Australian National University

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The Voice of Knowledge & Innovation

RISK, RESILIENCE AND RECONSTRUCTION: SCIENCE AND GOVERNANCE FOR EFFECTIVE DISASTER RISK REDUCTION AND RECOVERY IN AUSTRALIA, ASIA AND THE PACIFIC

'There is nothing natural about natural disasters.' O'Keefe, 1976

APRU 14th Multi-Hazards Symposium in collaboration with the Research School of Earth Sciences, College of Science, The Australian National University

Tsunami overtopping seawall defence in Miyako, Japan, 11 March 2011 (photo from Miyako City Office via Reuters)

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Conference Convenors:
Professor Helen James and Professor Phil Cummins

Conference Organizing Committee:
Associate Professor Lorrae Van Kerkhoff
Associate Professor Michael Eburn
Associate Professor Jamie Pittock
Dr Colleen Lau
Dr Marta Yebra
Dr Anna Lukasiewicz
Dr Aparna Lal

PROGRAM

Contents

Reception 21 October 2018

Great Hall University House, ANU

6:30 – 9:00pm

For all Invited Guests and Delegates –

Sponsored by the Research School of Earth Sciences, College of Science, ANU

Registration: from 6:00pm

Host: **Professor Mike Calford**
Provost ANU

With Special Guests:
Dr Matilda House, Indigenous Elder,
Members of the Diplomatic Corps

Guest Speakers:
Mr Fernando de la Cerda Bickford, Counsellor of the Embassy of the Republic of Guatemala, representing H. E. Ms Connie Taracena Secaira

Ms Christina Schoenleber,
Director, Policy and Programs, APRU Secretariat

Professor Osamu Murao, IRIDeS

Professor Simon Haberle, Director, School of Culture, History and Language, College of Asia Pacific – Vote of thanks to Guest Speakers

Day 1 – Monday, 22 October 2018

Registration: 8:15 – 8:45am
Venue: Great Hall, University House, ANU

Opening Ceremony

9:00 – 9:05 Welcome Professor Brian Schmidt, AC, Vice Chancellor, ANU
9:05 – 9:15 Dr Matilda House, Welcome to Country Ceremony
9:15 - 9:25 Mr Paul Kelly, Acting First Assistant Secretary, Humanitarian, NGOs and Partnerships, Division, Department of Foreign Affairs and Trade, Canberra
9:25 – 9:30 Address by APRU representative Ms Christine Schoenleber, Director, Policy and Programs, APRU Secretariat

Addresses by Distinguished Keynote Speakers
Chair: Professor Kiaran Kirk, Dean College of Science, ANU
9:30 – 10:00 Keynote Speaker One:
Carolina Distinguished Professor Susan Cutter
Director of the Hazards and Vulnerability Research Institute
University of South Carolina

Vulnerability and Resilience Science: Concepts, Tools and Practice

10:00 – 10:30 Keynote Speaker Two:
Professor Kyle Powys Whyte, Timnick Chair in the Humanities,
Michigan State University

On Indigenous Resilience: Histories, Theories and Practices

10:30 – 11:00 Questions and Discussion
Vote of Thanks to Keynote Speakers: Professor Stephen Eggins, Director Research School of Earth Sciences

11:00 – 11:30 Morning Tea and conference photo – sponsored by *Climate*

Chair: Professor Rajib Shaw, Keio University
Disaster Risk Reduction, Resilience and Climate Adaptation

11:30 – 11:50 Dr Jonathan Lassa, CDU
Political commitment for disaster risk reduction and climate adaptation in Australia, Asia and the Pacific

11:50 – 12:10 Professor Vinod Kumar Sharma, Indian Institute of Public Administration
Use of Scientific Knowledge and Public Participation in Disaster Risk Reduction in post-earthquake reconstruction in the state of Sikkim, India

12:10 – 12:25 Dr Bev Sithole, CDU
Hazard Smart Remote Communities in Northern Australia

12:25 – 12: 45 Questions and Discussion

12:45 – 13:15 Lunch – sponsored by the School of Culture, History and Language, College of Asia Pacific

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13:15 – 14:30 Special Panel Discussion: APRU
Chair: Dr Takako Izumi, IRIDeS/Tohoku U/APRU M-H program

Stakeholder Engagement: Science, Technology and Innovation in Disaster Risk Reduction

Panel:
Professor Rajib Shaw, Keio University;
Professor David Sanderson, UNSW;
Professor Helen James, ANU;
Dr Riyante Djalante, UNU-Tokyo; and
Mr Asmal Perwaiz, ADPC Bangkok

14:15 – 14:30 Questions and Discussion

Chair: Professor Douglas Paton, Charles Darwin University
Policy and Governance of Disaster Mitigation and Learning Lessons

14:30 – 14:50 Dr Daniel Hikuroa, University of Auckland
How Indigenous Knowledge can Reduce Risk, Facilitate Recovery and Increase Resilience

14:50 – 15:10 Dr Syamsidik, Syiah Kuala University, Banda Aceh Indonesia
Challenges to Preparing the Unprepared: Coastal Communities in Indonesia in the Context of Coastal Hazards and Impacts of Climate Change

15:10 – 15:30 Professor Stephen Roberts, ANU

Towards Efficient Uncertainty Quantification as Applied to Tsunami Runup.

15:30 – 15: 50 Professor Dr Osamu Murao, IRIDeS,Tohoku University, Japan

Tsunami Mitigation Strategies in the Coastal Areas Affected by the 2011 Great East Japan Earthquake and Tsunami

15:50 – 16:05 Questions and Discussion

16:05 – 16:15 Afternoon Tea – sponsored by the ANU College of Law/School of Legal Practice

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Chair: Associate Professor Geoffrey Cary, ANU
Risk information and Decision Making

16:15 – 16:35 Associate Professor Seth Westra, University of Adelaide

Future Climate Risk: the Challenge of Compound Events

16:35 – 16:55 Dr Jane Sexton, Geoscience Australia
Access to Hazard and Risk Information to underpin Decision-making

16:35 – 16:55 Dr Andrew Gissing, Risk Frontiers
Better Practice Planning for Catastrophic Disasters

17:00 – 17:15 Questions and Discussion

Close Day One of Conference

7:00 – 10:00 Conference Dinner for Invited Speakers, Delegates and Distinguished Guests (Venue Great Hall, University House)
Sponsored by the Research School of Earth Sciences, College of Science, ANU

(nibbles and drinks to be provided in the foyer of Great Hall from 6:30pm)

Host: Professor Joan Leach, Director, Centre for the Public Awareness of Science, ANU

After dinner speaker: Dr Alan Ryan, Executive Director, Australian Civil Military Centre (ACMC)

Professor Saul Cunningham, Director, Fenner School of Environment and Society. Vote of thanks to Dr Alan Ryan

Day 2 - 23 October 2018

Chair: Emeritus Professor Stephen Dovers, ANU
Multi-agency Governance and Support to Decision Makers

9:00 – 9:20 Dr Alan Ryan, Executive Director, Australian Civil Military Centre, Department of Defense
Improving multi-agency governance arrangements for preparedness, planning and response: Implementing the Integrated Approach in Australia

9:20 -9:40 Professor Holger Maier, University of Adelaide
A Spatial Decision Support System for Natural Hazard Risk Reduction Policy Assessment and Planning

9:40 – 10:00 Dr Christine Kenney, Massey University, NZ
Envisioning Collaborative Governance in Disaster Risk Reduction in Aetearoa, New Zealand

10:00 – 10:15 Questions and Discussion

10:15 – 10:30 Morning Tea – Sponsored by the Fenner School of Environment and Society

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Chair: Professor David Sanderson, UNSW
Fostering alternative approaches to sustainability and decision support tools

10:30 – 10:50 Emeritus Professor Stephen Dovers, FASSA, ANU
Getting better at Disaster Risk Reduction: Managing Lessons or Learning Policy?

10:50 – 11:10 Dr Petra Buergelt and Professor Douglas Paton, CDU
A Key Approach to Effective DRR: Transforming Western

Worldviews towards Indigenous Worldviews

11:10 – 11:30 Professor Cynthia Neri Zayas, University of The Philippines
Using Resilience Practice from Indigenous Local Knowledge in Japan and the Philippines

11:30 – 11:50 Dr Minako Sakai, ADFA, UNSW
Fostering Community Resilience by Connectivity between Victims and Supporters in Post-disaster areas in the Asia Pacific Region

11:50: 12:05 Questions and Discussion

12:05 – 12:45 Lunch – sponsored by the Bushfire and Natural Hazards Cooperative Research Centre

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Chair: Associate Professor Michael Eburn, ANU
Resilience Planning and the Built Environment

12:45 – 13:05 Associate Professor Alan March, University of Melbourne
Ways Forward for the Governance of Integrated Urban Planning and Emergency Management

13:05 – 13:25 Professor Jiang Xu, The Chinese University of Hong Kong
Post-disaster resilience planning in China: towards a resilience-based approach?

13:25 – 13:45 Dr Mittul Vahanvati, RMIT
Build Back Better, Risk Reduction and Disaster Resilience: key Determinants of their Linkages

13:45 – 14:05 Dr Riyanti Djalante, United Nations University, Japan
Governance for Disaster Recovery and Reconstruction: a Systematic Literature Review

14:05 – 14:25 Questions and Discussion

14:25 – 14:45 Afternoon Tea

Chair: Professor Holger Maier, University of Adelaide
Engaging with Future Risk

14:45 – 15:05 Professor Douglas Paton, CDU
All singing from the same song sheet: Disaster Risk Reduction through engagement and the visual and performing arts

15:05 – 15:25 Dr Daniel Every, CQU and Ms Peta Miller Rose, QFES
'I think I am going to be frightened out of my wits:' Defining, measuring and enhancing psychological preparedness to improve decision-making during natural disasters

15:25 – 16:45 Dr Jessica Boylan, Edith Cowan University
Measuring psychological preparedness for bushfires

16:45 – 17:05 Assistant Professor David Lallemant, Nanyang Technological University, Singapore
Modelling Dynamic Risk Driven by Changing Hazard, Vulnerability and Exposure

17:05 – 17:20 Questions and Discussion

Close of conference – Professor Helen James and Professor Phil Cummins, Thank you to APRU/ANU, sponsors, Participants, University House, Assistants

ROUNDTABLE with Professor Kyle Powys Whyte

Tuesday 23 October 2018
11:30am – 1:30pm

Venue: North Room, University House

Colonialism, Risk Reduction and Resilience Planning

Chair: Dr Matt Colloff

Colonialism strikes some people as either an abstract concept with few practical uses or a historical state of affairs. These views suggest that the study and analysis of colonialism is unrelated to risk reduction, hazard mitigation and resilience planning projects. This roundtable workshop will show otherwise. While, at one level, colonialism refers to a theory of structural oppression which can be articulated abstractly, at another level, colonialism actually points to current and highly tangible states of affairs that Indigenous peoples and other groups face in places such as the U.S. or Australia. These states of affairs, depending on the place, include legal barriers against land claims and treaty rights, sedimented ecological changes, territorial dispossession, sexual violence, and racism. The workshop will seek to both overturn some misconceptions of colonialism, such its being only historic, and also offer lessons and recommendations from practical experiences about how deep understandings in the role of colonialism can play a crucial role in understanding the ways in which Indigenous peoples and other groups face risks, hazards, and obstacles to achieving resilience. Among other forms of domination, such as labor exploitation and economic marginalization, colonialism can be defined specifically as a form of social power that undermines resilience. Kyle Whyte will provide cases from his work on Indigenous climate change planning and resettlement in North America, and connect that work to groups such as African American communities. The workshop is called a roundtable because there will be both the introduction of concepts and practices from the speaker and a large amount of time for conversation among the participants. The workshop is designed for graduate students and resilience and other planning and hazard professionals, and will also be of significance for researchers and professors. Given the wealth of experiences of attendees at this conference, participants will be encouraged to share briefly any of their experiences, best practices or reflections on what connections the concepts and realities of colonialism have for risk reduction, hazard mitigation and resilience planning projects.

