design process adds to better user satisfaction which is important for the long-term wellbeing of the community. This warrants filling up the gap in existing post-disaster resettlement policy to include the voice of the community.

1.2 Future visioning for risk resilience and development

Tomorrow's Cities Hub

Session leads: Mark Pelling University College London, Eva Filippi University of Bristol, Jon Ensor, University of York/SEI, Bosibori Baraki Kounkuey Design Initiative, Dilli Poudel, SAIS

Location: The Training and Skills Room

Description: Three papers and open discussion on (1) methods for inclusive visioning of risk and development futures (2) experiencing of multi-stakeholder visioning from Kathmandu bringing together community and city level actors, (3) experiences from Nairobi of future visioning in diverse slum and squatter settlement communities. This will be followed by an open session to bring in experiences form the audience and Q and A. The session can be delivered online if needed but would likely be a hybrid session including online presentation from overseas colleagues based in Kathmandu and Nairobi.

12:45-13:30 Lunch

13:30-15:00 Second parallel sessions

1.3 Whose recovery? Recognising and supporting the voices of disaster-affected people

Sessions leads: Hazel Marsh, Roger Few, Armijos Burneo, Mark Tebboth.

University of East Anglia (UEA)

Location: The Conference Room

Session Description: In responding to disasters, traditional state approaches tend to prioritize economic recovery and the rebuilding of physical infrastructures. The intangible aspects of recovery, such as psychosocial wellbeing, community coherence, are often overlooked, contributing to the deepening of social and economic inequalities and the perpetuation of environmental and cultural injustices. In this session, we explore how innovative disaster research can create opportunities for disaster-affected people to define their own needs and

priorities, how the capacities, knowledge, and skills of such communities can be supported and strengthened, and how their voices can effectively shape decision-making processes.

Presentations:

The reconstruction of vulnerabilities: intersectional narratives of rebuilding in Khokana after the 2015 Nepal earthquake

Rachana Upadhyaya, María Evangelina Filippi, Ryerson Christie,

University of Bristol, School of Sociology, Politics and International Studies

Abstract: Conventional social vulnerability frameworks emphasise the differential impacts of disasters on the basis of identifiers such as income, gender, age, disability, and geographical location. This has led to a categorical understanding of vulnerability underpinned by the identification of discrete socio-demographic variables that define and disaggregate social groups in static and monolithic ways. Drawing on intersectionality approaches from feminist literature, this paper proposes thinking about vulnerabilities across multiple axes of marginalisation intersecting with each other over time and space. Using the case of Khokana, an expanding peri-urban Newari town in the outskirts of the Kathmandu Valley, we ground our intersectional analysis of vulnerabilities in the 2015 Nepal earthquake reconstruction process. The generation of qualitative data was organised around two phases: an exploratory phase (2020) aimed at identifying meaningful categories of differentiation through participant observations and interviews, and a focused phase (July - August 2021) aimed at unpacking the interplay of these categories using an intersectionality wheel in a focus group and individual interviews. Preliminary findings bring to the fore the unexplored narratives of women and their intersectional identities, often unrecognised in blanketed post-disaster reconstruction policies in Nepal. Unravelling the homogenous category 'woman', our research illustrates that historical caste segregation, contemporary rural-urban migration, recognition of citizenship rights, and a patriarchal system overriding land ownership, intersect to reconstruct women's vulnerabilities after disasters. We conclude that intersectionality provides pathways towards recognising marginalised voices in disaster reconstruction scholarship and practice.

Burn, flood, rebuild, repeat: the realities of living in persistent harmscapes

Anna Wilson[1], Skhue Ncube[1], Aileen Ireland[1,] Jen Dickie[1] and Niall Hamilton-Smith[2],

1. University of Glasgow
2. University of Stirling

Abstract: Contemporary state approaches to disaster management and recovery often emphasise resilience and the need to "bounce back". Such approaches are, perhaps unconsciously, predicated on two core notions: first, that the conditions of a locality and the people within it prior to a disaster are ones that one would want to revert to, and second, that disaster is an aberration. However, the combination of two global trends means that such approaches may prove woefully inadequate. The rapid growth of informal urban settlements in many regions means many local populations are living in circumstances that are already extremely precarious. At the same time, our apparent inability to effectively contain (let alone reverse) global heating puts many such settlements at risk of environmental hazards such as water scarcity, fire and flood events.

This presentation describes research carried out with local and community-based researchers in three marginalised settlements in the Cape Flats area of South Africa. Residents in each site produced a range of visual, written and verbal texts to describe their experiences of a particular hazard (water

scarcity in the most formal neighbourhood, flooding in the most informal, and fire evens in the third). Their accounts make visible the realities of living in persistent, complex harmscapes, where sociopolitical, topological, environmental and historical forces combine to make risk a constant presence.

Community Resignification of a Red Zone: Decolonial-Participatory Research Process in Panabaj Territory (Guatemala)

Cristina Sala Valdes[1], Teresa Armijos Burneo[1], Diego Antonio Reanda Sapalu[2], Alex Petzey[2], Eliza Calder[3] and Jeremy Phillips[4]

1. University of East Anglia

2. Community researcher

3. University of Edinburgh

4. University of Bristol

Abstract: Territory can be defined not only as a geographic space, but also, from an ontological perspective, as a community space that enables relationships among its inhabitants; from the links between the community, its past, and its future. It is recognized that in post-conflict peacebuilding processes, actors seek to re-signify different spaces that have been linked to war (Björkdahl and Kappler, 2017:6, 10 in Armiño, 2020:157) as a way to re-build their life projects. We will argue that in the aftermath of a disaster event (and in a continuum in time) in the so-called red zones (an exogenous label made by institutional actors but the community), this process of resignification is also present, although under-researched and therefore under-represented. This presentation will focus on the collaborative and interdisciplinary project "Ixchel: Building understanding of the physical, cultural and socio-economic drivers of risk for strengthening resilience in the Guatemalan cordillera". One of the work packages of this project is aimed at understanding community experiences of risk by unfolding a decolonial and participatory research process led by community leaders from formal and informal associations. One of the research processes is taking place in Panabaj Canton (Santiago Atitlan, Guatemala), a community that has experienced both war and disaster events, what makes their relation with the territory a very tensioned one but, at the same time, deeply rooted into it. Our research process has been fuelling a dialogue of knowledges that is creating the space, from bottom up, to gather different kinds of community knowledges, experiences and expertise, which is unearthing a profound sense of belonging and a process of resignification of their k'aslemaal (territory).

What we don't talk about when we talk about recovery

Nihal Ranjit[1], Vineetha Nalla[1], Teja Malladi[1] and Swathi Alse[2]

1. Indian Institute for Human Settlements, Bangalore, India

2. Independent Illustrator, Bangalore, India

Abstract: When it comes to representing the voices of disaster-affected people (DAPs), academic articles and media reports rarely manage to capture the varied narratives of everyday risks and vulnerabilities. Individual experiences are often reduced to 'data' or 'evidence' to further an argument or apolitical narratives about DAPs. Robust projections of an increase in frequency and severity of climate-related extreme events have meant that experiences of these realities are becoming more widespread and universally relevant. This prompted us to create a graphic anthology – Afterwards – in an attempt to communicate disaster research in a non-academic and accessible format both to our

participants as well as the wider public. This graphic anthology illustrates stories of disaster impacts and recovery from India and is based on a three-year research project, which explored experiences of post-disaster recovery in flood- and cyclone-affected settlements in three Indian states. At UKADR 2022, we aim to present illustrated narratives of DAPs residing in a resettlement colony on the outskirts of a coastal city in India and their everyday challenges. Although fictionalised, the narrative, dialogue, and experience of the characters are based on the data collected as part of our research. It ties together the experiences of DAPs who were resettled, often against their will, to new settlements that were built overlooking their recovery needs and priorities.

1.4 Innovative research to build capacity of East African communities to natural hazard

Session Leads: Flavia De Luca[1], Jitendra Agarwal[1], Juliet Biggs[1], Ignasio Ngoma[2], Anastasios Sextos[1]

1. Univestiy of Bristol

2. Malawi University of Business and Applied Science

Location: The Training and Skills Room

Session Description: This session will focus on integrating resilience to natural hazards into policies for long-term infrastructure development and short-term emergency management. It will also explore methodological synergies for multi-hazard approaches to build community resilience. This session aims to disseminate the results of project PREPARE and SAFER PREPARED operating in East Africa. Furthermore, it will also highlight the research and innovation activities delivered with East African communities in pre-pandemic and pandemic phases.

Presentations:

Innovative research towards building capacity in Malawi: a smart e-tool for measuring community resilience

Jitendra Agarwal, Anastasios Sextos, Rishi Parajuli, and Maria Xanthou

Department of Engineering, University of Bristol

Abstract: Pre- and post-disaster management efforts usually focus on the sustainability of school infrastructure and on policies targeting shelter, recovery, and retrofit. The modern approach to pre- and post-disaster management includes community resilience as a key concept and a prerequisite to human welfare. Community resilience pertains to every aspect of human existence (psychological, physical, social, financial, and environmental). It results from the synergy among society, infrastructure, economy, and environment within the geographical limits of a specific area. Community preparedness in dealing with shocks and stresses is closely related to this synergy. Towards this goal, PREPARE Africa is a University of Bristol-based multidisciplinary research project prompting the need to examine community resilience enhancement through a multidisciplinary, participatory, and critical approach. Our methodology is based on a bottom-up inclusion of all major contingents and stakeholders of Malawi educational communities such as students and parents, teachers, headteachers, and school management committees. The medium for including end-users, decision- and policy makers alike is an e-tool our project team has developed for evaluating resilience

according to the major stakeholders' experience, knowledge, and preparedness. The e-tool is a mobile app with sets of questions that our research team put together to address different aspects of community resilience. Therefore, we 'll focus on the efficiency of the e-tool to measure community resilience and to yield reliable metrics of a concept with multiple parameters such as social, economic, geographical, governmental. The e-tool feeds on the responses of all stakeholders who contribute to an overall education resilience index in the form of quantifiable and qualitative result. An automated score resulting from this e-tool, after being used as an app, provides an overview of the current school resilience status, which could be received by the school head or the state agency. The app can be easily and equally used by all members of a school community in order to conduct and complete the survey. This method of measuring community resilience contributes to the school self-assessment at scale and, ultimately, track their resilience for policy and planning.

Earthquake Resilient Communities in East Africa: a research partnership for success

R. De Risi, J. Agarwal, J. Biggs, F. De Luca, Z. Dulanya, A. Fagereng, N. Giordano, K. Goda, I. Kafodya, P. Kloukinas, H. Mdala, I. Ngoma, V. Novelli, R. Parajuli, A. Sextos, E. Voyagaki, L. Wedmore, M. Werner, J. Williams, M. Xanthou

Abstract: Building resilient communities against natural hazards is imperative, especially in seismic-prone developing countries, where the scarcity of basic data is coupled with an intrinsic vulnerability of the built environment. On the one hand, data scarcity avoids the development of state-of-the-art models; on the other hand, it leads to a low-risk perception. Therefore, risk communication and eventually awareness become challenging issues too.

To overcome such existing barriers, the EPSRC projects PREPARE and SAFER if PREPARED started working on the development of co-produced tools and guidelines for enhanced disaster preparedness in close partnerships with local governmental and academic institutions. The plan was to adapt the most advanced risk assessment methodologies to the local context making the most of the available data and acquiring new information where possible. The ultimate aim was to inform future hazard mapping and new building guidelines, also proposing suitable low-cost engineering solutions.

Those projects led to a larger partnership with several East African institutions. This partnership helped to share the experience of the previous projects and facilitated the discussion about challenges that still need to be addressed.

This presentation presents the lesson learned during the research journey and follows the constructive outcomes of the new broader partnership. The main goal is to communicate and transfer the body of research and the baggage of experiences to the wider research community ensuring documentable impacts and facilitating future initiatives.

A tool to increase seismic risk awareness in Malawi.

Raffaele De Risi

Department of Civil Engineering, University of Bristol

Abstract: Seismic risk is computed by convoluting seismic hazard, vulnerability and exposure. Such a convolution requires multidisciplinary competencies, and it is not straightforward when the models associated with the single components are unavailable. On the contrary, risk assessment becomes a simple operation when all the models are ready-to-use and pre-elaborated to be convoluted with simple functions. Therefore, a tool with readily available risk components can simplify the convolution for the inexperienced user. Seismic risk results can be visualised with maps or loss curves. Loss curves are particularly helpful for comparing scenarios, especially if alternative mitigation measures are

implemented. Risk maps, however, provide a graphical representation allowing fast identification of risk hotspots.

This abstract presents a new Matlab-based Graphical User Interface (GUI) as a plug-and-play tool to compute seismic risk for schools in Malawi. The app uses three primary sources of data: exposure data, hazard maps, and vulnerability models. Specifically, the exposure data consists of the shapefile of the locations of primary and secondary schools in Malawi. The hazard maps are those provided by the Global Earthquake Model (i.e. GEM) for 475 years and 2475 years return period, respectively. Hazard values for all other possible return periods are computed using a well-consolidated fitting approach. Such a pre-computation of hazard allows an interesting discussion about the scarcity of data in developing countries. Finally, the vulnerability models consist of fragility curves that have been computed for typical Malawian buildings. The tool returns the risk curves in terms of safety factors for the desired set of schools in Malawi at the country level for a specific value of hazard corresponding to a user-defined return period. The tool also produces a report providing useful graphical and numerical representations that can improve awareness about seismic risk, as the results are simple to understand and can be replicated for many scenarios with little computational effort.

15:00-15:30 Tea

15:30-17:00 **Early Career Research Network Session and possible side events**

1.5 UKADR ECR Network

Session Description: This session is aimed at officially launching the UKADR ECR Network to the broader disaster community. Over the last eight months, we have been building this network among a group of 'self-identified' early career researchers. This session will include four presenters and a discussion.

17:00 UKADR Annual General Meeting

The Annual General Meeting of the UKADR will take place between 17:00-18:00 everyone is welcome to join the meeting.

19:00 Evening drinks reception at ECCI – everyone welcome!

We are hosting an evening drinks reception from 19:00 at the ECCI please do join us and celebrate our research and practice together.

Day 2: UKADR Conference 2022

09:00-09:30 Welcome and Keynote Address

Professor Lindsey McEwen

Director of the Centre for Water, Communities and Resilience (CWCR), University of the West of England.

Key Note: Voices in a Pandemic (VIP-CLEAR): using deep mapping to explore children's changing perceptions and experiences during COVID-19 'recovery'

09:30-11:00 Parallel Sessions

2.1 Multi-hazard risk management approaches across disaster risk management and climate change adaptation

Ekbal Hussain and Melanie Duncan British Geological Survey, Joel Gill Cardiff University, and Marleen de Ruiter Vrije Universiteit Amsterdam

Location: The Conference Room

Session Description: The recent UNDRR Global Platform highlighted the need for countries to be able to better assess the risk associated with cascading and compounding hazards, and complex crises. The platform called for strengthened assessment of biological, environmental and technological hazards in line with a multi-hazard approach to disaster risk management (co-Chair Summary, UNDRR, 2022). In addition to the complexities arising from interconnected hazards, recent events such as the covid-19 pandemic and the European floods have shown that disaster risk is systemic issue, which necessitates a more holistic approach to understanding and managing risk. However, despite progress in multi-hazard-risk research there remains a gap between research and implementation, and there is insufficient evidence showing how scientific research advances have led to risk reduction. It is therefore timely to consolidate and share learning, set research priorities and ensure the needs of stakeholders and partners are addressed. Within this session, we would like to discuss good practice in the practical implementation of research for risk management. We welcome presentations spanning all elements of disaster risk management and climate change adaptation through a multi-(hazard)-risk lens/approach.

Presentations:

Vulnerability and risk assessment of social-ecological systems in the Yangtze River Delta and the Pearl River Delta of China.

Yuting Peng, Natalie Welden and Fabrice Renaud

University of Glasgow

Abstract: Due to increasing population pressure and urbanization, as well as global climate change impacts, some coastal river deltas are increasingly becoming increasingly exposed, vulnerable, and at risk to natural hazards. Comprehensive assessments of exposure, vulnerability and risk allows deriving the risk profile of deltas, which is critical for developing risk reduction approaches and adaptation

policies and strategies. Current vulnerability and risk assessments focus more on social vulnerability, do not systematically identify interactions between social and ecological systems, or fail to balance ecosystems and social systems. We argue that ecosystem services, which link ecosystems to human well-being, can be used to better characterize the mutual dependencies between society and the environment within risk assessment frameworks. We propose an indicator-based vulnerability and risk assessment framework for social-ecological systems of delta environments that integrates the role of ecosystem services. By systematically incorporating ecosystem service indicators, this study also provides an indicator list based on a literature review focusing on river deltas. The proposed framework of vulnerability and risk assessment in deltaic social-ecological system can provide an effective tool to address the vulnerability and risk in specific deltas. It can serve as a guide for assessing the multi-hazard risks of social-ecological systems within and across coastal deltas and allows to target the development of management measures and policies aimed at reducing risks to natural hazards."

Progress Review: Compound Extreme Weather Events 10-Years On.

Lou Brett[1], Christopher White[1], Daniela Domeisen [2], Bart Van Den Hurk[3], Philip Ward[4], and Jakob Zscheischler[5]

1. Department of Civil and Environmental Engineering, University of Strathclyde, Glasgow, UK
2. Department of Environmental System Science, Institute for Atmosphere and Climate, ETH Zurich, Switzerland
3. Deltares, Delft, Netherlands;
4. Institute for Environmental Studies (IVM), Vrije Universiteit Amsterdam, Amsterdam, Netherlands;
5. Department of Computational Hydrosystems, Helmholtz Centre for Environmental Research, UFZ, Leipzig, Germany.

Abstract: Traditionally, research has focused on singular hazards; recently, there has been a shift towards considering multi-hazard risk. This shift is important because compound events – the combination of two or more drivers and/or hazards, leading to societal or environmental risk – can result in more severe impacts than single hazards. The IPCC SREX (2012) report was the first concerted effort to synthesise existing compound 'thinking', seen across multiple fields, into the explicit research focus of compound events. By reviewing existing literature, this talk discusses progress within compound events research since the IPCC SREX (2012) report; and highlights research opportunities for the coming 10-years. Geographically, little research has been conducted within Africa and South America, posing clear research opportunities. Furthermore, spatially compounding events - where hazards across multiple connected locations cause aggregated impacts - remains relatively understudied. Spatially compounding events are important for managing risk and disaster funding across different governing authorities. Additionally, whilst specific hazard combinations, such as dry-hot events, have been well studied; other combinations, such as snowfall followed by hot events, have been less studied, indicating further directions for future work. As energy generation transforms to renewable sources, understanding combinations of (extreme) weather events that could impact energy generation, such as cold and low-wind events, is also a significant growth opportunity. Finally, by better utilising impact datasets/models of extreme compound events on infrastructure, agricultural and human health can be fully appreciated. This talk has highlighted both the importance of, and future opportunities within, compound events research.

Multi-hazards and emergent risks in northern Europe's remote regions

Christopher J. White [1], Matthew J. Roberts [2], Katy Freeborough [3,] Hayley J. Fowler [4], Graziella Devoli[5], Michael Cranston [6], John Douglas [1]

1 University of Strathclyde, Glasgow, UK

2 Icelandic Meteorological Office, Reykjavík, Iceland

3 British Geological Survey, Nottingham, UK

4 Newcastle University, Newcastle, UK

5 Norwegian Water Resources and Energy Directorate, Oslo, Norway

6 Scottish Environment Protection Agency, Stirling, UK

Abstract: Across northern Europe, natural hazards are becoming more pervasive in a warming climate. As they do, and as other emergent risks, including compound events and cascading disasters, start to affect parts of this region where they have not before, transport links and supply chains, ecosystems, agricultural yields and forestry are increasingly being impacted. The impacts of these events is often greatest in the most vulnerable and remote regions, affecting people, economies and communities and the infrastructure that supports and connects them.

Two projects (i) EMERGE: Multi-hazards and emergent risks in Northern Europe's remote and vulnerable regions, funded by NERC (NE/W003775/1), and (ii) Building resilience to interacting extreme weather-driven hazards and cascading impacts, funded by Scotland's National Centre for Resilience (NCRR2022-004), bring together experts to explore interacting hazards and their emergence across Scotland, Iceland and Norway.

In this presentation, we explore some of the unique challenges posed by the emergence of compounding and cascading risks of weather-driven hazards in remote regions. We present findings from a series of ongoing workshops. We will use case studies to demonstrate the changing nature of natural hazards and their unique challenges in remote regions. We will explore the increasing use of citizen science observations, including a network of independent rainfall observers and crowd sourced observations of hazards, and identify the key science, observation, prediction and monitoring gaps.

The outputs from the projects will form the basis of a new forum that fosters open scientific collaboration and information sharing relating to complex extreme events, and identifies needs and opportunities specific to in remote regions.

Stochastic modelling for multi-hazard resilience of school education systems

Ahsana P. Vatteri[1], Li Sun[1], Dina D'Ayala[2], Dexter S. Lo[3], Anabel A. Abuzo[4] and Jefferson R. Vallente Jr-[5]

1,2. Department of Civil, Environmental and Geomatic Engineering, University College London (UCL)

3,4,5. XU Engineering Resource Center, Xavier University - Ateneo de Cagayan

Abstract: Schools play an integral role in the healthy existence and advancement of communities around the world. Multiple hazard events can induce considerable damage to school and associated infrastructure embedded in a community. Depending on the level and extent of damage to buildings and accessibility through road networks, school compounds can be classified as immediately usable or fully functional, partially functional or totally unusable over a given period of time, while repairs or reconstruction take place. Some of the schools might also be used as shelters or evacuation centers. Inevitably, the education process of students attending these schools is disrupted.

The probability of any given school being able to deliver the education service required is affected by numerous uncertainties, which shall be accounted for. This paper presents a probabilistic resilience framework, combining Agent-based (AB) and Bayesian network (BN) approaches for system performance analysis. The framework estimates first, the disruption to education due to multiple hazards to quantify the resilience of school-road networks by modelling causal effects and correlation between different interacting factors from physical, functional and social vulnerability aspects of the infrastructure. Secondly, it explores strategies for recovery plans by updating the system disruption according to decisions taken by two agents, namely the school and road operators. The paper presents the preliminary outcome of this framework being developed under the UNESCO Chair on Disaster Risk Reduction and Resilience Engineering at UCL, based on a case study in Cagayan De Oro in the Philippines, which is exposed to earthquakes and flooding.

Developing a harmonized strategy for multi-hazard risk reduction and resilient societies in Europe

CORE project (science & human factor for resilient society) approach through human, social, societal, and organisational aspects in Europe

Malith Senevirathne, Dilanthi Amaratunga, Richard Haigh

Global Disaster Resilience Centre, University of Huddersfield, UK

Abstract: Earthquakes and tsunamis are unpredictable and rare incidents which can potentially develop into natural disasters causing the highest number of victims per event. The probabilistic tsunami risk analysis methods have been proven successful in reducing tsunami risks, however, the published literature demonstrates large gaps and uncertainties exist in many phases of the risk analysis methods, especially in hazard perception and theoretical foundation. The methods contain varying maturities, from advanced probabilistic tsunami hazard analysis to less mature probabilistic risk analysis. These include the limitations in identifying multi-hazard perspectives of vulnerable categories, cascading effects, risk information/misinformation and warning mechanisms. Even though the European coastal cities such as Cadiz, and the banks of the Lyngen are exposed to tsunami risks, the official risk reduction strategies do not comprehend the potential threat that a rapid onset of events could pose to the exposed local population and livelihoods. This highlights the need for an integrated regional Tsunami Early Warning System, which reduces the vulnerability of regions exposed to rapid onset hazards in Europe (EU). Under this viewpoint, the CORE project funded by the Horizon 2020 program investigates such complex characteristics, to develop a harmonized resilience approach for strengthening the crisis management capacities of EU countries via the involvement of transdisciplinary scientific communities. This research aims to outline how tsunami risks could be assessed to yield important information to systematically improve the societal response capacities of EU cities and their inhabitants to potential multi-hazardous risks. A community resilience assessment framework is applied to focus on the Sumatra, Indonesian (2004) and Tohoku, Japan (2011) tsunami events as case studies to highlight the practical use and the challenges such systems must deal with.

2.2 Innovative governance mechanisms for co-produced risk management and climate change adaptation

Session leads: Soledad Garcia Ferrari, University of Edinburgh; Harry Smith, Heriot-Watt University, Dr Amelia Bain, University of Edinburgh, Stephanie Crane de Narváez, University of Edinburgh, Eliza Calder, University of Edinburgh,

Location: Training and Skills Room

Session Description: This session aims to explore the scope of action-research to develop governance mechanisms to consider the vulnerabilities of socio-environmental systems, driving projects which strengthen community resilience and promote a more equitable distribution of the costs of disaster risk management and climate change adaptation.