PANEL 1. FLOODS, ENVIRONMENTAL MANAGEMENT, GENDER AND CLIMATE CHANGE

Venue: Common Room, University House

Time: 14:30 – 17:30; 22 October 2018

Chair: Associate Professor Jamie Pittock, ANU

1. **Dr Mucahid Bayrak, College of Liberal Arts, National Taiwan Normal University, Taipeh**

   Are Vietnamese farmers able to combat global climate change? A study on Perceptions and Attitudes of Local Households towards Sustainable Forest Management of Climate Change Intervention

2. **Dr Thong Tran, NUS**

   Institutional effects on rural adaptation in the Vietnamese Mekong Delta: Evidence of farmers' responses to post-dyke environmental change

3. **Emeritus Professor Robert J. Wasson, ANU**

   Estimates of Flood Hazards: The 'Real and the Unreal'

4. **Mr Luigi Toda, Oxfam, The Philippines**

   RISE from floodwaters: An Integrated Risk-based Approach to Flood Management

5. **Fong-Zuo Lee, Jihn-Sung Lai, Wen-yi, Chang and Yih-Chi Tan, National Taiwan University**

   Assessments of Induced Disaster on Woody Debris and Turbidity Current Venting in a Reservoir

6. **Professor Yih-Chi Tan, National Taiwan University**

   How to make flood prone communities resilient: Case study from Taiwan

7. **Dr Mo Hsiung Chuang, Ming Chuan University, Taiwan**

   Assessing the adaptation benefits of JW Eco-Technology in flood disasters

8. Assistant Professor Indrajit Pal, Asian Institute of Technology, Thailand

Social Resilience and Flood Vulnerability Assessment at the Local Level: A system Approach in Sakon Nakhon Province, Thailand

9. Professor Md Anwarul Abedin, Bangladesh Agricultural University

Climate Change, water and conflict nexus: Gender based adaptation measures in coastal Bangladesh

PANEL 2.– PACIFIC DISASTER RISK, RESILIENCE, HEALTH AND MANAGEMENT

Venue: Common Room, University House

Time: 9:00 – 12:45; 23 October 2018

Chair: Dr Andrew Gissing, Risk Frontiers

1. **Dr Colleen Lau, NHMRC Fellow, ANU**

   Prevention and Control of Emerging Infectious Diseases in the Pacific Islands

2. **Dr Van-Mai Cao-Lormeau, Research Director, Unit of Emerging Infectious Diseases, Institut Louis Malardé, Papeete, Tahiti, French Polynesia**

   When the flap of mosquitos' wings in small Pacific islands causes tornadoes in the rest of the tropical world: Zika and other emerging arboviruses

3. **Dr Amelia Turagabeci and Professor Paul Jagals, Fiji National University**

   Building Capacity for Disaster Management – the role of Fiji National University as a regional educator

4. **Dr Nasir Hassan, WHO, Western Pacific Region, Suva**

   Climate Change and Health in the Pacific

5. **MrsTautalaMauala**

   Disaster Risk Reduction and Recovery in Samoa

6. **Professor Andreas Neef, University of Auckland**

   Guiding framework for engaging diverse populations in disaster risk reduction: Reach, Relevance, Receptiveness and Relationships

7. **Associate Professor Chris Ballard and Dr Meredith Wilson, ANU**

   People, Place and Story: contexts for local knowledge in disaster

Mitigation

8. **Dr Laura Bruce, UNSW**

   What does neighbourhood level urban resilience look like in the Pacific context?

9. **Dr Maelle Calandra, University of Paris Sciences and Lettres**

   Cyclone Pam: An anthropological perspective on a long term disaster (Tonga, Vanuatu).

10. **Professor Andreas Neef, University of Auckland**

    The Tourism-Disaster-Conflict Nexus: Lessons Learned from the Asia-Pacific Region

11. **Associate Professor Adam Switzer, Nanyang Technological University, Singapore**

    On the need for enhanced research on the historical and geological record of past tropical cyclone events in the Western Pacific

PANEL 3.– BUILDING RESILIENCE TO BUSHFIRE HAZARDS

Venue: Common Room, University House

Time: 13:30 – 15:50, 23 October 2018

Chair: Dr Marta Yebra, ANU

1. **Associate Professor Jason Sharples, UNSW/ADFA**

   Reassessing building resilience to bushfire in the age of violent pyroconvection

2. **Dr Melissa Parsons, UNE**

   The Australian Natural Disaster Resilience Index

3. **Associate Professor Geoff Cary, ANU**

Trans-pacific bushfire management research improves outcomes for environment and society

4. **Dr Scott Hanson-Easey, University of Adelaide**

   The Road to Nhill: Sharing Responsibility for Bushfire Prevention

5. **Dr Leonardo Nogueira de Moraes, University of Melbourne**

   Natural Hazard Mitigation for Disaster Risk Reduction – knowledge, research and stakeholder engagement

6. **Mr Changming Yin**

   Burn severity estimation of North Australian Tropical Savannas using Radiative Transfer Model and Sentinel-2A MSI Data

7. **Mr Andrea Massetti**

A method for forest fuel assessment and recovery based on satellite remote sensing.

PANEL 4. USING SCIENCE FOR IMPROVED EARTHQUAKE, LANDSLIDE, CYCLONE AND VOLCANIC RISK REDUCTION ASSESSMENT AND MANAGEMENT

Venue: Drawing Room, University House

Time: 9:00 – 12:45; 23 October 2018

Chair: Dr Jane Sexton, GeoScience Australia

1. **Professor Phil Cummins, ANU**

   Interdisciplinary/International Collaboration in Earthquake Research and Education to Support the Development of the Indonesian disaster risk reduction program

2. **Associate Professor Edris Alam**

   Enhancing landslide risk reduction strategies in SE Bangladesh

3. **Dr Sujan Babu Marahatta**

   Knowledge and Practice of Earthquake Preparedness and Management in secondary school students of Kathmandu District, Nepal

4. **Dr Paolo Miguel Manalang Vicerra, Chulalongkorn University**

   Bangkok, Thailand

   Vulnerability and risk perception: The 2013 Bohol earthquake in The Philippines

5. **Mr Sebak Saha, Anthropology, CAP, ANU**

   Responses to cyclone warnings: the case of Cyclone Mora (2017) in Bangladesh

6. **Mr Craig Arthur, Geoscience Australia**

   National Scale Tropical Cyclone Hazard: Unlocking local scale Events for Hazard and Impact Assessment

7. **Dr Gulsan Ara Parvin, Kyoto University, Japan**

   Cyclone Warning and People's Expectation: A case study of Cyclone Aila Affected area, Bangladesh

8. **Mr Matthew Garthwaite, Geoscience Australia**

Towards operational monitoring of volcano deformation in Papua New Guinea using remotely sensed InSAR observations

9. **Dr Jaime Victor, University of the Philippines, Diliman**

   Deterministic Landslide Susceptibility Assessment of Antipolo, Rizal, by Stability Index Mapping

10. **Mr Rexha Verdhora Ry, ANU**

    A Preliminary Result of Microtremor Study for Earthquake Risk Assessment in Jakarta, Indonesia

11. **Associate Professor Christie Lam, Osaka University, Japan**

    Resilience and Disaster Governance: Lessons Learned from the 2015 Nepal Earthquake

PANEL 5. - HUMANITARIAN AID AND IMPROVED URBAN RESILIENCE TO DISASTERS AND CLIMATE CHANGE

Venue: Fellows Room, University House

Time: 13:00 – 15:20; 23 October 2018

Chair: Dr Anna Lukasciewicz, ANU

1. **Professor David Sanderson, UNSW**

   How can humanitarian aid strengthen governance structures to build urban resilience to disasters and climate change?

2. **Associate Professor Stephen Matthewman, University of Auckland**

   Theorizing disaster communitas and disaster capital

3. **Dr Anna Lukasiewicz, ANU**

   The Emerging Imperative of Disaster Justice

4. **Dr Jennifer Day, University of Melbourne**

   Improving Humanitarian Response and Research: The Academic-Practitioner Collaboration for Urban Shelter, South Pacific (APCUS-SP)

5. **Dr Solmaz Hosseininoon, Azad University (south branch) and IEES (International institute of earthquake engineering and seismology).**

   Resilience and Informality: Effects of Formalization Processes as Agents of Transformation

6. **Assistant Professor Mojgan Taheri Tafti, University of Tehran**

   Urban life in post-disaster temporary settlements in Iran

7. **Mr Aslam Perwaiz, ADPC Bangkok**

   Private Sector Investment in Enhancing Disaster and Climate Resilience

8. **Ms Ana Lucia Hill, Mexico City**

   Continuity of operations and continuity of government as an investment in sustainable development

9. **Dr Andrew Coghlan, Australian Red Cross**

The Australian Red Cross – Guidelines and Challenges for Translating Evidence Based Research into Practice

PANEL 6:– MITIGATION, EDUCATION AND PREPAREDNESS FOR TSUNAMI RISK

Venue: Drawing Room, University House

Time: 13:15 – 15:35, 23 October 2018

Chair: Professor Stephen Roberts, ANU

1. **Dr Harkunti P. Rahayu, School of Architecture Planning and Policy, ITB Bandung**

   Building Coastal Resilience Through Tsunami Evacuation Plan: Pre-Disaster v. Post-Disaster – Learning from Indonesia

2. **Mr Stephen Sutton and Dr Saut Sagala, CDU, presented by Dr Petra Buergelt/Prof Douglas Paton**

   True, but trivial?: The value of grass-roots cultural local stories and songs as effective DRR strategy on Simaleu, Indonesia

3. **Mr Gareth Davies, Geoscience Australia**

   A new probabilistic tsunami hazard assessment for Australia

4. **Mr Ryan Pranantyo, ANU**

   Understanding the past for a better future hazard assessment: Eastern Indonesia tsunami case studies

5. **Dr Caroline Orchiston, Otago University, NZ**

   Towards tsunami-safer communities in New Zealand: Evaluating Real events, Exercises, Drills and Awareness programmes

PANEL 7:– SOCIAL DRIVERS OF VULNERABILITY AND RESILIENCE

Venue: Torrance Room, University House

Time: 13:15 – 15:35, 23 October 2018

Chair: Dr Christine Kenney, Massey University, NZ

1. **Ms Yixuan Chen, Osaka University**

   Disaster preparedness in an ageing society: Ten years on from the 2008 Sichuan Earthquake

2. **Dr Robyn Molyneux, University of Melbourne**

   Delayed disaster impacts on academic outcomes for primary school children

3. **Mrs Patricia Cerone, ANU**

   Matthew effects in long-term recovery

4. **Ms Katelyn Rossiter, Phd student, CDU (presented by Prof Douglas Paton or Dr Petra Buergelt)**

   Social Media: A Valuable String in the Disaster Risk Reduction (DDR) Governance Bow throughout the DRR cycle

5. **Associate Professor Sigi Goode**

   Sociality Perceptions of Social Media During and After a Natural Disaster

6. **Professor Helen James, ANU**

   Risk, Vulnerability and Inequality: Dilemmas of theory and practice in post-disaster reconstruction along the Sendai Coast, Japan, after the Tohoku Triple Disaster, 2011.