Presentations:

Co-developing a gender and socially inclusive flood Early Warning System in Baguio City, Philippines

Mirianna Budimir, Practical Action.

Abstract: To ensure an effective Flood Early Warning System (FEWS), it has to be people-centric and work for everyone. In a transformative approach, the FEW systems and processes are designed throughout in a way that centres and empowers those who might otherwise be an afterthought, or not considered at all. However, in practice there are often major gaps in many stakeholders' understanding and willingness to participate in efforts to develop a transformative system.

Truly transformative actions need to be based on a process that is grounded firstly in an understanding of the needs of the most vulnerable and thereafter, developed in a collaborative manner with FEWS stakeholders as the system evolves. This presentation will share lessons learned from a case study in Baguio City, Philippines. The project applied a gender-sensitive lens to better allow for appropriate, applicable, and timely early warning to those who might be left behind. The project undertook a research study, and associated recommendations and actions in partnership with city officials responsible for the implementation of the Flood Early Warning System in Baguio City. By implementing all the actions specifically aligned to each recommendation, the FEWS will take a gender transformative approach to the design and implementation of the FEWS to ensure that the FEWS is effective for everyone who needs it, leaves no one behind, and supports equitable and inclusive risk reduction and resilience.

Integrating Climate Change Adaptation and Disaster Risk in the Irish Emergency Planning System

Dug Cubie,

University College Cork

Abstract: In Ireland, there is a portfolio of policies, plans, strategies and reports that address directly and indirectly the consequences of climate change and emergency planning. However, emergency management and climate change adaptation are currently two discrete systems for governance, management and coordination at the national level. There is no nationally-shared understanding of what constitutes 'risk' and 'resilience' to short, medium, and long term change, and how best to develop an integrated and holistic approach to both the long term climate change adaptation needs and the more immediate emergency risk management needs. This presentation will provide an overview of the findings of a report published in August 2022 by the Irish Environmental Protection Agency entitled: "Integrating Climate Change Adaptation and Disaster Risk in the Irish Emergency

Planning System". The report identifies how existing approaches to disaster risk reduction, disaster risk management and climate change adaptation in Ireland are juxtaposed, and concludes that identifying ways to promote coordination and to align incentives, priorities and planning processes will facilitate a more holistic and comprehensive approach to disaster risk management at all levels of government. Drawing on the Horizon 2020 ESPREssO project, the report provides a high-level roadmap of guiding principles and a series of priority actions that the government and other stakeholders may wish to consider for achieving greater coherence and integration between the emergency management and climate adaptation frameworks in Ireland. The PIs for the project were: Dr Martin Le Tissier (UCC MaREI Centre) and Dr Dug Cubie (UCC School of Law).

Exploring the scope and challenges of public participation in Nepal's disaster governance

Ashrika Sharma[1], Kate Donovan[1], Sukanya Krishnamurthy[1] and Maggie Creed [2]

1.University of Edinburgh

2. University of Glasgow

Abstract: Public participation in Disaster Risk Reduction (DRR) provides opportunities to integrate local and scientific knowledge on hazard risks and to identify strategies to reduce exposure to these hazards through improved planning and policy decisions. Disengagement between local communities and decision-makers may lead to uninformed decisions that increase future risk and disempowers communities. Nepal transitioned into a federal democratic nation in 2015. It has undergone decentralization as part of the federal reform process, including its efforts towards DRR, with greater autonomy to local governments in policymaking. Based on interviews with key DRR practitioners in Nepal, we explore the scope and challenges of public participation within Nepal's context of federalization, the institutionalization of Disaster Risk Reduction and Management in municipal bodies, and participatory governance. Even though federalized disaster governance has been promoted as a mechanism that encourages public participation and provides space for marginalized people to engage in decision-making, this has not guaranteed a better government response to public participation in DRR. Although most policies encourage the creation of spaces for public participation, this research reveals that these spaces are limited and token gestures more than serious processes with significant implications. We caution that the growth in municipal powers and responsibilities resulting from federal reform does not necessarily translate to greater public participation. The devolution of authority needs to be accompanied by legal frameworks and guidelines to deliver the services, for which the local governments have now been made responsible.

Alliance for Resilient Urban Communities Social Enterprise (ARUCOSE): experience in South East Asia

Andres Payo[1], and Nguyen Quoc Dinh[2],

1. British Geological Survey, Nottingham, UK;
2. Vietnam Institute of Geosciences and Mineral Resources (VIGMR)

Abstract: ARUCOSE stands for Alliance for Resilient Urban COmmunities Social Enterprise. We increase the resilience of vulnerable urban residents to natural-human hazards by empowering social entrepreneurs to grow their business ideas. This started as one of twenty networks that bring together UK researchers with collaborators from across the developing world to tackle global challenges. The Network focus on the need and ability to evaluate and increase the resilience to natural-human hazards of increasingly vulnerable populations in the hyper-expanding margins of cities, specifically in Vietnam and more generally in SE Asia. All started with the Hanoi Workshop where we tackled the concept of cascading human-natural hazards in the context of a coastal megacity catchment and

specifically within the Red River-Hanoi-Delta catchment. In April 2019, we started a project aiming to better understand the dynamics of resilience of Hanoi and Metro Manila cities. In December 2019, we started a two-year project funded by the UKRI EPSRC funded project "Resilience to Coupled Human-Natural Multihazards Network". We have already created the network and identified the services that we would like to offer. During this session we will present our experience of incubating the first cohort of 10 social enterprises in South East Asia, including ARUCOSE's business plan and next steps.

Transformative methods of data co-production for risk management in underserved neighbourhoods

Philipp Ulbrich,

Urban Big Data Centre, Urban Studies, School of Social and Political Science, University of Glasgow

Abstract: The use of citizen-generated data to inform disaster risk management governance and policymaking for Climate Change Adaptation has been shown in various contexts and applications. With its potential for enhanced availability of otherwise tacit community knowledge, and rich, timely and granular information, the case for citizen-generated data for decision-making in risk and sustainable development is clear and compelling. However, while existing literature discusses the relation between citizen participation for data generation, and participation in risk management governance, the extent and methods through which the co-production of data for disaster risk management leads to changes in governance is still relatively unexplored. With the case study of two socio-spatially marginalised communities living in self-constructed neighbourhoods located on the slopes of Niterói-Brazil and Medellín-Colombia, this presentation reflects on the extent to which community-generated data with open digital platforms enhances their ability to meaningfully (as opposed to extractively) use the data to self-empower and negotiate with municipal authorities regarding urban service provision and risk reduction. This presentation thus provides an initial insight into the parameters of the role of co-production of community-defined risk-related data and changes in governance in the global South, further pointing to a research agenda which focuses the intersection between power, the function and role of data, and the transformative impacts of community data generation for disaster risk management governance and Climate Change Adaptation."

Strengthening built asset data integration in community flood resilience planning and recovery: contemporary issues and challenges.

Pavithra Rathnasiri, Onaopepo Adeniyi, Niraj Thurairajah

Department of Architecture and Built Environment, Faculty of Engineering and Environment, Northumbria University, Newcastle, UK

Abstract: Flooding has made a considerable demand for improving built assets and overall community resilience. The need to mitigate flood effects has been met with different efforts. Data-driven approaches are tremendously becoming important in this regard, due to their inherent technological capabilities to understanding the dynamics of flood-induced impacts on built assets and communities. Data-driven approaches also aid the understanding of the impact of built asset characteristics alongside community attributes on resilience and recovery. It has a proven ability to evaluate the complex nature of flooding and facilitate enhanced resilience decisions. However, the use of built asset data for built assets as well as community flood resilience planning and recovery is surrounded by issues and challenges. This study, therefore, aimed to identify contemporary issues and challenges associated with built asset (built environment) data for built asset flood resilience and community recovery through an expert survey. The expert interviews conducted with 12 participants revealed the existing challenges mainly relating to data acquisition, classification, management and utilization.

Overcoming these challenges is important to facilitate a resilient future in terms of built assets and overall community resilience. The findings of this study are significant for decision-makers to create data-inspired plans for resilient built assets in communities.

11:00-11:15 Coffee and tea

11:15-12:45 Parallel Sessions

2.3 Managing global uncertainty with effective warnings

Session Leads: Carina Fearnley and Ilan Kelman, University College London

Location: The Conference Room

Session Description:

Presentations:

An interdisciplinary approach to developing a regional Landslide Early Warning System in India: experiences and learnings from the LANDSLIP project

Emma Bee, Bruce Malamud, George Adamson, Christian Arnhardt, Mirianna Budimir, Claire Dashwood, Amy Donovan, Saibal Ghosh, Ramesh Guntha, Phillip James, Rabisankar Karmakar, Raj Kumar M, Sumit Kumar, Alessandro Mondini, Akshaya Kumar Mishra, Robert Neal, Anshu Ogra, Praful Rao, Maneesha V. Ramesh, Hemalatha T, Ramesh, Helen Reeves, Joanne Robbins, Mauro Rossi, Gargi Singh and KR Viswanathan.

(1) British Geological Survey.

(2) King's College London, UK.

(3) Practical Action (UK and India).

(4) Cambridge University, UK.

(5) Geological Survey of India.

(6) Newcastle University, UK.

(7) Consiglio Nazionale delle Ricerche, Itlay.

(8) Met Office, UK.

(9) Save The Hills, India.

(10) Center for Wireless Networks & Applications (WNA), Amrita Vishwa Vidyapeetham, Amritapuri, India.

(11) Jacobs, UK.

Abstract: The five-year LANDSLIP (LANDSLIde multi-hazard risk assessment, Preparedness and early warning in South Asia) research project engaged an interdisciplinary and international team of scientists and practitioners to develop a prototype regional landslide forecasting and early warning system (LEWS) for hydrologically related landslides in two case study regions of India, the Nilgiris and Darjeeling. Central to the LEWS was a common and shared understanding of its conceptual framework. In other words, what components were required to developed a successful LEWS and how did they interact. The aim of the conceptual framework was to help ensure all partners had a shared vision and understanding, and that the prototype LEWS itself would enable insights that would lead

to positive behavioural change e.g. by recipients of the daily landslide forecast bulletins (i.e. District Authorities).

Here we present our journey and reflections on the development of the LANDSLIP prototype landslide early warning system and its component parts, which includes a decision-support information dashboard and protype daily landslide forecast bulletin. Our team consisted of researchers from the British Geological Survey, Kings College London, Amrita University, Consiglio Nazionale delle Ricerche, Practical Action, UK Met Office, and Newcastle University and the conceptual framework was developed in collaboration with in-country partners (e.g. Save the Hills, Keystone, National Centre for Medium Range Weather Forecasting (NCMRWF) and District Management Authorities). As the nodal agency for landslides in India, the Geological Survey of India (GSI) partnered with the project and provided a focal point for the prototype LEWS.

Developing forecast information for institutional decision-makers

Mirianna Budimir

Practical Action

Abstract: Advances in forecasting science and technologies are increasing the availability of early warning information that has the potential to save lives, livelihoods, and reduce losses from natural hazard-related disasters. Forecast products are used by institutional stakeholders to make decisions in advance of an event within their official decision-making capacities such as government officials or civil society actors operating in a risk reduction, preparedness, or response roles. However, there remains a gap between the production of forecasts and warnings and the operational use of such information by institutional stakeholders. Many of these issues stem from underlying process gaps such as lack of collaboration between disciplines, and gaps in engaging with end user needs. This presentation will share key learning from translating scientific forecasts into useful information, in particular on both the content and the process of developing forecast bulletins for institutional decision-making. Insights will be shared based on a review of academic and grey literature and key informant interviews with operational forecasters covering a range of hazard types (floods, landslides, volcanoes, cyclones, drought) and locations (Latin America, Africa, Asia, Europe) within and beyond the FCDO and UKRI-NERC funded Science for Humanitarian Emergencies and Resilience (SHEAR) programme. The presentation will cover the need (and common pitfalls) of developing forecast information for institutional stakeholders; key steps, skills, and processes for developing forecast information; real-world examples of good or bad practice; and useful resources for practitioners to support the development of effective and appropriate forecast products for institutional stakeholders.

A novel approach for monitoring bridge scour hazard and giving flood warnings

Eleonora Perugini, Enrico Tubaldi, Euan MacDonald, Douglas Bertram, Christopher White

Department of Civil & Environmental Engineering, University of Strathclyde, Glasgow, UK

Abstract: Flood-induced bridge scour, the material excavation around bridge foundations due to the erosive action of flowing water, is a complex phenomenon that involves fluid-structure interaction, theory of turbulence and sediment transport. The large number of empirical formulae and theoretical studies developed during the past years highlight the wide uncertainty related to the physics of the scour phenomenon. Nevertheless, flood induced scour is one of the most common causes of bridge failure in the UK and worldwide, resulting in substantial disruptions to road and rail transport infrastructure networks, huge reconstruction costs and casualties. Transport operators usually make decisions concerning bridge management by visually comparing the water level with a flood level marker fixed in correspondence of the level expected under a 200yr return period flood. This does not

provide a direct measure of the presence and extent of scour hole and does not consider the temporal evolution of the scour. This work illustrates the development of a demonstrative platform for real-time scour evaluation. The proposed platform exploits data from low-cost non-contact sensors for monitoring river flow properties and advanced state-of-the-art models for describing the temporal evolution of scour. The platform can be adapted to the available data from sensors. The developed platform could be used by transport operators to take optimal decisions concerning issuing flood warnings to communities and implement actions to reduce bridge vulnerability. The project has received funding from the EU's Horizon 2020 programme (RAMOBRIS n° 101030511) and the National Centre for Resilience (NCR).

Innovative approaches for Flood Early Warning systems in Nepal

Januka Gyawali[1] , Maggie J. Creed[2], Dharam R Uprety[1]

1.Practical Action, Nepal

2. University of Glasgow, UK

Abstract: Nepal ranks tenth highest country in the world in terms of exposure to fluvial (riverine) flooding. Every year, during the monsoon season – June through September – fluvial flooding causes loss and damage to buildings and infrastructure, and causalities in Nepal, particularly in the flat Terai region. Similarly, the hilly and mountainous regions are prone to flash-floods, flood-induced landslides, and Glacial Lake Outburst Floods (GLOF). Flood early warning systems have been established in the major flood prone-basins across the country to save lives and livelihoods, and minimise loss and damage. Although community-based flood early warning has existed for many decades, if not centuries, formalisation of the flood early warning systems (FEWS) began in the 1990s for GLOF and in 2002 for fluvial and pluvial flooding. During the last two decades, FEWS have helped governments and communities to shift from a reactive approach to a proactive, people-centred approach to flood risk management. A shift from "watch and warn" to web-based telemetric systems and people-centred citizen science has improved both flood warning accuracy and lead times for vulnerable communities. This research explores how flood early warning systems have evolved, improved, and become instrumental in saving lives and livelihoods, and reducing flood damage in Nepal. We will discuss innovative approaches for flood early warning systems, advantages and benefits of different FEWS, and identify opportunities and gaps to improve the system further.

A state of disaster preparedness and management in Africa – A systematic Review

Maria Unuigbe[1] and Gihan Badi [2]

1. University of Central Lancashire
2. Chartered Institute of Architectural Technologists

Abstract: The international community regards sustainability as a necessity and albeit the empirical evidence to support this, to some it is a luxury as the drive to meet basic human needs goes beyond convenience but is a matter of wellbeing and survival. This is the case in most, if not all developing countries particularly in the Global North that are currently experiencing severe electricity, food, and water poverty, combined with rapid population growth and urbanisation that is placing increasing demand on natural resources, disrupting their regular weather patterns, and undermining their environmental resilience. Consequently, causing floods, droughts, storms, and fires amongst others that is changing its natural landscape. Disaster preparedness and management is germane and promote human and environmental well-being, economic growth, and ultimately sustainable development. While there is body of knowledge on disasters, this is primarily related to countries within Asia and the Pacific region. There lacks comprehensive research on disasters in the African

region, which is of significance because globally, the region has the second highest disaster risk. It is one of the most vulnerable to the effects of climate change and is experiencing increased frequency and severity of disasters and hazards. For instance, 2010 and 2019 saw circa 635% increase in disaster events from 85 occurrences in the 1970s which resulted in the death of over 730,000 people and displacement of many more. Additionally, the region is the 2nd most populated in the world with one of the highest urbanisation rates and this is expected to double by 2050, which makes it a prime candidate for disaster mitigation. Therefore, this study conducts a systematic review and thematic analysis of the current literature on the state of disaster preparedness and management in selected SSA countries. The study would be useful as possible the foremost of its kind, therefore, offering original and theoretical contribution to the subject area. It would also proffer possible recommendations beneficial to policymakers and stakeholders to promote disaster preparedness and management in the African context, in addition to identifying areas for future research.

Resilient Food System Adaptation Can Greatly Reduce Famine in a Global Catastrophic Food Shock

Morgan Rivers [1], Michael Hinge [1], Juan B. García Martínez [1], Ross J. Tieman [1], Victor Jaeck [2], Talib E. Butt [1,3], Florian U. Jehn [1], Vasco H. A. Grillo [1], David C. Denkenberger [1,4]

1. Alliance to Feed the Earth in Disasters (ALLFED), Fairbanks, AK, USA.
2. ETH Zürich, Department of Mathematics, 8092 Zurich, Switzerland
3. Northumbria University, Faculty of Engineering and Environment, City Campus, Newcastle-upon-Tyne, NE1 8ST, United Kingdom
4. University of Alaska Fairbanks, Mechanical Engineering and Alaska Center for Energy and Power, Fairbanks, AK, 99775 USA

Abstract: After a nuclear war, volcanic eruption or asteroid or comet impact that causes an abrupt sunlight reduction scenario, agricultural yields would plummet. Global society is currently unprepared for such an event, implying an urgent need for evaluation and prioritization of solutions. We analyzed a nuclear winter scenario involving the injection of 150 Tg of soot in the stratosphere using a linear optimization model by-country and at a global scale. We investigated the effects of loss of trade, some simple adaptations, rationing and storage of excess food for the coldest years, and rapid, large-scale deployment of resilient foods including cold tolerant crops, methane single cell protein, lignocellulosic sugar, greenhouse crops, and seaweed. We calculate 191% of caloric needs met post-waste in the 2020 baseline. In comparison, found that global macronutrient availability increased from a no adaptation case of approximately 19% of global needs to approximately 146% with all adaptations and trade. However, insufficient preparation beforehand, post-disaster conflict, or economic collapse would worsen these outcomes and reduce the likelihood of international trade and effective adaptation.

Key future work to prevent global famine from lack of production in any ASRS includes 1) research on food production methods, production ramp-up and technology deployment, 2) further development/piloting of technologies and techniques conducive to a faster response such as fast construction and rapid repurposing, and 3) policy outcomes such as the creation and distribution of effective disaster response plans.

2.4 Bridging Disaster Risk Reduction and Climate Change Adaptation for Resilience

(Open session 1)

Session Leads: Terry Cannon, IDS, and Kate Crowley, ECCI, University of Edinburgh

Location: Training and Skills Room

Session Description: This session brings together discussions that span and create synergies between Disaster Risk Reduction and Climate Change Adaptation.

Presentations:

Community Resilience in Response to Extreme Events

Sandra Engstrom and Tony Robertson

University of Stirling

Abstract: Funded by Scotland's National Centre for Resilience and delivered by the University of Stirling as part of the Extreme Events in Science and Society research programme (extremeevents.stir.ac.uk) this project explored the ways communities and individuals, both locally and internationally, are impacted by and react to extreme events and how community resilience is manifested. It brought together over 80 participants from 45 organisations and groups in Scotland with insights from communities, the voluntary sector, academia, and statutory organisations. It centred around two participative workshops, a series of semi-structured interviews with a subset of participants, a photo exhibition and writing journals. This presentation sets out key insights from the approach and key messages relevant for policy and practice."

Is Disaster Risk Creation more significant than DRR?

Terry Cannon

Institute of Development Studies

Abstract: Most work in disaster risk reduction assumes that it reduces risk and loss. Research is supposedly 'taken up' by governments and relevant institutions and used to inform policy. Donors, NGOs and other actors supposedly engage in activities that reduce disaster risk. We need to rethink these comforting assumptions. This presentation argues that governments and the private sector are much more likely to create disasters than to reduce them. The argument is of course controversial, and requires careful assessment of what our role is if such is the case. In the context of a global economy, dominated by the ideology of neo-liberalism, more effort must be given to understanding processes of disaster creation.

The presentation examines the notion of disaster risk creation (Lewis and Kelman, 2012) and examines the concept of Cure to Damage Ratio, which assesses the difference between finance and activities that are supposed to reduce disaster impacts (the 'cure') as compared with the resources that are used to make vulnerability worse, that increase global warming, and to expose more people to natural hazards (the 'damage'). It will be argued that this concept of C:D can form the basis for research that helps understand the root causes of disasters. Examples are used where it appears that the C:D ratio is of the order 1:1000 – in other words typically a thousand times more resources are used that make disasters worse than the amount of funding that is supposed to make them better. In this context it is vital that research takes stock of what it can and cannot achieve, and develops ways to advocate for a more realistic approach to disaster risk.

James Lewis & Ilan Kelman, “The Good, The Bad and The Ugly: Disaster Risk Reduction (DRR) Versus Disaster Risk Creation ~(DRC)”. PLOS Currents Disasters. 2012. doi: 10.1371/4f8d4eaec6af8

A just and appropriate response for heat-resilient neighbourhoods

Leslie Mabon

The Open University and National Centre for Resilience Ambassador

Abstract: Extreme hot weather has long been recognised as a hazard in the tropics, particularly in urban areas where the combination of climate change and urban heat island effects can make heat extremes even more pronounced. However, events such as the heatwave faced in the UK in summer 2022 and the ‘heat dome’ in North America in 2021 illustrate that under a warming climate, extreme heat events also have the potential to cause significant harm in higher-latitude cities. Recent heat events also illustrate how infrastructure and governance practices at higher latitudes may be ill-prepared to maintain resilience in the face of extreme heat, and that the most vulnerable people and places may be at disproportionate risk. This contribution therefore outlines key issues for creating heat-resilient neighbourhoods in temperate climate cities, as well as some of the insights that can be learned from locations globally with a much longer history of adapting to extreme heat. To do so, the contribution focuses on the temperate city of Glasgow (Scotland, UK) and the tropical city of Taipei (Taiwan). We suggest that as well as enhancing the resilience of the built environment to heat through, for example, strategic urban greening, there is a need for localised understanding of who and where is at most risk to heat within a particular society and context. The experience of Taipei in particular shows that societal understanding is vital to develop heat resilience and response strategies that have justice at their heart. Conversely, we also identify the retrofit of buildings for heat adaptation and the stewardship of urban nature for cooling and resilience benefits as skills and job requirements that have the potential to support a just transition whilst enhancing heat resilience.

British Cognizance of Climate Change

Mark Ashley Parry

Northumbria University

Abstract: Despite anthropogenically induced climate change being viewed by many as one of the greatest societal challenges of the 21st century, discernment, especially young people, remains under-explored within the mitigation debate. This is surprising, given research demonstrating the potential for collective action to reduce greenhouse gas emission nationally through individual behavioural changes. The paper explores the intersecting perception of climate change and levels of engagement being undertaken to explore how people are reacting to climate change. The nexus of these themes were explored using a mixed method approach through the use of primary data collection, including interviews (N = 5), two national surveys (N = 1,134, Survey 1; and N = 1,700, Survey 2). In addition, this primary data is cross-analysed through the use of secondary data (BEIS, Eurobarometer, and YouGov) to extrapolate a more comprehensive picture based on the case of the United Kingdom. The research found that in the United Kingdom (and implicitly elsewhere) there are high-levels of perception of climate change as a major concern, especially amongst young people, and more extensively since 2013 when a social tipping point around this issue occurred. This has occurred despite the ‘finite pool of worry’ a theory suggesting a likely plateauing or decline in concern when other crises start to predominate in people’s day to day, such as during the aftermath of the Brexit vote, COVID-19 and associated economic uncertainty. Although there is this high-level belief in climate change amongst young people and civil society more widely, the level of engagement through mitigation strategies

varies. Those strategies that are behavioural are generally undertaken, especially amongst the youngest in society and those who view climate change as serious. However, this applies when there is substantive investment. This demonstrates that if the government wants to implement significant change through the will of society to reduce greenhouse gas emissions, investment on those on low incomes is also needed in order to enable the requisite behaviour change needed. Lastly, in recent years, climate activism groups such as 'Extinction Rebellion' and 'School Strikes for Climate Change' have materialised. It was found that the public were supportive of both groups, but the level of support was higher for the 'School Strikes for Climate Change'. The continued monitoring of perception and engagement drivers associated with climate change in the future is important to help to assess the nature of likely reactions and resistance to future climate change.