PANEL 8: UNIVERSITIES, EDUCATION, LESSONS TO BE LEARNED, RISK AND RESILIENCE

Venue: Common Room, University House

Time: 12:45 – 14:00, 22 October 2018

Chair: Professor Israr Qureshi, ANU

1. **Associate Professor Carol Mutch, University of Auckland**

   The role of schools in disaster response and recovery in the Asia Pacific

2. **Dr Tabassam Raza, Philippine School of Business Administration, Manila**

   Development and Implementation of a Disaster Risk Management Specialization: Philippine School of Business Administration, Manila

3. **Mr Md Dzaky Alfajr, Dirantona, Universitas Gadjah Mada, Yogyakarta, Indonesia**

   On Building Resilience: Universitas, Gadjah Mada (UGM), Student Community Service – Community Empowerment Learning (SCS-CEL)

4. **Dr Robyn Molyneux, University of Melbourne**

   Distress and Satisfaction with Research Participation: Impact on Retention in Longitudinal Disaster Research post-bushfire study

5. **Professor Andre Le Duc, University of Oregon, and Dr John Vargo**

   Disaster Resilient Universities: The ability to not only survive a crisis but thrive in a world of uncertainty

ABSTRACTS AND BIOS

Keynote Speaker 1

Distinguished Professor Susan Cutter

University of South Carolina

Hazards & Vulnerability Research Institute
Department of Geography
University of South Carolina, Columbia SC USA

Vulnerability and Resilience Science: Concepts, Tools, and Practice

This presentation provides an overview of two important concepts in natural hazards science—social vulnerability and community resilience. Conceptually, vulnerability and resilience are related, but they are not the opposite extensions of one another. Instead they are driven by different questions: 1) what circumstances create the social burdens of risk and how do these affect the distribution of risks and losses (e.g. vulnerability); and 2) what enhances or reduces the ability of communities to prepare for, respond to, recover from, successfully adapt to, or anticipate hazard threats, and how does this vary geographically (resilience). In order to provide the scientific basis for disaster risk reduction policies and practices, measurement schemes for social vulnerability and community resilience are required. This presentation reviews an existing tool for measuring social vulnerability, the Social Vulnerability Index or SoVI®, which is widely used in the USA in both hazard mitigation planning and disaster recovery. It describes its development, implementation in the USA, and replications in other countries. Emerging metrics for monitoring community resilience are also described, beginning with the Baseline Resilience Indicators for Communities (or BRIC) Index. This index establishes the baseline conditions, attributes, and assets in communities that exist that can then be used as the standard by which to assess the effectiveness of policy or practice interventions to enhance community resilience. The translation of these two tools into practical use by emergency managers is illustrated using recent USA disasters.

Bio

Dr. Susan Cutter is a Carolina Distinguished Professor of Geography at the University of South Carolina where she directs the Hazards and Vulnerability Research Institute. She received her B.A. from California State University, East Bay and her M.A. and Ph.D. (1976) from the University of Chicago. She is a geographer with primary research interests in the area of disaster vulnerability/resilience science and its measurement. She has authored or edited fourteen books, the most recent published by Cambridge University Press, Hurricane Katrina and the Forgotten Coast of Mississippi, more than 150 peer-reviewed articles and book chapters. Dr. Cutter has mentored more than 50 masters and doctoral students.

Dr. Cutter has led field teams to study long term recovery from Hurricane Katrina (2005), Hurricane Sandy (2012), the October 2015 South Carolina floods, and Hurricane Matthew (2016). She has provided expert testimony to Congress on hazards and vulnerability, was a member of the US Army Corps of Engineers IPET team evaluating the social impacts of the New Orleans and Southeast Louisiana Hurricane Protection System in response to Hurricane Katrina, and was a juror for the

Rebuild by Design competition for Hurricane Sandy reconstruction. Her policy-relevant work focuses on emergency management and disaster recovery at local, state, national, and international levels.

Dr. Cutter has served on many national and international advisory boards including those of US National Research Council (NRC) and the National Science Foundation (NSF), United Kingdom's DFID Research Advisory Group, and ICSU's Integrated Research on Disaster Risk Programme. Dr. Cutter serves on numerous editorial boards as editor, co-editor, or board member. She is also serving as the Editor-in-Chief for the Oxford Research Encyclopedia of Natural Hazard Science.

Dr. Cutter is an elected Fellow of the American Association for the Advancement of Science (AAAS) (1999). She is also past President of the American Association of Geographers (AAG) (2000), and past President of the Consortium of Social Science Associations (COSSA) (2008). Dr. Cutter held the MunichRe Foundation Chair (2009-2012) on Social Vulnerability through the United Nations University-Institute for Environment and Human Security, in Bonn, Germany. In 2010, Dr. Cutter received the Lifetime Achievement Award from the AAG, its highest honors and was awarded its Presidential Achievement Award in 2018. In 2015 she was awarded an honorary doctorate from the Norwegian University of Science and Technology in Trondheim, Norway and was also elected as a foreign member of the Royal Norwegian Society of Sciences and Letters.

Keynote Speaker 2

Professor Kyle Powys Whyte

Michigan State University

On Indigenous Resilience: Histories, Theories and Practices

Indigenous peoples' environmental and climate justice movements have long been among the most visible and impactful environmentalisms globally. While Indigenous peoples often refer to "resilience" as one of their environmental aspirations, little is still known or taught in academic, professional and policy spheres about the Indigenous intellectual traditions and histories from which Indigenous concepts of resilience arise. This presentation will provide an overview of Indigenous environmental studies as a field with ancient roots and contemporary theories and practices. Some of the key findings of this field are the different ways in which concepts similar to resilience are developed through studies of moral relationships, including responsibility, interdependence and justice. The presentation will show how this field presents important insights for academics, professionals and policy-makers who are interested in resilience or using resilience frameworks. The Pacific region has been an important location for Indigenous environmentalism focused on concepts of resilience, some recent examples including the legal victory of the Whanganui Iwi in Aotearoa to push New Zealand to recognize the Whanganui river as a legal person, the Inuit Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations Resulting From Global Warming Caused by Acts and Omissions of the United States, and the diverse actions and publications on Indigenous traditions of sustainable development organized by the Tebtebba Foundation (the Indigenous Peoples' Centre for Policy Research and Education). The presentation will discuss Indigenous resilience in this context as

well as cover some recent research findings on how Indigenous and non-Indigenous partners interested in resilience can work together best.

Bio

Professor Kyle Whyte is the Timnick Chair in the Humanities, Associate Professor of Philosophy, and Associate Professor of Community Sustainability at Michigan State University. His research addresses moral and political issues concerning climate policy and Indigenous peoples, the ethics of cooperative relationships between Indigenous peoples and science organizations, and problems of Indigenous justice in public and academic discussions of food sovereignty, environmental justice, and the anthropocene. He is an enrolled member of the Citizen Potawatomi Nation.

Other Speakers (Alphabetical Order)

Md. Anwarul Abedin

Bangladesh Agricultural University, Department of Soil Science

Climate change, water and conflict nexus: Gender based adaptation measures in coastal Bangladesh

Abstract

Climate change impacts disproportionately affect the world's 1.3 billion poor, the majority of whom are women. Women suffer heavily from the consequences of climate change, such as reduced harvests and increasing food and water insecurity, which are often compounded by conflict. Conflict contributes to the shifting of gender's role. Women are contributing to both adaptation and mitigation efforts in many parts of the world, and they are creating innovative and localized solutions to build resilient communities. 2.5 million people of the southwest part of Bangladesh, particularly suffer from a serious safe water crisis. Taking into account nexus among climate change, water and conflict issue, it is imperative to adopt gender-responsive approaches that are essential in achieving cost-efficient and successful adaptation measures. By means of four FGDs with 40 participants and validated by expert consultations, we conducted analysis to understand the main perceived impacts from climate and water; and the adaptation responses from men, women and adolescent boys and girls. Findings show that climate change aggravates conflict via water scarcity in the study area. Water consumption and collection pattern varies among men, women, boys and girls, accordingly. Social and domestic conflicts occur on the way to collect water via eve teasing and; create argument and competition at the water source point for long queue anomalies. Household rainwater harvesting is the best possible way to meet water demand and overcome conflicts. Moreover, better access to information and involvement of women in water management programs are other adaptation options.

Keywords: Climate change, water and conflict, Gender and adaptation, Bangladesh

Bio

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2011 in environmental studies. Subsequently, he did JSPS postdoctoral research during 2011- and 2013 in the same university on international environment and disaster management. Dr. Abedin also worked as a visiting scholar at Northumbria University, UK under the theme of disaster management. He is conducting fundamental and applied research on water quality, water resource management, climate change adaptation and disaster risk reduction issues and also soil fertility and arsenic pollution. Dr. Abedin is collaborating in a number of research projects funded by DFID, NERC, British Council, JICA, CARRIA, Canada, World Bank, Kurita Foundation, Japan; and UGC, MOST and BAURES, Bangladesh. Email:m.a.abedin@bau.edu.bd.

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Dr Edris Alam

Department of Geography and Environmental Studies, University of Chittagong, Bangladesh

Enhancing landslides risk reduction strategies in SE Bangladesh

Abstract

Bangladesh is susceptible to a variety of natural and human induced hazards including tropical cyclones, earthquakes, tsunamis, floods, droughts and landslides due to its geographical location and fragile landscape. Over last fifteen years, the country experienced hill cutting problems and subsequent landslide occurrence in southeast Bangladesh. Landslide took over 600 deaths mostly in informal settlement in Chittagong City since 2000. Recently, on 12 June 2017 the landslides occurred in Rangamati took over 150 lives. Although the Governments of Bangladesh claimed that they undertake sufficient risk reduction strategies, the deaths associated with landslides are increasing following disaster occurrence. This proposed study will address the gap in knowledge by addressing a number of specific scientific and technical issues related to the diverse disciplinary fields of hazard and risk assessment and emergency response mechanism. It will engage a growing community of scholars, civil servants, emergency management officials, and policy makers who are dealing with landslide disaster governance in Bangladesh. Assessing institutional policies and communities hazard perception, disaster preparation and responses for emergency events may help to identify knowledge gaps and support developing response mechanisms to better prepare for future hazard events. In order to fulfill the objectives, the research will be organized in four work packages (WPs) and address and resolve a number of specific scientific and technical issues related to the diverse disciplinary fields by using digital technologies for 1) hazard identification and assessment; 2) disaster preparation; 3) institutional emergency response; and 4) strategic plan to improve institutional capacity dealing with landslide disaster preparedness and emergency response. Thus, the study seeks to increase landslide

disaster resilience of Bangladeshi communities by saving lives, reducing financial losses and strengthening safe living environment.

Keywords landslides, hazards, disasters, preparedness

Bio

Dr Edris Alam has been active in disaster research since 2000 while conducting his MSc thesis entitled 'post tropical cyclone disaster management' in the Department of Geography and Environment, University of Dhaka, Bangladesh. He is an Associate Professor in the Department of Geography and Environmental Studies at the Chittagong University (CU), Bangladesh. To enhance his capacity to contribute to disaster risk reduction, he studied a specialized Masters Degree (2006-2007) in Disaster Management and Sustainable Development at the Northumbria University, UK. Edris has a significant track record of high quality research outputs by publishing in the science of climate change, natural hazards, risk, vulnerability and disaster management. Since completing his MSc in 2002, Edris has published seven major international journal papers (e.g. Disasters, Earth-Science Reviews, Natural Hazards and International Journal of Climatology), one book and a further eight refereed publications in domestic and regional journals on extreme climatic events and disaster risk reduction. In November 2014, Edris received his PhD in Disaster Risk Reduction in Bangladesh from the University of New South Wales (UNSW), Australia. Email drisalam@yahoo.com

Craig Arthur
Geoscience Australia

National scale TC hazard: unlocking local scale events for hazard and impact assessment

Abstract

Geoscience Australia (GA) has recently updated the national Tropical Cyclone Hazard Assessment (TCHA), implementing a number of improvements over previous hazard assessments. The TCHA intends to address the challenges of inferring average recurrence interval wind speeds for application to building design standards. More and more, users are recognising the benefit of accessing individual events generated in the TCHA, for example to support scenario planning exercises for emergency management.

The model is structured to ensure data is accessible and delivers the information required by end users. Users can interrogate the event catalogue in a meaningful way – for example to select events that pass within a specified distance of a location, or events that exceed some threshold such as a specific TC intensity category. Users can extract TC events that may have never before been observed – such as a direct strike of a category 5 cyclone on Cairns. This is particularly useful for EM planning for communities where there has been no previous experience with major TCs and the community has become complacent.