Reshaping Smart Cities to foster disaster resilience

Aravindi Samarakkody, Dilanthi Amaratunga, and Richard Haigh

Global Disaster Resilience Centre, School of Applied Sciences, University of Huddersfield

Abstract: Cities are expanding faster and within that expansion insensitive and non-inclusive urban developments and land-use planning, result in higher levels of vulnerabilities and disaster risks. In broader terms, a Smart City is an improved form of a city that administers technology and innovations to transform the core urban systems to deliver more efficient services and better living quality. As a source that generates various advantages including wider social and economic benefits, Smart Cities attract larger populations that seek better living standards. Smart Cities often become the centres for employment generation where major economic activities are performed. When people concentrate and compete for the resources in Smart Cities, disaster risks arise. Amidst the developments in global living conditions, disaster events too are escalating in terms of their frequency and severity, leaving cities around the world to suffer substantial losses in numerous ways. Within the Smart City context, disasters can extend beyond the conventional risks, for instance, cyber-attacks. Therefore, as a unique city conceptualisation model, Smart Cities need a unique strategy to build, enhance and sustain resilience. Not only do the innovations in the form of smart solutions deliver products, insights, services, and technologies to operationalise resilience within Smart Cities, smart characteristics when capitalised effectively expedite the resilience-making process. Therefore, this research looks at different lines of inquiry through which the resilience concept can be operationalised within the Smart City concept. The outcomes can be discussed through resilience journeys of Smart Cities and key Smart City dynamics to address resilience.

Exploring the barriers that prevent integration of climate adaptation and risk reduction strategies: A desk-based approach to the challenges in coastal - urban areas of Nigeria

Samson Mpueh, Richard Haigh, and Dilanthi Amaratunga

University of Huddersfield

Abstract: Climate change and disaster risks are essential standpoints of actions for policy makers and relevant stakeholders to enhance sustainability in coastal - urban communities. They also have the potentials and the opportunities to enhance the level of resilience of urban dwellers. Nigeria has an INFORM risk rating of 6.8 from 10 according to the GFDRR as at 2019 in contrast to other emerging economies and primary hazards include coastal - urban floods. Indications reveal that climate change adaptation and disaster risk reduction policies are extremely fragmented with little or no convergence. It is noted that effects of climate change have impacts on aspects of life and environment however, the nature and extent vary spatial-temporally. The strategies to reduce the effects require integrated and cross - sectoral approaches. Hence, this paper which is part of a larger study aims to assess the

barriers that prevent integration of climate adaptation and disaster risk reduction strategies in coastal – urban Nigeria and the challenges in the implementation process. It also adopts a desk-based survey and interviews to answer the proposed questions under investigation, and as such, the findings will expound the integration of climate adaptation and disaster risk reduction in the Nigerian context.

From Foe to Friend: Reimagining 'Nature' in Disaster Risk Governance

Marie Aronsson-Storrier
University College Cork

Abstract: The need for transformative change to tackle disastrous environmental degradation and ecological decline is now widely acknowledged in scholarship as well as in global policy instruments. This paper critically explores recent policy initiatives – including by the UN Office for Disaster Risk Reduction – concerning nature-based DRR and the inclusion of traditional knowledge in law and decision making processes, and considers them alongside academic debates concerning onto-epistemological challenges around environmental (in)justice in order to explore alternative ways in which to position nature within disaster risk governance.

12:45-13:30 Lunch and posters

13:30-15:00 Parallel sessions

2.5 The use of citizen science to understand societal responses and needs to natural hazard threats

Session Lead: Justin Sharpe

National Oceanic and Atmospheric Administration (NOAA)

Location: The Conference Room

Session Description: Citizen science has long been used to engage public in reporting hazards they have experienced. However, it is necessary to explore the utility of citizen science beyond reporting tools, towards better understanding the need of underserved populations as well as their coping mechanisms for natural hazards. This session aims to discuss opportunities, challenges, innovations, and disaster research in using citizen science to understand risk and response efficacy.

Presentations:

Continuing Developments of U.S. Geological Survey's 'Did You Feel It?', A Citizen-Based Science System for Post-Earthquake Assessment and Information

David J. Wald[1], Vince Quitoriano[2], James Goltz[2], Sara McBride[2], Sabine Loos[1], and Elijah Knodel[1]

1 U.S. Geological Survey, Golden, Colorado, USA

2 Disaster Prevention Research Institute, Kyoto, Japan

3 U.S. Geological Survey, Moffett Field, California, USA

Abstract: The U.S. Geological Survey's (USGS) 'Did You Feel It?' (DYFI) system, in operation globally for over two decades (2000–2022), has collected over 6.5 million individual DYFI macroseismic observations. DYFI collects data on individuals' experience of earthquakes at rates and quantities never before possible, and high-quality intensity maps can be made almost immediately after an earthquake. Widespread DYFI adoption in the United States–along with ShakeMap—has facilitated the general acceptance of the concept of macroseismic intensity, fundamentally improving our ability to communicate hazard and risk to the population. The vast amount of DYFI data allows for data-rich analyses of otherwise intractable seismological, sociological, and earthquake impact factors. Yet, we are enhancing several important aspects of the DYFI system. For instance, given the widespread adoption of Earthquake Early Warning (EEW), it is imperative to evaluate how EEW is perceived and utilized by alert recipients. For DYFI respondents, we already know the responders' reported intensity, facilitating evaluation of their post-EEW behavior as a function of the shaking level they experienced. By augmenting DYFI with a post-alert questionnaire, we will evaluate how recipients respond to alert messages, how they regard their usefulness, and other aspects of EEW systems. We are also performing demographic and internet analytics to examine why DYFI response rates, when corrected for observers' intensities and population density, vary greatly worldwide. Based on those results, we hope to determine what correlative factors are limiting DYFI response, and to propose outreach and technical improvements for increasing DYFI access and equity in its use worldwide.

Community participation in local flood early warning in England and Scotland: processes, outcomes and influences.

Georgina Clegg, Richard Haigh, and Dilanthi Amaratunga

Global Disaster Resilience Centre, School of Applied Sciences, University of Huddersfield, United Kingdom.

Abstract: Community participation is suggested to have benefits for natural hazard early warning at the local level, including strengthened communication and dissemination of warnings, and improved response of those at risk. While previous research has focused on how participatory early warning systems have been implemented in different contexts, there has been limited investigation of what influences the process (enablers and barriers), and what the potential outcomes of such systems are. Abstract: This information is needed if effective community level early warning processes are to be established and sustained. The aim of this study was to understand how participation in flood early warning (FEW) takes place at the local level in the UK, the outcomes, and enablers and barriers. The UK was chosen as the study area as community participation in flood risk management is common. Fourteen semi-structured interviews were conducted. Respondents were selected for their expertise in FEW, disaster management, and community involvement. The responses were recorded, transcribed, and analysed thematically. The findings indicate that participation in local FEW commonly occurs through volunteers, and by residents informally. Participants were found to be involved in acquiring and sharing information on flood risk and warnings, and conducting preparedness actions. Identified outcomes were the provision of additional local information for decision making, greater reach of flood risk information and warnings, and strengthened community ties and wellbeing. Relationships with authorities, the flood risk faced, and the burden placed on volunteers were considered influences. Future research will investigate these aspects in more depth using case studies.

Changing Landscapes: co-producing collective knowledge through citizen science for disaster risk reduction

Teresa Armijos Burneo[1], Jenni Barclay[2], Jeremy Phillips[3], Monique Johnson[4], Richard Robertson[4]

1. School of International Development, University of East Anglia, UK

2. School of Environmental Sciences, University of East Anglia, UK

3. School of Earth Sciences, University of Bristol, UK

4. Seismic Research Centre, University of the West Indies, Trinidad

Abstract: The explosive eruptions of the La Soufrière Volcano, St. Vincent in April 2021 produced large amounts of tephra that affected the entire island. Already marginalised communities located in the north had to relocate to the south of the island for more than 6 months. More than a year after, heavy rain continues to generate lahars that cause significant impacts to people's lives and livelihoods, including the destruction of homes and damage to main roads. 'Changing Landscapes' is a collaborative citizen science project that brings together residents with scientists and artists to co-produce knowledge to reduce risk in this rapidly changing environment. Led by a group of interdisciplinary researchers from the UK and the Caribbean, participants were invited to observe and document changes in their landscapes using a combination of photography and rain gauges. Through a series of workshops and walks to exchange photography techniques and volcanic hazards knowledge, stories were collected, and rain gauges installed in the upper valleys of each community. These continue to operate with the support of the residents. A co-produced exhibit showcasing these experiences, launched in April 2022. In this presentation we explore the challenges and opportunities of interdisciplinary citizen science projects that aim to integrate community knowledge. We argue that citizen science can be (1) a vehicle to involve otherwise excluded communities in data collection and knowledge generation for disaster risk reduction, (2) a space to equalise different forms of knowledge and, (3) ultimately, a means to build and honour alternative forms of representation, response and recovery from disaster.

Waterproofing Data: towards dialogic data innovations for transformations to sustainability and flood resilience

Joao Porto de Albuquerque and Diego Pajarito Grajales,

Urban Studies, University of Glasgow

Abstract: Extreme weather events such as floods are becoming more frequent and have increasing impacts, which affect disproportionately marginalised and impoverished communities and neighbourhoods. Adapting to the new climatic conditions and building resilience to disaster risks are some of today's most significant challenges to require transformations to sustainability. Data innovations offer a promising opportunity to address these challenges but for them to be effective, a methodological approach is needed that achieves sustainable, inclusive, and equitable outcomes. In response to this need, this talk will present a methodological approach for co-producing data innovations for sustainability transformations, based on citizen science and the dialogic pedagogy of Paulo Freire, which has been developed in the transdisciplinary project 'Waterproofing Data'. The talk introduces three methodological innovations achieved in the project: making data practices visible, composing data stories, and engaging citizens and communities with flood data. We discuss the application of these methods and the significant impact achieved by the project in Brazil towards improving early-warning systems and strengthening community resilience.

2.6 Health and DRR: lessons from COVID, mental health and disaster risk reduction research

(Open session 2)

Susanne Sargeant, Disaster and Development Geoscientist, British Geological Survey

Location: The Training and Skills Room

Session Description: This session brings together a discourse on health and Disaster Risk Reduction with presentations relating to recent research relating to health risks including COVID-19. This interdisciplinary session brings a diverse range of voices from the UK and overseas.

Presentations:

Responding to COVID lockdown: the role of collective resilience in supporting young people with additional support needs in a social enterprise context

Sandy Whitelaw[1], Ailsa Mackay[2], and Heather Hall [3]

1. Health and Social Policy, University of Glasgow;
2. National Centre for Resilience/University of Glasgow;
3. The Usual Place/Inspired Community Enterprise Trust Limited

We report on a project that explored how a community café social enterprise that promotes the wellbeing and employability of young people with additional support needs, ['The Usual Place' (TUP)] responded to the two COVID-related lockdowns. The café serves as significant social base for its trainees, fostering regular social contact with other trainees, staff and the wider public as customers. The lockdowns therefore posed significant threats to these contacts. The organisation also operates within a strong value base – particularly ones of participation and enablement, highlighting the voice of their young people in social and economic contexts. We used an organisational case study model and a narrative centred approach to interviewing trainees, their parents and TUP staff. We set the questions: "What has been the effect of COVID on the potential for TUP to promote resilience with its young people?"; "how is 'resilience' conceptualised within the setting?"; "what features of TUP are significant in promoting resilience and what barriers exist?" We discovered that, often in the absence of statutory service support, TUP were able to maintain meaningful distanced engagement with their trainees across both lockdowns and successfully preserved levels of wellbeing and resilience. We locate this success within a series of 'ecological' organisational features that fosters core resilience: the embedded and embodied nature of TUP, particularly their ability to cultivate high levels of trainee participation; as well as an organisational ethic that highlights the need for the expression of some antagonistic ingredients and 'risk' as necessary pre-determinants of fostering resilience.