To evaluate the impacts of hazard events, GA provides the HazImp tool, which relates hazard magnitude to physical damage of buildings by applying building-specific vulnerability functions. In

combination with events selected from the TCHA, users can simulate the damage caused by a TC. Emergency managers can use scenarios to develop contingency plans using realistic, but previously unseen events. With judicious selection of vulnerability functions, we can explore the benefits of improved building standards for resilience to extreme wind hazards. Keywords: Natural hazards, tropical cyclone, impacts, scenario

Bio

Craig Arthur leads the Atmospheric Hazards Activity at Geoscience Australia, focused on developing models and information on tropical cyclones and other weather-related hazards. Craig has led numerous projects exploring the impacts of cyclones, both in Australia and in the Asia-Pacific region, as well as the influence of climate change on tropical cyclone impacts in the South Pacific. Many of these projects have used the statistical-parametric Tropical Cyclone Risk Model that Craig has developed at GA. Email: craig.arthur@ga.gov.au

Associate Professor Chris Ballard

College of Asia and the Pacific, ANU, and Dr Meredith Wilson, Collage of Arts and Social Sciences, ANU

People, Place and Story: contexts for local knowledge in disaster mitigation

Abstract

Local, Indigenous or community knowledge of disaster mitigation measures is rarely if ever arranged in a discrete body that can be made neatly available to disaster professionals or researchers. Rather it is distributed across and embedded within a wide range of other domains of knowledge, which usually have more regular application in people's daily lives. Drawing on case material from the Pacific Island nation of Vanuatu, identified by the World Risk Report as the highest-risk country in the world, we show how the local rubric of "People, Place and Story", developed in promoting the Indigenous management of a UNESCO World Heritage site, allows us to situate disaster knowledge within these broader contexts. The analytical device of a "disaster biography", which can be used to trace either the history of disasters and responses for a particular community or the historical development of specific forms of disaster knowledge, provides a means to integrate these contexts within a narrative framework. The arrival in Vanuatu of category 5 Cyclone Pam in March 2015 has pushed these considerations to centre stage, leading to the formalisation of disaster knowledge in the shape of an eventual disaster management plan for the community and its World Heritage site. Keywords: Local knowledge, Disaster mitigation, Indigenous knowledge, Vanuatu

Bio

Chris Ballard is a Pacific historian at the Australian National University, and Associate Professor in the College of Asia and the Pacific. He has conducted long-term field research as an archaeologist, historian and anthropologist, principally in Southeast Asia and the Pacific. His present work focuses on cultural heritage and World Heritage, indigenous historicity and natural hazards, resource ownership and land rights. He teaches a Masters-level course in disasters in the Asia-Pacific region, has researched disasters in Indonesia, Papua New Guinea and Vanuatu, and is the co-author of a recent UNESCO report on disasters and intangible heritage.

Meredith Wilson is a Visiting Fellow at the College of Arts and Social Sciences at the Australian National University. She has conducted field research as an archaeologist and worked as a heritage consultant in the Pacific region since 1996, and led the national team for the successful nomination in 2008 of the World Heritage site of Chief Roi Mata's Domain, Vanuatu. Since 2016 she has been working in collaboration with IRCI (Osaka) on disasters and intangible cultural heritage in Myanmar and Vanuatu. She is the co-author of a recent UNESCO report on disasters and intangible heritage. **Email:** chris.ballard@anu.edu.au; memlwilson@homemail.com

Assistant Professor Mucahid Bayrak

National Taiwan Normal University, Taipei, Taiwan

Are Vietnamese farmers able to combat global climate change? A study on Perceptions and Attitudes of Local Households towards Sustainable Forest Management and Climate Change Intervention

Abstract

Global efforts to combat global climate change have led to the establishment of the Reducing Emissions from Deforestation and Forest Degradation programme (REDD+). REDD+, which has been negotiated under the United Nations Framework Convention on Climate Change (UNFCCC) since 2005, is a climate change intervention which supports developing countries to combat deforestation and forest degradation in order to reduce forest-related carbon dioxide emissions in exchange for so-called carbon credits. This is needed as deforestation contributes to one-fifth of global carbon dioxide emissions and hence, climate change. This study concerns the implementation of REDD+ among local landscapes and communities in the Socialist Republic of Vietnam. How do affected forest-dependent households in Vietnam perceive their roles in forest management and REDD+ and how do these perceptions and attitudes influence the socio-ecological performance of REDD+? Two communes consisting of forest-dependent and rural communities in Central Vietnam (n=102) were selected for this study–the former involved in the UN-REDD programme and the latter involved in a REDD+ project of Fauna and Flora International. Employing an applied socio-ecological systems (SES) framework, this study ultimately aims to answer the question whether rural communities in Vietnam are able to achieve meaningful bottom-up participation in global climate change intervention programmes, such as REDD+, and concomitantly build more resilience to climate disasters.

Bio

Dr. Mucahid Bayrak is an Assistant Professor in the Department of Geography, College of Liberal Arts, National Taiwan Normal University,Taipei, Taiwan. He teaches various courses on sustainability policy and development cooperation to both undergraduate and graduate students. Mucahid's research concentrates on changing forms of resource management and policy, including the impact of REDD+ on local communities, and urban climate resilience of secondary cities in East and Southeast Asia. His most recent publications have been published in *Geoforum*, *Sustainability*, *Journal of Political Ecology*, and as book chapters in 'Shifting Cultivation and Environmental Change: Indigenous People, Agriculture and Forest Conservation' (Routledge, 2015) and 'Shifting Cultivation Policies: Balancing Environmental and Social Sustainability' (CABI, 2017). He was previously affiliated with the Chinese University of Hong Kong (where he received his Ph.D. in 2015), Harbin Institute of Technology, University of Economics Prague, VU University Amsterdam, Hue University, University of Sydney, Australia.

Dr Jessica Boylan
Edith Cowan University

Psychological preparedness: A new conceptualisation and the development of the Bushfire Psychological Preparedness Scale (BPPS).

Abstract

Bushfires are stress-inducing events requiring people to be mentally and physically responsive to ensure safety and, if safe, stay and defend their property. However, psychological research shows that uncontrolled stress is often associated with poor mental and physical performance. In the bushfire context, it is important for residents to consider the possibility of such compromised performance when developing their plan and determining if they will leave early or stay and defend. Given the stressful nature of fires, fire authorities strongly encourage people to be both physically and psychologically prepared. In spite of this, there is limited information on what psychological preparedness entails; there is limited research and measurement tools are lacking. Therefore, the focus of this project was to develop a conceptualisation of psychological preparedness and a self-report tool to allow for the expansion of psychological preparedness research.

Based on a systematic review, psychological preparedness was conceptualised as an individual's anticipated psychological and emotional ability to cope with the threat, uncertainty, unpredictability and confusion that may be experienced in the warning phase and at a bushfire's point of impact. Using this as the framework, a self-report tool was developed and psychometrically tested. Following rigorous testing, the resulting scale was a 33-item self-report tool, which met the most important criteria for satisfactory reliability and validity. In its current format, this tool can be used by anyone with psychological knowledge who is seeking to understand the psychological preparedness of an individual for a bushfire. With small adjustments a user-friendly one can be developed for public use.

Bio

Jessica completed her PhD in 2016, and investigated psychological preparedness in the bushfire context. She also has a Bachelor of Psychology (Hons) and Master of Psychology (Industrial & Organisational). Jessica is currently a senior research assistant at Edith Cowan University conducting research aiming to improve workplace safety in Australia.

Laura Bruce
UNSW

What does neighbourhood level urban resilience look like in the Pacific context?

Abstract

UNSW is a member of a collaboration between the Australian Red Cross and University of Newcastle, who have secured research funding to address the impact of rapid urbanization in the Pacific context, particularly for those living in informal settlements. The impact of urbanisation in the Pacific has received remarkably little attention despite the fact that in 2015, 10 Pacific Island Countries were over

50% urban and this expansion is mirrored by the growth of informal settlements.

We would like to use the opportunity of this conference to present our findings from this field based research (scheduled for July 2018), which will be guided by participatory appraisal methods to identify: the capacities and capabilities of communities to respond to and recover from the impacts of natural and human induced hazards, resilience in the urban development setting, and community perceptions of vulnerability, risk and resilience.

This research will address the unique vulnerabilities of communities in informal settlements in a capital city in Melanesia to identify the most appropriate adaptation approaches. The concept of resilience in the urban context has recently been used in a range of policy documents in the Pacific; this research will complement this body of work by advocating for a more people-centred approach to resilience and one which represents the views of those in informal settlements, a context that has traditionally been excluded from urban policy considerations. Keywords: urban resilience, Pacific, informal settlements, urbanisation

Bio

Laura Bruce is the Research Associate for the Judith Neilson Chair in Architecture at UNSW. Her area of research is urbanisation, disaster risk reduction and resilience both internationally and in Australia. Laura has thirteen years' experience in advocacy, project management and research across the international development and humanitarian sectors. Email:laura.bruce@unsw.edu.au

Leeanne Marshall is the Shelter Advisor at Australian Red Cross where she supports the delivery of high quality and inclusive shelter assistance to people affected by disaster and crises in the Asia Pacific region. She has worked in both development and emergency situations and is a member of the Strategic Advisory Group for the Global Shelter Cluster. Email: lemarshall@redcross.org.au

Dr Petra Buergelt and Douglas Paton
Charles Darwin University

A Key Approach to Effective DRR: Transforming Western worldviews towards Indigenous worldviews

Abstract

Disaster Risk Reduction (DRR) education strategies that focus on imparting knowledge are largely ineffective in developing the capabilities and relationships required to reduce the risk of extreme natural events occurring and turning into disasters. We propose that this ineffectiveness derives from a prevailing totalitarian, positivistic and rational worldview in Western cultures that result in people defining relationships with nature in largely anthropocentric terms. This worldview hinders people appreciating and understanding their interdependent and reciprocal relationships with nature, themselves and others and the natural sources of hazards. The ensuing disharmony with nature, themselves and others introduced into social-ecological relationships increases the risk of extreme natural events occurring and prevents Western cultures developing DRR strategies based on environmental co-existence. To stem this tide, humanity must urgently (re)establish harmonious co-

existence relationships with nature, themselves and others. We propose that living in harmony/balance with nature represents a cost-effective approach to DRR as it cultivates the individual and collective adaptive capabilities that reduce the risk of extreme natural events and contribute to both effective DRR and activities, and relationships that facilitate well-being in everyday life. We identify challenges to people shifting towards a metaphysical, nature-based, unified and egalitarian worldview that facilitates living in harmony/balance with nature, themselves and others. We discuss how transformative pathways, including transformative education, (re)learning from Indigenous people, art and ancient healing systems, can facilitate the ability of Western cultures to engage in transformative processes. This shift in worldview may hold the key to both human survival and thriving.

Bio

Dr Petra Buergelt is a social scientist and senior lecturer at Charles Darwin University, Australia, specializing in human adaptation and transformation in the context of DRR. Besides being the Deputy Chair of the Group of Energy Efficient Researchers (GEER) Australia, I am also a Sylff Fellow (Royichi Sasakawa Young Leaders Program, Tokyo Foundation-Nippon Foundation) and an International Associate at the Centre for Applied Cross-Cultural Research (Victoria University, NZ). I am passionately contributing to creating a paradigm shift that empowers humans to thrive in the face of uncertainty, complexity and change by living in harmony with themselves, others and nature using transformative processes. I am employing innovative qualitative research designs in trans-disciplinary and international projects in the areas of DRR, migration and Indigenous knowledges. Recently, I was the principal researcher for a $12.4 million project with six Australian Indigenous Communities that was awarded several national awards including the NAIDOC Award.

Maëlle Calandra

EPHE/PSL – CREDO, CREDO Maison Asie Pacifique Aix Marseille Université

Cyclone Pam : An anthropological perspective on a long term disaster (Tongoa Island, Vanuatu).

Abstract

Tongoa was one of the worst-hit islands in Vanuatu when it was struck on 13 March 2015 by Cyclone Pam, the most severe climatic event recorded in the South Pacific for several decades. The cyclone left both material and immaterial damage in its wake. Nearly all of the buildings on the island were damaged, the subsistence gardens were wiped out and people were emotionally affected by the violence and the losses generated by the event. Within a few days, a range of international NGOs arrived to provide assistance to the local population in its recovery process. They provided food, basic tools, and 'shelter kits' with which to build temporary houses, and ran awareness workshops about disasters. This paper examines both short and long term ethnographic data about the changes introduced to Tongoan lifeways by Cyclone Pam. I describe the life-cycle of Pam as an event, and consider what it has introduced to everyday life in Tongoa: new ideas and discourses, new constructions, and new objects and artistic creations. Thus, this case study offers insights about

material and immaterial aspects of a devastating event in a context where humans have always attempted to overcome disasters. Keywords: Cyclone Pam; Tongoa Island; post-disaster recovery

Bio

I'm currently a postdoctoral fellow at EPHE, a research associate at the CREDO (UMR 7308), and a lecturer in the University of Paris Sciences & Lettres. I specialise in Pacific societies, particularly in rural Vanuatu. My work sits at the nexus of theorisations of disaster and anthropology of nature; more specifically I am investigating how the notion of catastrophe is closely intertwined with relationships between people and their environment. Email: maelle.calandra@gmail.com

Dr Van-Mai Cao-Lormeau

Research Director, Unit of Emerging Infectious Diseases

When the flap of mosquitos' wings in small Pacific islands causes tornadoes in the rest of the tropical world: Zika and other emerging arboviruses

Abstract

The circulation of the four serotypes of dengue virus for almost a century and the recent emergence of Zika and chikungunya viruses in the Pacific islands may result from multiple drivers, including the presence of competent vectors, environmental and social contexts prone to populations' exposure to mosquito bite, and limited resources to implement sustainable vector control, organize surveillance and manage outbreaks. Moreover, increasing travel between the Pacific islands and tropical continental countries in Asia, Southeast Asia and Latin America did offer and is still offering the opportunity for new arboviral strains to be introduced into island populations that sometimes are totally immunologically naïve for such viruses. As an example, the introduction of Zika and chikungunya viruses in the Pacific islands resulted in large outbreaks and subsequent dissemination of those viruses at regional and global scales. Whether related to natural disasters (floods, tsunami, typhoon) or human driven (intensive urbanization) the events that result in mosquito proliferation and higher human density increase the risk for arboviruses' emergence and transmission. We will discuss here the public health issues the Pacific islands face from the circulation and the emergence of arboviruses and how to reduce their impact. We will also discuss the point that in our connected world where people mobility has been exploding, a neglected tropical disease affecting small isolated islands has the potential to become a public health emergency of international concern.

Bio

Van-Mai Cao-Lormeau is leading the research programs on arboviruses within the Unit of Emerging Infectious Diseases at the Institut Louis Malardé, Tahiti, French Polynesia. She has extensive experience in conducting research within the Pacific region. She has been the PI of several projects interested in the surveillance, epidemiology, molecular epidemiology and prevalence of arboviruses in the Pacific islands. She has authored and co-authored more than 50 articles in top ranked medical and research journals, including almost all the articles on Zika virus in the Pacific. She led the laboratory experiments that contributed to confirming the link between Guillain-Barré syndrome and Zika virus infection. She coordinated Zika and chikungunya post-outbreak population serosurveys in French Polynesia and in Fiji. She also supervised the laboratory experiments that provided first data

on the vector competence of local mosquito populations for Zika and chikungunya viruses. She is currently the PI of a project interested in the risk factors for Zika virus emergence and recurrent outbreaks within the Pacific area.

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Associate Professor Geoff Cary

Fenner School of Environment and Society, The Australian National University, Acton, ACT, 2601

How can humanitarian aid strengthen governance structures to build urban resilience to disasters and climate change?

Abstract

Bushfires, or wildfires, are a critical ongoing land management challenge in Pacific Rim countries. Bushfire disaster mitigation, consisting of various combinations of managing fuel and fire, protecting or relocating assets, and enhancing community resilience, is expensive but vital for the integrity of environment and society. Insights into allocation and optimisation of effort by government land managers, across activities like bushfire fuel treatment by prescribed burning and prevention and rapid attack of bushfire ignitions, is fundamentally important, particularly in the context of the changing climate. This presentation explores insights from landscape-scale computer modelling of fire management effectiveness in fire-prone environments around the world, including the USA, Canada and Australia. The relative effectiveness of different approaches to bushfire fuel treatment, including landscape prescribed burning and focused management adjacent to assets, and bushfire ignition management is explored. Important for this forum is the independent reporting by a government land management agency of the relevance of this research in contributing to successful outcomes in a recent, severe bushfire season in south eastern Australia. Central to this research effort has been a long standing collaboration between fire researchers from universities and state and federal agencies from around the Pacific Rim, and key aspects of this relationship will be discussed.

Keywords: Wildfire, Modelling, Management, Collaboration

Bio

Dr Geoff Cary is Associate Professor in bushfire science in the Fenner School of Environment and Society at the Australian National University (ANU). Geoff was awarded a Bachelor of Applied Science (Environmental Biology) (Honours) from the University of Technology, Sydney, and a PhD in the topic of landscape fire modelling from ANU. His research interests include: landscape-scale simulation of fire management and climate change effects on fire regimes; fire ecology from genes to communities; house loss in wildland fire; and laboratory experimentation of fire behaviour. He co-leads, with Dr Bob Keane (US Forest Service) and Prof. Mike Flannigan (University of Alberta), an international group of landscape-scale wildland fire simulation modellers. Geoff teaches bushfire dynamics and management in ANU courses including ‘Fire in the Environment’ (Convenor) and ‘Weather, Climate &

Fire' (Co-convenor). Geoff is on the Editorial Advisory Committee, and an Associate Editor, for the International Journal of Wildland Fire. Email: geoffrey.cary@anu.edu.au

Patricia Cerone
Australian National University

Matthew effects in long-term disaster recovery

Abstract

"Disasters are not confined to poorer countries, although they do impact poorer people disproportionately in rich and poor countries alike" (Oliver-Smith et al 2016, p. 10). In the immediate wake of disasters, pervasive and long-standing inequalities, caused by structural and institutional inequity and discrimination, come to light in a cataclysmic way. These pre-existing inequalities in levels of economic, social, and political capital often result in disasters disproportionately affecting poor, socially marginalised individuals and communities. Failed disaster relief programs from all levels of government further exacerbate these tensions. While the short-term impact of such inequity has been well documented, limited research has been carried out which evaluates how it impacts long-term recovery.

In seeking to fill this gap, this paper finds that Matthew effects exacerbate pre-existing inequalities, thereby causing socially marginalised communities to recover at disproportionate rates as a result of recovery divides. By failing to redress such inequities, and the Matthew effects which they cause, inequality increases post-disaster. Expanding on lessons learned from Hurricane Katrina, this paper shows how combatting these social constructions can only be achieved if there is the economic, social, and political will to do so, and highlights the importance of integrating disaster risk reduction and development. Additionally, multidisciplinary measures need to be implemented to resolve such inequalities throughout all stages of the disaster life cycle. All nations, rich and poor, must learn from the costly mistakes made during the response to Katrina, to avoid causing undue, disproportionate suffering to their most vulnerable citizens. Keywords: Recovery, Inequality, Matthew effect, Social marginalisation

Bio

Patricia Cerone is a graduate of the Master of Applied Anthropology and Participatory Development (Advanced) program at the Australian National University, with a specialisation in Humanitarian Action. Her work examines the nexus between disaster risk reduction and development, with a specific focus on social justice concerns within the post-disaster context. Email: cerone.tricia@gmail.com

Yixuan Chen
Osaka University

Disaster preparedness in an ageing society: Ten years on from the 2008 Sichuan Earthquake

Abstract

This paper will review how Chinese society has responded and evolved in terms of disaster preparedness following the series of earthquakes in Sichuan: the 2008 Sichuan Earthquake, 2013

Lushan Earthquake in Sichuan, and most recently, the 2017 Jiuzhaigou Earthquake. This paper addresses two focus: disaster education and disaster tourism, in the context of global trends occurring concurrently, especially in the Pacific Rim Region: population ageing and_disasters.

Following a literature review mainly from Japan and China, we carried out fieldwork in Sichuan and Beijing, China. The first author, native of Sichuan, interned at an NPO working on disaster education in Beijing and Sichuan, and conducted participant observation and interviews at schools in Sichuan. The second author conducted field work in Sichuan and other disaster tourism destinations. We all have repeatedly visited Sichuan and the 10th anniversary of the 2008_Sichuan_Earthquake.
Results of fieldwork showed disaster education and disaster tourism industry are important factors to take into consideration for post-disaster reconstruction and prepare for the next event, when the speed of ageing in the affected-community was accelerated with survivor's relocation and work opportunity following the earthquakes. The interview showed clear respondent concerns about disaster preparedness and risk factors for disaster vulnerability as well as the need to work on the sustainable disaster tourism other than building disaster museums. Keywords: Disaster preparedness, disaster education, disaster tourism, Sichuan

Bio

Ms Yixuan CHEN, MA is a PhD candidate at the Graduate School of Human Sciences of Osaka University, Japan. She completed her master's degree at Osaka University in 2018, looking at the disaster mitigation education in Sichuan, China, after she graduated from Sichuan University with BA degree. She herself experienced the 2008 Sichuan Earthquake. She has interned at a NGO on disaster education in Beijing and Sichuan. She participated in disaster-preparedness workshop in Indonesia in March 2018. Email: maycyx@hotmail.com

Ms Xin GAO, MA, is a PhD candidate at Graduate School of Human Sciences, Osaka University, Japan. She completed her master's thesis with distinction at Osaka University in 2015, looking at disaster tourism following the 2008 Sichuan Earthquake in China. She was involved in the Univers Foundation-funded research looking at the older people's home built for the disaster-affected older people with dementia in Chengdu, Sichuan, following the 2008 Earthquake, and contributed a chapter. She is the author of peer-reviewed paper, A study of disaster tourism in Bechuan following the Sichuan Earthquake in China: Focusing on disaster education, Journal of Japan-China Sociological Studies, 2016, and also a co-author of international peer-reviewed paper, Japanese perceptions of societal vulnerability to disasters during population ageing, International Journal of Disaster Risk Reduction, 2016. Email: koukin1990@yahoo.co.jp

Prof Junko Otani, DDS, MPH, MS, PhD, is Professor in the Graduate School of Human Sciences at Osaka University, Japan. She obtained her DDS from Osaka University, her MPH in international health and MS in population science from Harvard University and her PhD in social policy and administration from the London School of Economics. She has looked at disaster-affected areas of Kobe in Japan, Sichuan in China and New Zealand. She was awarded Royal Society of New Zealand fellowship to conduct research in Christchurch at University of Canterbury in 2013 and Australian Academy of Science

fellowship for School of Population and Global Health of University of Melbourne in 2015. She has been on the board of trustee of Japan Association for International Health since 2009, and the Japan-China Sociological Society since 2016 and was President for its annual conference in 2017. Her book includes: Older People in Natural Disasters, Kyoto University Press & Trans Pacific Press, Australia, 2010. Email: otani@hus.osaka-u.ac.jp

Mo-Hsiung, Chuang
Ming Chuan University

Assessing the adaptation benefits of JW Eco-Technology in flood disaster

Abstract

As a result of global warming and climate change, the problems of flood and drought have intensified. The adaptation strategy for water resources has become an important issue in Taiwan. This study uses the coastal area of Fengshan River in Hsinchu County as a case study. Based on the disaster potential maps of the Water Resources Department, the economic losses of possible floods are evaluated. Then the land adaptation strategy is used to simulate how the spatial distribution of JW ecological technology under different rainfall intensity has affected surface runoff and infiltration. The low impact development (LID) module in the storm water management model (SWMM) of the EPA is used to simulate the benefits of spatial distribution of JW Eco-technology under different rainfall intensity for floods and droughts. The result shows that the application of JW ecological technology in coastal areas can effectively reduce surface runoff, increase precipitation infiltration, recharge groundwater, and achieve the purpose of environmental adaptation.