Demanding a just and accountable recovery from below: Lessons from Covid-19 activism in Nepal

Nimesh Dhungana[1], Kripa Basnyat[2], Narayan Adhikari[3], and Flora Cornish[4]

1. University of Manchester
2. Reclaiming Narratives, Nepal
3. Accountability Lab, Nepal
4. London School of Economics and Political Science

Abstract: Disasters are known to reveal and intensify pre-existing social inequalities. But they can also act as a catalyst for socio-political transformation (Pelling & Dill, 2010), evidenced in the reinvigoration of civil society activism and the emergence of newer forms of participatory and accountability

initiatives to deepen the prospects for democratic and just recovery under difficult circumstances (Curato, 2019; Dhungana, 2020). As a global disaster, the Covid-19 pandemic has unveiled various forms of injustices facing historically disadvantaged communities, notably informal workers and labour migrants. At the same time, it has also triggered innovative forms of solidarity and rights-based movements to amplify the voices of marginalised communities. What are the opportunities and limitations for grassroots accountability activism to assert the political potential for a 'just recovery' for labour migrants in post-Covid Nepal? The paper draws on an ongoing participatory research project to examine this overarching research question. Using the Covid-19 disaster as a site of political possibility, the paper draws on the voices and experiences of a mix of returnee migrants and civil society activists in Nepal to understand the injustices facing labour migrants but also the potential of grassroots activism in challenging indifference and injustices within the Covid-19 response. The possibilities (and limitations) of such activism will be discussed in terms of their ability to construct alternative narratives of care and collaboration, and forge newer alliances to hold the State accountable to the voices of the disadvantaged communities.

Curato, N. (2019). Democracy in a time of misery: From spectacular tragedies to deliberative action. Oxford University Press.

Dhungana, N. (2020). Doing civil society-driven social accountability in a disaster context: Evidence from post-earthquake Nepal. Politics and Governance, 8(4), 395-406.

Pelling, M., & Dill, K. (2010). Disaster politics: tipping points for change in the adaptation of sociopolitical regimes. Progress in human geography, 34(1), 21-37.

Exploring social factors that affected public health information sharing among underprivileged communities in Sri Lanka during the COVID-19 pandemic

T. Kamalrathne[1], D. Amaratunga[1], R. Haigh[1], R. Jayasekara[2], L. Kodituwakku[3], U. Ariyasinghe[4], H. Herath[4], P. Ranaweera[5], C. Rupasinghe[3], S. Rathnayake[4], N. Fernando[6], C. Siriwardana[2]

1 Global Disaster Resilience Centre, University of Huddersfield, UK

2 University of Moratuwa, Sri Lanka

3 National Dengue Control Unit, Sri Lanka

4 Ministry of Health, Sri Lanka

5 Anti-malaria Campaign, Sri Lanka

6 University of Colombo, Sri Lanka

Abstract: Covid-19 pandemic is an eye-opener for many governments which has called for the need to develop more sustainable infrastructure, governance, and policies to cope up with disaster resilience. Dissemination of public health information, including warnings and advice on disease outbreaks, has been a key intervention in many governments to fight against the COVID-19 pandemic. Therefore, countries have developed unique strategies and policies to govern public health information during public health emergencies such as epidemics or pandemics. However, evidence shows that there are significant barriers and challenges in understanding health information shared by many stakeholders related to the COVID-19 pandemic. In this context, the core objective of this

research is to explore the factors that have affected public health information sharing, particularly among underprivileged communities in Sri Lanka amidst the COVID-19 pandemic. A questionnaire survey and semi-structured interviews were carried out in 12 districts in Sri Lanka to collect data. 3200 households were covered by the field research. Results revealed that dissemination of public health information about the COVID-19 pandemic has been significantly low among marginalized communities in rural, urban and estate sectors. Inadequate awareness of the SARS-CoV-02 virus and vaccines has been a cause of vaccine hesitancy, and unintentional violation of restrictions imposed by the government, including quarantine law. For instance, 36% were completely unaware of the types of COVID-19 vaccines and their suitability. More than 55% were totally unaware of the effectiveness of vaccines against the SARS-CoV-02 virus, whereas 47% were totally unaware of the possible side effects of vaccines which has been the major cause of vaccine hesitancy in Sri Lanka.

The potential for property-level flood adaptation as a flood disaster mental health intervention

Paul Hudson,

Department of Environment and Geography, University of York, UK

Abstract: Objectives: To discuss the overlap between property-level flood adaptation (PLFA) and public health risk management for flood risks and disaster risk across both fields of work

Design & Methods: Narrative review, evolving form the flood risk research domain.

Results: Promoting property-level flood adaption has multiple areas of benefit to both flooding and mental health risk management as a potential invention that render greater individual and social resilience. This is because both fields display a lot of common interests and approaches if a common approach and locus of activity.

Conclusions: The complexity of disasters as a social product means that there is not a single agency or actor that can address the issue from a single perspective. Not addressing relative concerns and considerations reflects varying institutional frameworks and inertia. However, the promotion and development of PLFA strategies can be a productive locus of behaviour for further active collaboration and research.

The Environmental, Wildlife and Human Health Risk of the Remobilization of pollutants from River Sediments during Flood Events (RIFFLE Project)

Farzana Ferdoush and Michelle C. Bloor

School of Interdisciplinary Studies, University of Glasgow, UK

Abstract: Sediments are regarded as a river's long-term memory. They mainly comprise of particles that are eroded from the ground, ending up at some point in estuaries as mudflats or the ocean. Abstract: However, sediments can also remain stable for a relatively long time - and bind pollutants which, for example, have entered the rivers through farming practices, mining or industrial wastewater. As a consequence, many old river sediments contain pollutants, such as heavy metals or dioxins and dioxin-like compounds that are not easily degradable. During flood events, old sediments can be churned up because of the velocity at which the water is flowing. In the process, the pollutants bound in them are regularly released and contaminate flooded areas. The problem of pollutants from old sediments is greatly underestimated. One reason for this could be that to date there have been practically no studies at all on the economic consequences of this problem. However, contaminated

sediments are a 'ticking time bomb' that can explode each time there is a flood. There is a need for good river management that not only looks at the immediate risk for humans, animals and infrastructure but also at the long-term consequences resulting from pollutants in the riverbeds. The aim of the RIFFLE Project, funded by the Scottish National Resilience Centre (NCR), is a pilot study to understand the potential risk of river sediments to Scottish agricultural land during flooding incidents, using the River Nith as a case study, and with a particular focus on heavy metal contamination. Secondary data was used to determine the historic flood extent for the River Nith, and to select the project's sampling locations. River sediment, water column and soil samples from above and below the flood extents were collected and analysed to determine heavy metal concentrations. Our presentation will outline the key findings from the research and the next steps.

Reflections on a South-North action research project to build resilience in rural Cambodia

Yunjeong Yang[1], Sourn Chantra[2], Oum Phoeun[2], Adriana Keating[3]

1 Graduate School of International and Area Studies, Hankuk University of Foreign Studies, Seoul, Korea; Visiting fellow, Edinburgh Earth Initiative, University of Edinburgh, UK

2 Habitat for Humanity Cambodia

3 International Institute for Applied Systems Analysis, Austria

This paper reflects on and shares learning from a multi-partner academic and practical collaboration surrounding a Climate Change Adaption (CCA) project in three rural communities in Cambodia. This multi-party action research is focused on community resilience and disaster risk reduction capacity building and research. The partners are: Habitat for Humanity Cambodia (HfHC), a non-profit organization in community development via housing and other development projects, representing the South and working directly with the flood prone communities; a team of researchers based in the North, affiliated with academic and research institutes, bringing a research framework and methodology, and resources for the project.

The role of the COVID-19 pandemic and the need to work remotely has supported a shift in power dynamics by highlighting the fact that the quality of data collection depends heavily on the local behaviour and methods, while overseas researchers are often constrained from visiting the field in person, in addition to the conventional language barriers. To respect local contexts under the COVID-19 and social distancing, relying on the local partner's qualification and capacity in conducting data collection has become essential to the research process. Meanwhile, practical difficulties in engaging low-educated local community dwellers to be meaningful part of the 'community-based' project remain a major challenge. Supporting local communities and at the same time avoiding dependency culture requires both sensitive and skillful intervention. The research team will share experiences and necessary mindset shifts, including challenges and suggestions to strive towards a more equitable collaboration in international development action research.

Integrating public health into disaster risk reduction and resilience planning: challenges and strategies for better integration

Asitha De Silva[1], Dilanthi Amaratunga[1], Richard Haigh[1], Taufika Ophiyandri[2], Bambang Istijono[2], Benny Hidayat[2], Ade Suzan[a2]

1 Global Disaster Resilience Centre (GDRC), University of Huddersfield, UK

2 Andalas University, Indonesia

Abstract: The global pandemic of COVID-19 has drawn attention to multi-hazard preparedness and planning since many countries were unable to cope with the dual challenge of natural hazards throughout the pandemic. Despite the level of development, many countries in the world have faced devastative impact from the pandemic, where communities suffered from deaths, economic losses, social deprivation, and even mental instability of their members. Global and national platforms have initiated many discussions around making communities resilient during a global pandemic. Integrating public health aspects into disaster risk reduction seems to be one of the emerging topics where many scholars are working on developing new strategies. Therefore, this study aims to better understand the challenges of pandemic preparedness and strategies for better integration when integrating public health aspects into disaster risk reduction. The study was formulated on a literature review based on academic data bases, international policies and frameworks, and institutional reports, followed by a thematic extraction and a classification. The results of the literature review recognised consumption, pollution, health security, poverty, and communication as the main areas of challenges faced by planners and decision makers when it comes to pandemic preparedness planning. Moreover, the state-of-the-art strategies identified by the literature review have been classified into three as consumer related, governance related, and management related strategies. Finally, the study concludes that identifying the challenges and strategies to overcome them will support decision makers in better integrating public health aspects into disaster risk reduction efforts towards making communities resilient.

15:00-15:15 Break

15:15-16:30 **Conference Reflections and Wine and Cheese**

Reflections for the UKADR community

16:30 End of Conference

Posters

The poster sessions will run over two days aligned with sessions running on both days:

Leveraging existing capacities - flood relief efforts following Cyclone Idai (2019), Malawi

Donald JC Robertson[1], Muthi Nhlema[2],

1. Hydro Nation Scholar, University of Strathclyde,
2. BASEflow

Abstract: In early 2019 Cyclone Idai hit the east coast of Africa bringing torrential rain and widespread flooding to Southern Malawi. Having an estimated impact on over 975,000 people, including the displacement of nearly 90,000 people, preliminary assessments by sector development partners & government identified that access to drinking water in the flood-impacted areas was of priority concern and an immediate response was required to protect and re-establish safe drinking water supplies. Following this assessment, and using a recently developed digital management information system (MIS) for the Malawian water sector, a team of researchers and practitioners, supported by the Scottish Government, were able to repurpose both data and skills to assist with the immediate flood relief efforts and water supply challenges. Utilising community-sourced data to help guide water point rehabilitation teams, we present how existing research work, data, skills and local capacities were leveraged to respond to community-level water supply challenges in both the impacted communities and the internally displaced people camps. We discuss how community-sourced data, coupled with an intimate understanding of the local context, played an important role in guiding relief efforts and the lessons that should be applied to improve both community and institutional capacities to respond to future flooding events in Malawi. Finally, building from this example in hazard relief, we present a case to further incorporate community-level voices in wider water management practices.

Defining social justice, affordability, resource prioritization, and mechanisms to address injustices

Paul Hudson, Department of Environment and Geography, University of York, Heslington, York, UK

Thomas Thaler, Institute of Mountain Risk Engineering, University of Natural Resources and Life Sciences, Austria

Abstract: Across Europe there is an increasing behavioural turn in flood risk management, focusing on individual behaviour and responsibilities. For example, a greater focus on implementing property-level resilience measures. A conclusion from this trend is that there are additional burdens being placed on the residents of flood-prone areas, in the hope that their overall burden is reduced. Therefore, we must understand the burden that is being created as we can unintentionally create new patterns of inequality in terms of who is and is not protected if certain individuals can be judged to be overburdened. This is particularly relevant in the aftermath of disaster events when there is a push to build resilience. Once concept for measuring this aspect of the burden generated is affordability, which seeks to define and measure what a suitable burden on an actor is, and then can be targeted for additional assistance, e.g., loans, vouchers, or subsidies to eliminate the burden. The concept of affordability can be used to identify how to best spend resources after a disaster event to support a process of 'building back better'. However, the way this burden can be defined and addressed can also be influenced by different social justice considerations and definitions. This research explores the implications that different social justice concepts for defining what is a reasonable affordability burden that can be placed on the individuals/households expected to adapt to and limit flood impacts and on the policy strategies and outcomes that can be used to design policy instruments which address this

burden. We then further explore how these definitions can be operationalised and measured using a dataset of German households as an illustration of how significant these differences could be.