Keywords: JW Eco-Technology, environmental adaptation, flood disaster

Bio

I teach for the Department of Urban Planning and Disaster management of Ming Chuan University. Our department emphasizes the capacity to use updated skills/programs to assist in spatial survey, analysis, and management, including drone and geographic information system (GIS). We care about our local social responsibility and have developed close connection with local communities to reduce their environmental and societal vulnerability from potential disasters. Email: bigbear@mail.mcu.edu.tw

Dr Andrew Coghlan
Executive Director, Australian Red Cross

The Australian Red Cross – Guidelines and Challenges for Translating Evidence Based Research into Practice

Abstract

Recent events in Australia and around the world have seen highly traumatic incidents in urban public places resulting in witnessed death and injury in a violent manner. In recent times, we have seen incidents such as the Martin Place siege (2014), deaths at Dreamworld theme park (2016), the attack on pedestrians in Bourke Street (2017). Events such as these may not fit neatly into the traditional

parameters of emergency management arrangements but have significant and lasting community impact.

Red Cross worked with practitioners, researchers and community leaders from around the world to develop a set of evidence informed guidelines to assist those who support communities before, during and after collective trauma events. Andrew Coghlan will present these guidelines and discuss the challenges translating evidence based on research to practice.

Bio

Andrew works to promote resilience and build community capacity both in preparation for, and response to, disasters throughout Australia. As National Manager of Emergency Services, Andrew has led the building of Australian Red Cross' capacity and capability as a key player in emergency management within Australia. The strategic approach taken has seen a shift in emphasis for Australian Red Cross, from an important contributor supporting individuals in the immediate aftermath of disasters, to be recognised as an integral part of Australia's emergency management arrangements with key roles, responsibilities and partnerships across all levels of government.

Andrew has played a pivotal role in coordinating the Australian Red Cross response to a number of major emergencies and disasters including Cyclone Larry (2006), the Black Saturday Victorian Bushfires (2009) and Queensland Floods and Cyclone Yasi (2011).

Prior to joining Australian Red Cross, Andrew was the National Recovery Consultant with Emergency Management Australia, providing advice to both State and Federal governments following a range of emergencies and playing a key role in coordinating recovery assistance to Australians impacted by events such as the Boxing Day Indian Ocean Tsunami (2004).

Professor Phil Cummins

RSES, Australian National University

Interdisciplinary/International Collaboration in Earthquake Research and Education to Support the Development of the Indonesian Disaster Risk Reduction Program

Abstract

The 2004 Sumatra earthquake was the most lethal natural disaster of modern times. Such a massive earthquake came as a surprise to earth scientists worldwide, who had grossly underestimated the earthquake potential in this part of the world. In order to address this gap in the science of Indonesian earthquakes, the Government of Australia supported a technical capacity-building program that brought Australian and Indonesian earthquake scientists together to focus not only on improved science, but also on cooperation among government and academia to effectively utilize the science to help Indonesian society protect itself from future earthquakes.

The major cause of fatalities in earthquakes is building collapse, so reduction of earthquake fatalities can be achieved through adoption of seismically resilient building practices that take into account the best available earthquake science via a seismic hazard map. Development of such a map for a tectonically active area like Indonesia is a major undertaking, and requires coordinating the efforts of geologists, seismologists, geodesists and geotechnical engineers. Moreover, knowledge of

earthquakes is never complete, so a seismic hazard map is not a “one-off” but instead must be continually improved, and this requires education of a new generation of Indonesian scientists.

The Australian-Indonesian collaboration in earthquake science described here attempted to achieve all this and resulted in not only production of a modern earthquake hazard map, but also laid the foundation for a sustainable path towards development of improved earthquake hazard and risk products that will support Indonesian earthquake disaster risk reduction into the future.

Keywords Seismic hazard, Indonesia, International collaboration

Bio

Phil R. Cummins received his PhD in Geophysics form U. California Berkeley in 1988 and worked as a postdoctoral and research fellow at the Australian National University (ANU) until 1996, when he moved to the Japan Center for Marine-Earth Science and Technology (JAMSTEC). After leading a geodynamics research unit at JAMSTEC, in 2001 he took up a position leading earthquake and tsunami hazard research at Geoscience Australia (GA). In 2011, he accepted a joint appointment between GA and ANU as Prof. Natural Hazards, where he combines teaching and research in natural hazards at ANU with technical application of earthquake and tsunami science at GA.

Gareth Davies
Geoscience Australia, Canberra

A new probabilistic tsunami hazard assessment for Australia

Abstract

Geoscience Australia has recently updated the Australian probabilistic tsunami hazard assessment (PTHA). This was last produced in 2008 and has been widely used to support tsunami hazard and risk assessments around Australia. Like the 2008 PTHA, the new PTHA consists of a large database of pre-computed earthquake-tsunami scenarios with associated return periods. Wave time series from these tsunami scenarios are stored at approximately 20000 offshore points around Australia. This information can be used to identify earthquake sources driving tsunami hazard around Australia and provides tsunami wave boundary conditions to drive inundation-scale tsunami hazard studies for risk management applications.

Tsunami scenarios in the new PTHA have been extensively tested by comparison with 18 recent earthquake-tsunamis (2006-2016), using measurements from the global network of deep ocean tsunami detection buoys. This observational data (which was largely unavailable for the earlier study) allows earthquake-tsunami generation models to be tested in terms of their capacity to: A) generate tsunamis that 'look like' observations, and; B) represent the natural variability of tsunami wave heights without gross biases. Such tests demonstrate the importance of modelling stochasticity in the relationship between earthquake rupture-size and magnitude and treating spatial non-uniformities in earthquake slip.

Considerable effort has been made to quantify uncertainties in tsunami exceedance rates, while

accounting for constraints provided by historical seismicity data and rates of long-term tectonic plate motion. These uncertainties are generally large for destructive tsunamis, and are driven by the poorly constrained rates of high magnitude earthquakes on key subduction zones around Australia.

Keywords: tsunami hazard probabilistic modelling

Bio

Gareth Davies works at Geoscience Australia on a range of coastal hazard modelling type problems. His recent research focusses on the quantification of tsunami hazards and associated uncertainties. He has also recently worked on statistical models of coastal storm waves for erosion hazard applications. Email:gareth.davies@ga.gov.au

Dr Jennifer Day
The University of Melbourne

Improving Humanitarian Response and Research: The Academic-Practitioner Collaboration for Urban Shelter, South Pacific (APCUS-SP)

Abstract

This paper will introduce the Regional Studies Research Network on Academic-Practitioner Collaboration for Urban Shelter, South Pacific (APCUS-SP), and report on the design and activity of the network. Formed in early 2018, the goal of the network is to develop an effective and fast mechanism to bridge the practice-research divide in emergency response and recovery – to transfer knowledge between academic experts and governments, humanitarian emergency responders and recovery personnel. Linking academics and emergency/ recovery workers is vital because the groups hold different bodies of knowledge that are rarely shared during emergencies. Our network focuses particularly on urban shelter – an area where there is much to be gained from_collaboration.

Prior to this session, we will have held at least four workshops to assemble the APCUS-SP's stakeholders, including humanitarians operating from NGOs, members of government in the South Pacific, academics working on and in the South Pacific, and Pacific representatives of various intergovernmental agencies. We will also have conducted a number of agency-based consultation sessions with individual stakeholders. Via these consultations, we will have envisioned the partnerships and model of our network and engagement platform and made plans to generate funding to develop our online platform.

In this paper, we will report on the findings of the four workshops and our first year of collaboration. This will include a summary of how the network was co-designed and operationalized, the governance and working model of our collaboration platform, deployment of the members toward the mission, and the ongoing challenges facing the network. Keywords: humanitarian, urban, shelter, Pacific

Bio

Jennifer Day is a Senior Lecturer in Urban Planning at the University of Melbourne. She holds a PhD in City and Regional Planning from the University of California, Berkeley, and master's degree in Civil

Engineering from San Jose State University. She has bodies of work on urbanisation, economic development, and forced displacement. Her expertise spans spatial, analytical, and critical work, and she uses a range of quantitative and qualitative methods. She is a lead organizer in the Regional Studies Association Research Network on Academic-Practitioner Collaboration for Urban Shelter, South Pacific (APCUS-SP), which aims to unite academic knowledge and practitioner expertise toward better shelter in humanitarian emergencies. She is currently working on issues of forced displacement in Vanuatu. In 2017, she received an honourable mention in XYHT's Top 40 Under 40 Remarkable Geospatial Professionals. Her most recent book is Development Perspectives on Urban Housing in BRICS Countries (Palgrave 2016). Email: jday@unimelb.edu.au

Muhammad Dzaky Alfajr Dirantona
Universitas Gadjah Mada

On Building Resilience: Universitas Gadjah Mada (UGM) Student Community Service - Community Empowerment Learning (SCS-CEL)

Abstract

In 1971, Universitas Gadjah Mada (UGM) initiated a student community service that gradually evolved into a research-based community empowerment learning in 2006. It aims to co-create a sustainable program among the entire body of the university, government, and private sector that raises students' awareness towards issues that lack public attention e.g. Disaster Risk Reduction (DRR) in underexposed areas. Authors believe that despite the traditional view that academia are not adept in community engagement, they have the potential to take part in building resilience in disaster-prone communities by helping them adapt to sudden shocks and gradual changes occurring in disastrous areas. This research used qualitative approach, particularly a case study focused on Kertosari village, Banjarnegara. Kertosari scored 150 in the 2013 Indonesia's Disaster Risk Index, therefore comprehensive study of this region is of immediate concern. Result - UGM SCS-CEL program in Kertosari village voiced the community's motivations and expectations to the government. The program has become a milestone towards developing community independence in dealing with disasters. UGM, with the help of local government, has been providing guidance on landslide management efforts that include prevention, emergency response, rehabilitation, and reconstruction. A Landslide Early Warning System (LEWS), a collaborative effort between the university and Indonesian National Board for Disaster Management, has also been set up. Through this research, authors found flexibility and open-mindedness to collaborate were the keys; mitigation scenarios were set in motion once a relationship of trust and mutual respect were built between government-university and the community. Keywords: DRR, community empowerment, student, landslide management.

Bio

Dzaky is studying business management at Universitas Gadjah Mada. His research interests include, but are not limited to human resource management, economics, sociology and regional studies. Email:dzaky.alfajr.d@mail.ugm.ac.id

Naufal Fadhlullah Sayuti is a Law student majoring in Business Law at Universitas Gadjah Mada (UGM), Indonesia. He is interested in doing research on Legal, Business, International Relations, and Environmental issues. He's been awarded a research grant from the Research and Publication Unit, Faculty of Law UGM in 2017. Email: naufal.fadhlullah.s@mail.ugm.ac.id

Paxia Novarin is an International Relations student in Universitas Gadjah Mada researching political, economic, and environmental issues. She was granted a JASSO Scholarship for an exchange program (Project Learning Based) concerning urban planning and social issues in Ritsumeikan University, Japan. Email: paxia.novarin@mail.ugm.ac.id

Dr Riyanti Djalante

United Nations University, Institute for the Advanced Study of Sustainability, Tokyo, 150-8925, Japan

Governance for disaster recovery and reconstruction: a systematic literature review

Abstract

Disasters caused by natural hazards are occurring more often, impacting more people and costing the society more. In the scientific fields, there has been a proliferation of academic publications on natural hazards, risks, and disasters. Disasters and their impacts have been examined through the different stages from preparedness, emergency management, and post recovery and reconstruction. It is important that there be a periodic review of research on DRR. The author conducts a systematic literature review (SLR) on DRR literature to determine progress and key research topics so that future research can build upon existing works, avoid bias, determine major research, need for further research and strengthen research capacity in the future. This paper focusses on governance for disaster recovery and reconstruction. While there has been rapid development of research on governance of disaster management and risk reduction as a whole, research on the governance for recovery and reconstruction has been done only through particular approaches. The majority focus on roles of stakeholders and accountability at different levels, the politics and policy of rehabilitation and reconstruction, in addition to discussion on participation of community within the processes. This paper will review all of these themes and identify key governance principles expected for disaster rehabilitation and reconstruction processes.

Bio

Dr. Riyanti Djalante is an Academic Programme Officer at The United Nations University – Institute for the Advanced Study of Sustainability (UNU-IAS). She coordinates the research and policy development on Global Change and Resilience, which conducts research to address climate change, build community resilience, and reduce disaster risks. Her current appointments include as a member of IRDR Scientific Committee, and fellow of the International Social Science Council (ISSC). She is a Lead Author of IPCC Assessment Report 6 and Special Report on impacts of 1.5 degree warming, and the UNEP Global Environmental Outlook 6. She is involved in UNISDR initiatives on Words into Action and Report of the open-ended intergovernmental expert working group on indicators and terminology relating to DRR. Dr. Djalante has also consulted for international agencies on issues related to

governance, DRR and CCA in Indonesia. She is one of the authors (with Rajib Shaw, Frank Thomalla, and Matthias Garschagen) of Disaster Management in Indonesia, (2015, Springer Publishers).

Emeritus Professor Stephen Dovers
FASSA et al FSES, ANU

Getting better at DRR: managing lessons or learning policy?

Abstract

Critical to improving DRR and reconstruction is our ability to learn from disaster events and to apply that knowledge and the lessons we have learned to improve future outcomes. This is variously termed 'lessons management' or 'policy learning' (which are closely related but not often intersecting areas of work). This paper explores learning from disasters, drawing on the following data and bodies of work:

The coverage and nature of >1300 recommendations from 55 major post-event inquiries in Australia since 2009 (Cole et al, in press), and the role of such inquiries, the most well-known 'lesson drawing' process we have. Attention is paid to both what is focused on, and what is not, debates around the optimal forms of post-event inquiry and learning processes (eg Eburn and Dovers 2015, 2017).

The role of (national and international) strategic or framework policy in establishing a coherent policy environment within which to gather information and organize knowledge, a matter that has received limited general attention (eg Samnakay 2017), but rarely in the disasters space.

The role of organizational and institutional settings in encouraging the gathering, management and use of lessons, which has received less attention than the two above (but see Handmer and Dovers 2013). The paper paints a more complicated picture of 'lessons management', in recognizing the larger landscape of policy learning outside the emergency management sector: that is, the difference between operational lessons management (which we are arguably better at, within the sector) and broader whole-of-government and –society policy learning (which we are arguably worse at). Related is the issue of ensuring that 'lessons' are not simply gathered but are used to inform change in practice and policy. Critical but problematic is the need for, and the robustness and persistence of, the policy processes and institutional settings within which either form of learning will be enabled or not.

Bio

Steve Dovers is a former Director of, and now an Emeritus Professor with, the Fenner School of Environment and Society, Australian National University, a Fellow of the Academy of Social Sciences in Australia, a researcher with the Bushfire and Natural Hazards Cooperative Research Centre, and a Senior Associate with the firm Aither. He has supervised 70 PhD scholars and authored/co-authored over 200 research publications in sustainable development, environmental management and disaster policy, including the Handbook of Disaster Policies and Institutions (with J Handmer, Routledge, 2nd edition 2013), and Environment and Sustainability: A Policy Handbook (with K Hussey, Federation Press, 2nd edition 2013).

Dr Danielle Every and Ms Peta Miller- Rose

CQU Adelaide and QFES

'I'm going to be frightened out of my wits': Defining, measuring and enhancing psychological preparedness to improve decision-making during natural disasters

Abstract

Psychological preparedness is "an individual's anticipated psychological and emotional ability to cope with the threat, uncertainty, unpredictability and confusion that may be experienced in the warning phase and at a bushfire's [or other disasters] point of impact" (Boylan, 2016: 92-93). It enhances physical preparedness and people's ability to carry out their plans in unpredictable, confusing conditions. However whilst physical preparedness is relatively easily understood and communicated, psychological preparedness can seem more complex, less useful and unfamiliar or alien. How then can we engage people in this aspect of preparedness in ways that are easy to understand and which encourage people to see its value? Rather than repeat old familiar ways of developing communication from 'experts' to the community, we approached this challenge from the bottom up. We spoke with Bundaberg and Brisbane residents and emergency and disaster management personnel about psychological preparedness. In this presentation, we explore the sometimes surprising, sometimes challenging responses to questions about terminology, who people trust, and how best to engage and interest people in psychological preparedness. We share how these community responses are changing the way we communicate about psychological preparedness to best reach people from diverse age groups and education backgrounds.

Bio

Danielle Every is a Senior Lecturer with CQUniversity, Adelaide. She is a social psychologist who specializes in word on the social experiences of climate change, disasters and severe weather particularly for vulnerable communities. Her recent work on psychological preparedness began in 2016 after finding that residents affected by the Sampson Flat Bushfire felt they were physically but not emotionally prepared. Since then she has worked with Bundaberg Region Council and the Queensland Fire and Emergency Service to explore how to engage people to prepare their minds as well as their property.

Peta Miller-Rose came from a nursing background to Queensland Fire & Emergency Services as a volunteer firefighter in 1999 and is proudly still a volunteer today. She progressed into a staff role and is now the Manager for Bushfire Safety in the Office of Bushfire Mitigation. Peta works with community and land managers to mitigate the risk of bushfire and its impact on communities and takes the lead in promoting timely and accurate information before, during and after incidents. In January 2014 Peta proudly received the Australian Fire Service Medal (AFSM) for her work in community engagement and education and reports this as the most rewarding work of her career.

Matthew Garthwaite

Geoscience Australia

Towards operational monitoring of volcano deformation in Papua New Guinea using remotely sensed InSAR observations

Abstract

The primary goal of volcano monitoring is to provide timely warnings of volcanic hazards to decision makers and the public. Volcano observatories around the world have traditionally relied on ground-based monitoring networks of seismic, thermal and geodetic instrumentation to make their judgements. But more recently, data acquired by remote sensing satellites has been applied to volcano monitoring. One such remote sensing technique is satellite radar interferometry (aka InSAR), which makes use of repeated radar images acquired by satellite. By combining these radar images, it is possible to map the surface motion that has occurred between the two imaging times. These surface motion maps can then be used to infer deformation sources within the Earth's crust. Using InSAR to measure crustal deformation has been demonstrated as a promising tool for identifying the timing of impending eruptive activity at many active volcanoes around the world. Despite this, the tool is still not used to support volcano observatories operationally. In this presentation we will discuss how InSAR can be applied to deformation monitoring of active volcanoes in Papua New Guinea and the existing barriers to doing this operationally in this country. We will show InSAR results obtained for the Rabaul Caldera, Papua New Guinea's most high risk volcano, and a comparison with GPS observations of caldera deformation. We will also show the outcomes of a country-wide InSAR survey to determine which volcanoes deform and may be candidates for future operational InSAR monitoring.

Key words: Volcano monitoring, remote sensing, InSAR, Papua New Guinea

Bio

Dr. Matthew Garthwaite is a geodesist at Geoscience Australia, the Australian federal entity that provides advice to government on the geosciences. He is leading the effort to develop the agency's capabilities to make use of radar remote sensing (InSAR) to map surface movements caused by natural and anthropogenic phenomena. These observations will be used in the Geodesy and Positioning program to refine Australia's vertical height datum, as well as measuring the impacts of earthquakes, tectonics and resource extraction. Since 2013, Matthew has been involved in Australia's aid-funded project in Papua New Guinea to provide assistance to the Rabaul Volcano Observatory. Through this project, Matthew has been exploring ways to use InSAR for operational monitoring of volcano deformation. Email: matt.garthwaite@ga.gov.au

Professor Lisa Gibbs

Jack Brockhoff Child Health & Wellbeing Program, University of Melbourne

Delayed disaster impacts on academic outcomes for primary school children

Abstract

Children living in disaster affected environments not only face potential exposure to trauma and loss, they are also likely to have interrupted access to education in the short term and their ongoing learning may be affected by emotional distress and social disruption. However, little is known about the impact on children's academic outcomes in the following years. The Strengthening School

Communities study utilised major datasets from the Victorian Department of Education and Training to examine academic scores for children who began primary school in 2008, one year before the Black Saturday bushfires (n=24,642). Scores at 2 and 4 years after the disaster were compared between students attending high, medium and low disaster affected primary schools. Expected improvements between Year 3 and Year 5 reading and maths scores were reduced for students attending schools in areas of high levels of bushfire impact. This highlights the importance of tailored educational support and monitoring to avoid long term disadvantage for students living in disaster affected areas. Potential pre-disaster factors contributing to outcomes were also examined to assist in development of individual risk screening processes.

Keywords: disaster; children; academic; development; school; education; psychology

Bio

Professor Lisa Gibbs (1,2) leads a range of disaster research programs including studies focusing on the experience of children in disaster contexts. Email:lgibbs@unimelb.edu.au

This paper draws on the Strengthening School Communities study and was prepared with the following study co-investigators: Jane Nursey(3), Janette Cook(4), Greg Ireton(1), Nathan Alkemade(3), Michelle Roberts(4), Colin Gallagher(6,7), Richard Bryant(8), Karen Block(1), Robyn Molyneaux(1), Sean Cowlishaw(3), David Forbes(3). 1. Jack Brockhoff Child Health & Wellbeing Program, Centre for Health Equity, University of Melbourne; 2. Centre for Disaster Management and Public Safety, University of Melbourne, Australia; 3. Phoenix Australia: Centre for Posttraumatic Mental Health, Department of Psychiatry, University of Melbourne, Australia; 4. Smouldering Stump, Victoria, Australia; 5. Victorian Department of Education and Training, Australia; 6. Centre for Transformative Innovation, Faculty of Business and Law, Swinburne University of Technology, Melbourne, Australia; 7. Melbourne School of Psychological Sciences, University of Melbourne, Melbourne, Australia; 8. School of Psychology, University of New South Wales, Sydney, Australia

Lisa Gibbs

Jack Brockhoff Child Health & Wellbeing Program, **University of Melbourne**

Distress and satisfaction with research participation: impact on retention in longitudinal disaster research

Abstract

Research conducted in the post disaster environment needs to be mindful of potential participant vulnerabilities arising from the disaster experience, losses and subsequent stressors. Previous studies have established that post-trauma research can be conducted safely and is appreciated by research participants even if it is an emotional experience. This presentation will report on participant experiences of the Australian post-bushfire research study – Beyond Bushfires. It examines relationships between research participation distress, probable mental health conditions, and satisfaction with the research experience over time.
The study incorporated a range of sensitivity strategies to minimise participant distress. Participants included 1,056 respondents (Wave 1) interviewed via telephone and web-based survey between December 2011 through January 2013, and 736 (76.1%) of the participants were re-surveyed between

July and November 2014 (Wave 2). Two questions were included in the survey at each time point to monitor research impact. Reported distress at completing the survey was low, while overall satisfaction was high. Participants' reported satisfaction was not associated with their reported level of distress from participating; and reported participation distress at Wave 1 did not predict whether a respondent would return to complete the survey at Wave 2. Fire-related Posttraumatic stress symptoms were associated with increased satisfaction and likelihood to return at Wave 2. These findings add to previous findings of perceived benefits outweighing the costs of participation for respondents, by demonstrating that distress did not influence retention and that probable fire related PTSD was associated with a more positive research participation experience. Keywords: trauma, longitudinal, disaster, risk analysis, research participation, vulnerable, ethics, distress, satisfaction, survey method

Bio

Professor Lisa Gibbs(1,2) is the Principal Investigator of the Beyond Bushfires study.