Heritage as a tool for climate change risk assessment and adaptation: studies from Indonesia, Sri Lanka and South Africa

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2. Faculty of Humanities, Humanities, University of Pretoria, Pretoria, South Africa
3. Centre for Asia Pacific Initiatives, University of Victoria, Victoria, BC, Canada
4. Gama Ina-TEK , Universitas Gadjah Mada, Yogyakarta, Daerah Istimewa Yogyakarta, Indonesia

Abstract: There can be no sustainable development without Disaster Risk Reduction (DRR) including Climate Change Adaptation (CCA). Yet these rely on a foundation of understanding risk in all its complexity. Heritage is largely missing from conventional risk approaches, despite its ability to shape our identity, deliver capacities, and expose vulnerabilities. This paper presents the findings from a two-year research project that aimed to better understand the role of heritage within risk assessment and adaptation through the investigation of three case study sites across three Low-Middle Income Countries (LMICs). The case study sites identified were across three scales: the small-scale settlement of Elandskloof in South Africa; the city region of Yogyakarta, Indonesia and a national approach across Sri Lanka. Exploring these three scales we were able to capture a heritage driven risk narrative and found that heritage opens avenues for dialogue on livelihoods, gender, local level capacity and vulnerability.

Positioning Disaster Justice within the Sphere of Disaster Risk Governance: A Stepping Stone towards Exploring Disaster Justice

Anuradha C. Senanayake, Dilanthi Amaratunga, and Richard Haigh

Global Disaster Resilience Centre, University of Huddersfield, United Kingdom

Abstract: The frequent occurrence of disasters in the contemporary world has challenged the lives of people around the world. While vulnerabilities in the field of disasters have been commonly studied, the introduction of the concept ‘disaster justice’ has emphasized that disasters in fact accelerate already existing vulnerabilities in a society. Disaster justice is a claim towards the governance of disaster contexts to handle its unequal impacts. The Sendai Framework for Disaster Risk Reduction emphasizes the importance of disaster risk governance as one of its four priorities. In this vein, this study is an investigation of the concept of disaster justice within the sphere of disaster risk governance, with the main objective of investigating the elements of disaster risk governance that compliments disaster justice. This secondary data-based study was conducted in two stages. First, a systematic literature review was conducted to explore the elements of disaster justice. In the second stage, a thematic mapping exercise was conducted in order to recognise the coherence between disaster risk governance and elements of disaster justice. Accountability, representation and recognition were utilised as main domains of disaster justice as per the framework of Shreshta et al. (2019). The findings conclude that the coherence between disaster risk governance and the disaster justice lies in the thematic orientations of eradication of poverty, people, climate change, regional cooperation, stakeholders, overall engagement, laws and regulations, and finance and technology.

Aligning the Global Disaster Risk Index with the Sustainable Development Goals to assess risks to socio-ecological systems in river deltas

Cremin Emilie[1], Sumana Banerjee[3], Ly Ha Bui[4], Abhra Chanda[3], Hieu Hong Hua[5], Da Van Huynh[5], Hue Le[4], Sonia Murshed [6], Salehin Mashfiqus[6], Jack O'Connor[2], Anh Vu[7], Zita Sebesvari[2], Andy Large[7], Fabrice G. Renaud[1]

1 School of Interdisciplinary Studies, University of Glasgow, UK

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4 CRES, Vietnam

5 Can Tho University, Vietnam

6 BUET-IWFM, Bangladesh

7 University of Newcastle, UK

Abstract: River deltas are densely populated and simultaneously highly exposed to natural hazards such as flooding, coastal and bank erosion, salinization, and storms. Hazards threaten people's lives and livelihoods, ecosystems, and infrastructure and as such, hamper governments' efforts to achieve the Sustainable Development Goals (SDGs). Reducing risks to natural hazards contributes to sustainable development but, to date, risk assessment frameworks have not captured this well. A major challenge is to better assess multi-hazard risks and prioritize risk-reduction interventions in river delta landscapes to secure their long-term sustainability.

The research reported here improves the existing Global Delta Risk Index (GDRI), a multi-risk assessment tool, by incorporating key sustainability considerations. Outcomes offer a step forward in aligning two major global frameworks, namely the SDGs and the Sendai Framework for Disaster and Risk Reduction, through the identification of relevant indicators in the specific context of three major mega-deltas: the Red River and the Mekong in Vietnam, and the Ganges-Brahmaputra-Meghna in Bangladesh and India.

The selection of indicators is based on a generic impact chain developed from in-depth consultations with experts and researchers from the region. The impact chain synthesizes the main drivers of vulnerability of socio-ecological systems exposed to multi-hazards. It also highlights the links between the SDGs and risk indicators. In doing so, it highlights key social, economic and political drivers that threaten the sustainability of livelihoods. Through revising the GDRI, we reframe the interlinkages between the exposure of livelihoods to hazards, the vulnerability of social-ecological systems and efforts toward the achievement of SDGs.

Promoting Companion Animal Guardians with (dis)Abilities' Access to Veterinary Medical and Behavioral Services during COVID-19: Affordability, Feasibility, and Accessibility

Haorui Wu, Dalhousie University

Ravinder Sarah Bains, Dalhousie University

Amy Morris, Vancouver Humane Society

Celeste Morales, Vancouver Humane Society

Abstract: The study aims to explore COVID-19-driven societal impacts on companion animal guardians living with (dis)Abilities relating to veterinary medical and behavioral service access. Companion animal guardians with (dis)Abilities are expected to confront more challenges than their counterparts without (dis)Abilities. However, current research rarely investigated COVID-19-specific impacts on

access to veterinary medical and behavioral services from the lens of persons with (dis)Abilities (PWDs). This study used in-depth interviews to qualitatively illustrate that: (1) COVID-19 has worsened PWDs' already precarious financial capacity to pay for veterinary services; (2) Existing social support programs do not effectively address PWDs' unique requirements, supporting a healthy human-animal bond; and (3) Curbside veterinary services triggered extra emotional burden towards PWDs. This study suggests that building PWD-driven social assistance and support programs would help reduce these barriers and promote a healthy human-animal bond."

How can Earth Observation data be better translated and disseminated for use in disaster risk management?

Authors: Jessica Payne (COMET, University of Leeds), Kate Donovan (University of Edinburgh), John Elliott (COMET, University of Leeds)

Abstract: To effectively reduce disaster risk, decision makers must have access to up-to-date, accurate, and high-resolution hazard data. Scientific institutes should work closely with local authorities to make such data available to vulnerable societies. Whilst these data are increasingly openly available, the degree to which data are accessible and queryable varies greatly. In Iran, land-surface deformation has resulted from the decline in groundwater levels. Moreover, the gap between groundwater extraction and renewal is so large that the resulting short-term impacts are likely to be irreversible.

We use Earth Observation data to calculate subsidence rates due to groundwater extraction and constrain the location of ground ruptures and faulting in Tehran, Iran's capital city. This data includes Sentinel-1 Interferometric Synthetic Aperture Radar (InSAR); Pléiades optical stereo imagery; and laser altimetry data. The COMET-LiCS Subsidence Portal was published to disseminate InSAR data relating to subsidence in Iran (https://comet-subsidencedb.org/). The portal presents interferograms; velocity timeseries; and maps of the spatial extents and rates of subsidence for 99 regions across Iran. Interactive tools allow users to make quick, critical assessments related to extents and rates of subsidence. Publishing the portal is an effort to reduce the gap between research and disaster risk reduction. However, this and other portals often require some level of technical understanding to best use and interpret their data. Here we discuss and welcome feedback on the best approaches for translating Earth Observation outputs so that they are usable, useful, and used for disaster risk reduction and management for decision makers and beyond.

The Global Landslide Detector (GLD; https://landslide-aidr.qcri.org/service.php) and the under-development Landslide Tracker (LT) are tools that report landslides in near-real-time. The GLD uses machine learning to extract data about landslides automatically from social media. The LT analyses satellite data to highlight areas of change over time identifying where landslides have occurred. Both tools operate at the global scale. By combining these tools, we are aiming to build a system that can rapidly identify areas where humans are reporting landslide impacts and then trigger an automated analysis of satellite data to gain a true understanding of where landslides have occurred. In the UK, these timely landslide data are used for the Daily Landslide Hazard Assessment, which informs the Natural Hazards Partnership. This information is then used to communicate the forecasted likelihood for landslide impacts on a regional scale to the responding stakeholders. The opportunities for further uses for this system are still being explored through planned engagement.

Mapping single hazards and multi-hazard interrelationships in Global South urban areas: A case study in Kathmandu, Nepal.

Harriet Thompson (Department of Geography, Faculty of Social Science & Public Policy, King's College London, London, UK)

Bruce D. Malamud (Department of Geography, Faculty of Social Science & Public Policy, King's College London, London, UK)

Joel C. Gill (School of Earth and Environmental Sciences, Cardiff University, Cardiff, UK)
Robert Šakić Trogrlić (International Institute for Applied Systems Analysis, Laxenburg, Austria)
Melanie Duncan (British Geological Survey, Edinburgh, UK)

Abstract: Achieving a holistic approach to disaster risk reduction in urban areas remains challenging. This requires understanding the breadth of single hazards and multi-hazard interrelationships across various spatial and temporal scales that might impact a given urban area. Here we describe an approach to systematically map the single hazards and multi-hazard interrelationships that have a potential to impact Kathmandu, Nepal, one of the focus cities of the UK Global Challenges Research Fund (GCRF) Tomorrow's Cities research hub. Using an existing classification of 21 natural hazard types (across six hazard groups: geophysical, hydrological, atmospheric, biological, space), we first searched for evidence of each of these occurring in or affecting Kathmandu. We used systematic mapping to find and select evidence, applying a simple Boolean search with keywords and reviewing publications across all years available on online databases before selecting evidence from 2010 onwards where available. We examined and integrated evidence from diverse sources, including academic literature, grey literature, traditional media, global and national disaster databases and social media. Using this blended evidence, we found 21 single hazard types that might impact Kathmandu. We found case study evidence for 11 interrelationship types that have had previous impact in Kathmandu with many more that are theoretically possible. Moving forward we will investigate the impacts of these single hazards and multi-hazard interrelationships on urban poor communities in Kathmandu. We will systematically consider how well different sources of event and impact data represent the urban poor and which data are most relevant for DRR strategies.

Incentives and enablers as a governance mechanism for implementing disaster risk management

Shavindree Nissanka , Dilanthi Amaratunga, Richard Haigh
University of Huddersfield, Huddersfield UK

Abstract: Investing in resilience requires extensive funding, which is one of the critical causes of the current under-investment in resilience. Moreover, imposing resilience by law is not practical in all circumstances considering the versatile socio-economic dynamics and practicality. Therefore exploring new ways of thinking about disaster risk governance is essential in improving the implementation of disaster risk management practices at the ground level.

The need to incentivize and reward risk-informed local and national investments in resilient practices has recently drawn attention in existing studies. Accordingly, this study will investigate incentives and enablers as an innovative governance mechanism for implementing disaster risk management. The findings establish the need and role of incentives and enablers in disaster risk management and the different types and uses of the incentives and enablers. Incentives and enablers are rewards for actions that exceed the minimum level of compliance and will act as inducements for improved performance. Amidst the different types of incentives, financial incentives become significant as they will reduce funding constraints for resilient investments. Developing a clear pathway of how incentives and enablers can contribute to effective disaster risk management can help improve community resilience and better disaster risk governance.

Transitions: comparing timescales of eruption and evacuation at Volcán de Fuego to evaluate current risk mitigation capacity.

Ailsa Naismith (University of Bristol), Jenni Barclay (UEA), Jeremy Philips (University of Bristol), I. Matthew Watson (University of Bristol, Teresa Armijos (UEA)

Abstract: During volcanic crisis, risk mitigation is effective only if institutions and local people respond quickly. Volcán de Fuego (Guatemala) is an active volcano that frequently provokes eruptive crises. In this paper, we ask: does current disaster risk reduction (DRR) policy give local people enough time to evacuate from an eruption? We explore this question by comparing timescales of volcanic activity and human response in several recent eruptions. We use multiple geophysical datasets for individual events within Fuego's accelerating paroxysmal cycle (2015 –2018) to constrain timescales of eruptive evolution. In parallel, we determine timescales of response through qualitative interviews with institutional and local actors. We then compare eruption and response timescales to explore uncertainties and variability within. We find that eruption and response timescales are comparable at Fuego. However, we also present evidence that timescales of response lag those of eruptive evolution due to long periods of decision-making and warning. We assess these findings with respect to current DRR policy at the volcano and through different actors' mental models of risk. We conclude that the current DRR network at Fuego does not give enough warning time of impending activity to mitigate risk to local people. We conclude with suggestions for how stakeholders can come together to discuss a community's needs during eruptive crisis and how actors with different mental models could work together to evacuate in time. We intend our work to be of practical use to both institutions and local people for nuanced DRR policy before a future eruptive crisis.

Search and Rescue (SAR) Effectiveness of Uncrewed Aerial Systems (UAS) after natural disasters

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Abstract: A central and fundamental component of disaster response is the use of technology or human teams to locate and assess vulnerable people. This set of assessment activities are generally termed "Search and Rescue" (SAR), and specifically termed "ASR Level 1" based on the International Search and Rescue Advisory Group (INSARAG) protocols.

UASs represent an opportunity for a faster response with fewer logistical overheads, potentially leading to a more effective ASR Level 1. Emergency response organisations across the world are utilising UASs for SAR activities with varying degrees of success. However, there has been no in depth research into the effectiveness of their use resulting in no standard testbed. A standard testbed can inform and improve UAS SAR protocols which has the potential to save more lives

During two sets of fieldwork, over 60 drone missions were flown, capturing data that was organised by the visibility of the target, the environment, the altitude of the aircraft and the sensor type and sensor angle. The imagery collected during these missions was presented using an online platform to many human observers who were given the task of determining whether each image contains a human target or not.

These observation results were analysed using a modified SAR effectiveness formula enabling flight comparison of different flight parameters. Additionally, the data set has enabled the development of an Artificial Intelligence (AI) human recognition system which will be compared to the observation results.

Living on "inhabitable" land: the ongoing struggle for recovery around Fuego Volcano, Guatemala

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Abstract: The path of recovery that the community of La Trinidad has taken after the eruption of Fuego Volcano in 2018 has been different from that of other affected communities. On June 3rd, pyroclastic

flows destroyed the town of San Miguel Los Lotes, 6 km away. The eruption caused the evacuation of 13,000 people and the later declaration of five towns as inhabitable. We take a decolonial perspective on disaster recovery to explore how people in La Trinidad used their experience in negotiating with the Guatemalan government to demand a relocation solution that was in line with their ways of living as gente campesina. This process continues today, four years post eruption. We aim to contribute to a more situated disaster response perspective from the experience of La Trinidad in the aftermath of the eruption, which drew memories from their community history. Our initial work is a collection of this history; briefly, in 1998, they returned to Guatemala after twenty years as refugees in Mexico, struggling to find adequate land to live and thrive. Shortly after settling on the flanks of Fuego, the volcano became active again. Before 2018, their community had become accustomed to living with lahars in the barrancas during rainy seasons, and occasional pyroclastic flows extending to and burning their crops. Now, the volcano's daily eruptions are too close to their collective memories of the war. While they struggle to find new lands, they have returned to Fuego, living in an area that has been declared "inhabitable".

Towards Intergenerational Equity: Analysis of Youth Engagement Strategies in Climate Action Planning in Mzuzu, Malawi

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Abstract: Globally, meaningful youth participation in planning processes aimed at dealing with climate change impacts has been advocated for sustainability purposes. Article 6 of the United Nations Framework Convention on Climate Change requires parties to ensure there is public participation in addressing climate change, its effects, and the development of responses. In the city of Mzuzu, Malawi, local community members have been involved in planning processes at different planning levels but more intensively at the community level. Despite this approach receiving much attention, minimal consideration has been put on which societal groups are to be engaged directly, with youths being excluded to a large extent, even though about 49% of the population in Malawi is aged between 10 and 34 years. This article, therefore, seeks to foreground how current stakeholder engagement strategies in climate change planning marginalise the youth. To do this, this article critically reviews current stakeholder engagement strategies and assesses the extent to which youth are involved in the planning processes in Mzuzu City. It further assesses the factors affecting youth involvement in the planning process and subsequently recommends how stakeholder engagement strategies can be designed and implemented to ensure effective youth engagement in climate change planning processes in the city.

Understanding the spatial distribution of Non-Communicable Diseases for better preparedness and community resilience

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Abstract: 2030 Agenda for Sustainable Development (SDGs) aims at ensuring healthy lives and promoting wellbeing for all at all ages. The COVID-19 pandemic has initiated global discussions among communicable diseases where Non-Communicable Diseases (NCDs) seems ignored. NCDs are one of the major causes of morbidity and mortality worldwide which contributes for 41 million (71%) deaths each year. Highlighted by the Sendai Framework for Disaster Risk Reduction (SFDRR), health is one of

the critical factors that increases the community vulnerability. Getting to know such vulnerable groups based on health conditions will always support better disaster risk reduction planning and decision making. Therefore, the aim of this study is to identify the spatial distribution of NCDs based on prevalence and mortality focusing on cardiovascular diseases, cancers, and diabetes. The study adopted the case study method based on Sri Lanka using secondary data collected from the Registrar General's Department of Sri Lanka from 2010 to 2015. Based on thematic visualization using ArcGIS as a tool of analysis, spatial distribution of NCDs were mapped according to the districts of Sri Lanka. Calculated cause specific death rates and prevalence rates identifies the most vulnerable districts under each disease. The results indicate that the mortality among men is greater than women. The study would enable to further explore the association of the environmental factors and the NCD deaths by districts and assess the distribution of deaths in broader aspect. In conclusion the outcomes of this study will support decision makers to understand the community vulnerability based on NCDs for better preparedness when making communities resilient.

Development of a data model for the collection of pre- and post- disaster data in multi-hazard environments for disaster risk reduction

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Abstract: Numerous data collection tools exist primarily for hazards such as earthquake, flood, and landslides. Some tools can be applied to multiple, individual hazards; however, given the complexities involved, few are designed for the collection of data related to concurrent, cascading, and cumulative hazards over time. Moreover, data reflecting the interaction and interdependency between different hazards, their impacts on the built environment and existent mitigation actions is rarely captured and must be considered for effective response to and prevention of future risks. We present a data model and associated dictionaries for the collection of pre- (exposure) and post- disaster (damage and impact) data on buildings located in multi-hazard environments. The data model is developed using a tiered approach for data collection depending on the level of detail required and the amount of time available to the user. We anticipate the data model and dictionaries can provide stakeholders with a flexible approach for data collection which can be used and adapted depending on their needs. The data model and dictionaries can be adopted either in digital or analogue format, and integrated in existing or new data collection tools. Future work will focus on testing the model in different environments and adopting and adapting the approach to different stakeholder needs.

Pluvial flood risk assessment in urban areas using a multi-criteria approach

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In urban areas, pluvial flooding is one of the most devastating natural hazards that cause adverse effects on human lives, infrastructure, and the environment. Urbanisation and dense population make urban areas more vulnerable to flood impacts. Against the flood damage background, flood risk assessment can help people understand local flooding risk and provide important information to the decision-makers.

In this context, this study developed a comprehensive conceptual framework for the urban pluvial risk assessment. The indicators collected by the literature review can serve as an indicator list for future flood risk assessment. Based on this conceptual framework, this study assessed the flooding induced by Hurricane Harvey in the Houston area using two different methods: the indicator-based method and the Bayesian Networks (BNs) modelling approach. The indicator-based method is one of the most

frequently used approaches in natural hazard risk assessment areas, and BNs are up-and-coming technologies in artificial intelligence. These two methods have different principles for calculating flood risks. Hence, this study aims to investigate the difference between one traditional risk assessment approach and one relatively new risk assessment approach by comparing the results. Such comparison is important for future urban flood risk assessment studies to improve the result accuracy.

Establishing a common multi-hazard, multi-risk baseline: findings from the MYRIAD-EU project

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Abstract: The first priority of the Sendai Framework for Disaster Risk Reduction is Understanding Disaster Risk. In order to progress this priority, it is vital that research and practice effectively draws upon previous disaster risk work, and that we ensure consistency and continuity in our use of terminology and concepts. To this end, we present the results of the first work package (WP1) of MYRIAD-EU – a multi-disciplinary, multi-sector project on systemic risk assessment and management in the EU (funded by Horizon 2020). WP1 aimed to establish a baseline to ensure that all MYRIAD-EU work packages are underpinned by a common understanding of terminology and concepts, and current academic, policy, and industry perspectives on multi-hazard, multi-risk assessment and management.

Three tasks were central to WP1: review and development of multi-hazard, multi-risk terminology, concepts and indicators (1.1); review of existing multi-hazard, multi-risk assessment and management tools, methods and approaches (1.2); review of existing policy and governance for multi-risk management (1.3). In this presentation, we focus on two outputs from the project: a handbook of multi-hazard, multi-risk terminology and a wiki-style platform for crowd-sourcing existing tools, methods and approaches for multi-hazard, multi-risk management from within and beyond the MYRIAD-EU project. We present our collaborative, mixed-methods approach and findings on existing terminology and approaches. We conclude with our reflections on the importance and challenges of establishing a baseline and common understanding, and how to effectively continue to evolve and embed this work within and beyond the MYRIAD-EU project.

Justice for Whom? Recovery for Whom? Children, Climate Change and Disaster Recovery

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Abstract: It is increasingly recognised that social and environmental justice should be first-order priorities for decision-making and action around climate change and disaster recovery at local, national, and international levels. However, it remains the case that most social justice discourse and disaster recovery initiatives are expert-led, leaving a gap regarding the voices of those most marginalised and most at risk from the impacts of anthropogenic climate change. This is particularly the case for children, whose direct voices on climate change are missing from the National Action Plans demanded by the Paris Agreement by countries committed to the United Nation's Convention on the Rights of the Child. This Convention acknowledged the importance of children's agency and right to be heard in decisions that affect them. This paper considers the concepts of social and climate justice from a child-centric position and critically reflects on what may constitute justice in the context

of recovery from climate related disasters. Drawing on the findings from the Children's Climate Risk Index (CCRI) project, we propose ways in which children and young people may be engaged in assessing and responding to climate change over multiple spatial and temporal scales. We conclude by discussing how children can contribute significantly to social justice discourses and disaster recovery initiatives in ways that help ensure that responses are reflective of their agency and are better tailored to both their lived experiences and the futures that they envision for themselves.

Living-TransForming Disaster Relief Shelter: An Approach Towards Effective Post-Disaster Housing

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Abstract: Literature indicates project management factors resulting in post-disaster shelter provisions' low satisfaction. Due to the pressing need to often provide a large quantity of DR-shelters over a short time after a disaster, rush or delays in delivery can result in adverse long-term effects on associated quality, sustainability and costs. While recent approaches have proposed the DR-shelters' incremental upgrade encouraging self-recovery, they have not addressed previous failings and the provision of environmentally friendly and economically efficient solutions mainly due to dependency on external resource allocation faced with pre-existing or disaster-related lack of infrastructures.

Therefore, to address this knowledge gap, this research proposes a holistic co-biodesign speculation process framework for future living transforming (LTF)DR-shelter to translate its visions and speculations on different scales of project and product management and product design (shelter, material, organism…) systematically. The framework is framed around the proposed self-upgrading LTF DR-shelter vision, facilitating self-recovery more, integrating separate emergency and temporary shelter into one initial ten-kit (living-textile), and self-transforming into monolithic self-sustaining structure onsite. It is envisaged that the proposed framework will facilitate co-creation across the design team from the initial bio-design stages, accelerating the design process for DR-shelters that respond to the factors, context and resources associated with the specific post-disaster.

The framework is being developed through existing DR-shelter and Bio-design literature's comprehensive qualitative and SWOT analysis and through three stages of formulation, validation, and application testing with subject experts. Furthermore, the research design adopts a foresight approach (framework and methods) to address the research aim and objectives.

The Role of Communities in the Management of the 2014-15 Floods events in Malaysia

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Abstract: Flooding is one of the most dangerous natural hazards in Malaysia occurring almost yearly and affecting around 22 per cent of its population. Notably, the floods between December 2014 and January 2015 were the worst experienced in decades, killing 24 people and affecting 200,000 people. Notwithstanding regular occurrence of floods and efforts from community members both in rural and urban areas to mitigate the severity of its impacts, the lack of facilities, equipment and poor communication and coordination with local authorities and governmental agencies have often exacerbated situations. Thereby leading to the continued experiencing of harsh realities post-disaster. In view of this, this study aimed to investigate how the responses of local people fit in a multi-level governance structure in a country with state-centric apparatuses for disaster management. Using the communities of Kelantan state and Temerloh in Central Pahang as case studies, the study employed a

survey strategy of 80 households and data was analysed using descriptive statistics and thematic analysis. The findings reveal that while local communities in many Malaysian districts have implemented actions to manage and mitigate flood risks during the 2014/15 events. Most community districts rely on volunteers as opposed to their local authorities' agencies. Additionally, the finding identified a failure in the Disaster Risk Management top-down approach to empower local people and raise disaster risk awareness which had an impact on their involvement and decision-making process. The study contributes to the discourse and empirical body of knowledge on disaster management and mitigation that would be beneficial to policy makers and further research on empowering local communities.