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This paper was prepared with study co-investigators: Robyn Molyneaux (1), Sonia Whiteley(3), Karen Block(1), Louise Harms (4), Richard Bryant(5), David Forbes(6), H. Colin Gallagher(7), Colin MacDougall(1,8), and Greg Ireton(1). 1. Jack Brockhoff Child Health and Wellbeing Program, Centre for Health Equity, University of Melbourne, Melbourne; 2. Centre for Disaster Management and Public Safety, University of Melbourne, Melbourne; 3. The Social Research Centre Pty Ltd, Melbourne; 4. Department of Social Work, University of Melbourne, Melbourne; 5. School of Psychology, University of New South Wales, Sydney; 6. Phoenix Australia: Centre for Posttraumatic Mental Health, Department of Psychiatry, University of Melbourne, Melbourne; 7. Centre for Transformative Innovation, Faculty of Business and Law, Swinburne University of Technology, Melbourne; 8. School of Health Sciences, Flinders University, Adelaide

Andrew Gissing

Risk Frontiers

Better practice planning for catastrophic disasters

Abstract

The hallmarks of catastrophic disasters are death and destruction, large scale disruption, the displacement of populations and public anxiety. Often they occur with little to no warning (such as earthquakes), though can also occur slowly (for example droughts, disease and food shortages), growing in size and duration. Events overwhelm the capacity of institutions and the community to cope, as emergency systems, communications and plans fail to adapt to the complexity and magnitude, leaving leaders without full knowledge of the event. Emergency leaders are confronted with overwhelming issues, with complexity and uncertainty on a scale they likely have never experienced or imagined. The event becomes subject to significant national and international media scrutiny, and inevitably, political involvement.

Catastrophic events are cascading in nature, escalating in their impacts as interconnected systems fail

yielding yet further impacts and making the recovery more complex and prolonged. Restoration of essential lifelines could take months and disease may wreak further havoc. Examining existing planning practices and defining better practice is key to building preparedness frameworks that can enable institutions and communities to best respond to and recover from catastrophic events. Research through the Bushfire and Natural Hazards Cooperative Research Centre has examined better practice in preparing for catastrophic events. The outcomes have included developing a preparedness framework consisting of community; governance; culture; understanding risks; mitigation; planning; assessing and developing capability; learning and development; exercising; and evaluating, monitoring and improvement. To support the framework a maturity-based benchmarking tool has been developed to measure existing practices against better practice.

This presentation will outline better practice planning models for catastrophic disaster events and provide suggestions for practical application by communities and institutions. Keywords: Catastrophe, disaster planning, preparedness, capability

Bio

Andrew has over 15 years emergency management experience, including in senior executive roles. Andrew is an emergency risk management and resilience expert. He previously held the position of Deputy Chief Officer / Director Emergency Management and Communication with the Victoria State Emergency Service and, before joining Risk Frontiers, was the Director Enterprise Risk Management at the Department of Family and Community Services.

Andrew leads our risk and resilience group and works with Risk Frontiers' clients to enhance their ability to manage risk and engage effectively with stakeholders. Most recently he has led engagements to assist Government agencies to better understand management practices in relation to catastrophic disasters, develop emergency risk management frameworks and improve community engagement practices.

He has recently contributed to World Health Organisation and International Federation of Red Cross and Red Crescent Society publications on disaster resilience. Andrew holds Masters (Hons) of Science and Bachelors of Economics degrees, and is the author of some thirty journal and conference papers. Email: andrew.gissing@riskfrontiers.com

Sigi Goode

Research School of Management, CBE, Australian National University

Sociality Perceptions of Social Media During and After a Natural Disaster

Abstract

Prior research has shown the group participation benefits of microblogging as an outlet for emotional problem solving, especially during a natural disaster. However, the mechanism for this process has not been identified in prior literature. Using a theoretical lens derived from prior group therapy literature, we advance two theoretical explanations of catharsis with competing outcomes. One explanation holds that catharsis arises from resolving personal problems. A second explanation holds that catharsis arises from a perception of emotional similarity with others. Using data from 180 Twitter

users, we test these two theories in two time periods: during a natural disaster, and in the period following the natural disaster. Keywords: social media, catharsis, natural disaster

Bio

Sigi Goode is an associate professor of information systems in the Research School of Management at the College of Business and Economics, Australian National University (ANU). His research interests lie in information security behavior, service and technology adoption, failure and use, and open source software. He has published in journals such as MIS Quarterly, Journal of Management Information Systems, European Journal of Information Systems, Decision Support Systems, and Journal of Business Ethics among others. He has more than fifteen years' experience designing, developing and managing online information platforms. He received a Carrick Institute OLT National Award for Teaching Excellence in 2006. He is an associate editor of Information & Management and the Australasian Journal of Information Systems. Email:sigi.goode@anu.edu.au

Dr Scott Hanson-Easey
The University of Adelaide

The Road to Nhill: Sharing Responsibility for Bushfire Prevention

Abstract

The discourse of Shared Responsibility between government and citizens in emergencies and disasters has become a central tenet of disaster management policy since the 2009 Victorian Bushfires Royal Commission. Yet the notion of Shared Responsibility remains controversial, and its pragmatic application in communities is contingent upon multiple and intersecting social, economic, environmental, governance, and geographic factors. Arguably, in order for communities and local stakeholders to take on their share of responsibility in emergencies and disasters, engagement processes must start with communities' understanding of risks set against local environment and socio-cultural contexts. In this paper I advance a Community-Based Participatory Research (CBPR) approach to engage communities and stakeholders in dialogue on emergency and disaster risk. A recent case study in the small western Victorian township of Nhill exemplifies how this approach can work in practice. The Karen community (former humanitarian refugees from Burma), Nhill Learning Centre, Country Fire Authority (CFA) and The University of Adelaide identified Total Fire Ban and Fire Danger Period communication and interpretation as a problem. The Karen community determined that a short film featuring the community's cultural practices, values, and norms, alongside key CFA information, would be the best way to communicate risk messages to the community. The project underscores the importance of community-led, collaborative dialogue in enhancing Shared Responsibility before emergencies and disasters, whilst building social and human capital in new Australian communities. Keywords Community Engagement; Shared Responsibility; Risk Communication

Bio

My current research addresses how natural environmental hazards, such as heatwaves and bushfires, are communicated to lay publics. I am also interested in understanding how people make sense of natural and human-induced hazards (and infectious diseases), and how risk communication

efforts could better address cultural, social and discursive contexts. In particular, my work utilises a community-based participatory research (CBPR) paradigm to support emergency service agencies in the process of designing risk and emergency messages with Culturally and Linguistically Diverse (CALD) communities across Australia. Employing a CBPR approach, I have worked with the Country Fire Authority (CFA) and the Karen (former humanitarian refugees from Burma) community in Victoria to develop a film on fire bans and restrictions.

I have a formal background in social psychology. Previous research has examined public understanding of climate change in local contexts. My PhD research explored political and lay discourses on Sudanese-Australians on talkback radio. scott.hanson-easey@adelaide.edu.au

Dr Nasir Hassan

Environmental Health Specialist, Division of Pacific Technical Support (DPS), World Health Organization: Western Pacific Region, Suva, Fiji

Climate Change and Health in the Pacific

Abstract

Pacific Island Countries (PICs) are ecologically fragile and among the most vulnerable to climate change. Sea-level rise threatens the very existence of some PICs. Many small islands in PICs already present high burdens of climate-sensitive health risks, such as vector-, food-, and water-borne diseases. Climate change will manifest in increased average temperatures, increased incidence and intensity of the most severe extreme weather events (e.g. floods, cyclones, storm surges, and drought), sea-level rise, and decreased food and water security. All these hazards will translate to increased mortality and morbidity from extreme weather events (including mental health) and climate-sensitive diseases such as malaria, dengue, cholera, filariasis, leptospirosis, and ciguatera fish poisoning. The existing and potential impacts of climate variability on health and health systems represent an immediate challenge in the Pacific.

In July 2017, the WHO Director-General made the 'health impacts of climate and environmental change' one of the four health priorities for his mandate, and it was proposed as one of the central platforms of the WHO General Programme of Work (GPW) for the 2019-2023 period. Furthermore, to build on the global climate change programme and to provide intensified support for one of the most vulnerable areas, a WHO Special Initiative on Climate Change and Health in Small Island Developing States (SIDS) was launched at the COP23 in collaboration with Fiji and the UNFCCC Secretariat in 2017. This presentation will discuss the WHO's Pacific Action Plan for the SIDS initiative, which includes strategic focus on Empowerment, Evidence, Implementation, and Resources.

Bio

Dr Nasir Hassan is Environmental Health Specialist at the WHO-Division of Pacific Technical Support (DPS), based in Suva Fiji. Prior to this, he held Team Coordinator, Health and Environment, WHO-Western Pacific Regional Office in Manila Philippines and Team Coordinator, Environmental Health and NCD at the WHO- Cambodia Office and was also assisting Environmental Health programme for

Lao PDR. In DPS, Dr Hassan is responsible for the WHO-Health, Environment and Climate Change Programme in the Pacific. Email: hassanm@who.int

Dr Daniel Hikuroa
Senior Lecturer

Māori Studies, Te Wananga o Waipapa, University of Auckland

How Indigenous Knowledge can reduce risk, facilitate recovery and increase resilience

Abstract

The frailty of human life has been tragically demonstrated by numerous natural hazards e.g. earthquakes, tsunami, drought, floods, volcanic eruptions and landslides leading to substantial disasters in the last decades. In the likelihood that the natural processes that caused such hazards will continue into the foreseeable future, we need to focus our attention upon reducing risk and increasing resilience. Indigenous knowledge (IK) is increasingly being recognised as an additional alternative domain of understanding, previously overlooked or ignored, that is relevant to present-day societal challenges such as natural hazards and disasters. In New Zealand, rapid social, political and environmental changes have led a growing chorus of Māori stakeholders to express the need to share their perspectives and understanding of natural hazards. IK is increasingly being recognised as an important database of multi-hazard information, hazard management and disaster recovery strategies – all of which contribute to increased resilience. A valuable aspect IK brings to our collective understanding of hazards is its temporal component. In the New Zealand context IK has been generated since Māori first arrived ~1000 years ago, many centuries before written records of hazards began. In other countries the IK record is even longer, c. 55,000 years in Australia. In this presentation I will demonstrate how integrating IK with modern knowledge can contribute to effective DRR and Recovery.

Bio

Dr Daniel Hikuroa is an Earth System Scientist who integrates mātauranga Māori and science to realise the dreams and aspirations of the communities he works with and is currently a Senior Lecturer in Māori Studies at the University of Auckland. From 2011 to 2016 he was the Research Director at Ngā Pae o te Māramatanga, New Zealand's Māori Centre of Research Excellence.

He is an established world expert on integrating indigenous knowledge and science and has undertaken many projects including co-writing the 2014 State of the Hauraki Gulf Environment Report, geothermal developments, planning river and catchment restorations, co-writing iwi environmental management plans, Independent Review Panel member of Sea-Change Tai Timu Tai Pari marine spatial planning for the Hauraki Gulf, hazard and vulnerability assessments and industrial waste rehabilitation. Dan has been spearheading alternative ways of assessing sustainability, including integrating indigenous knowledge and epistemologies into assessment frameworks and decision-support tools.

Ana Lucía Hill
Tec de Monterrey, Mexico City, Mexico

Continuity of operations and continuity of government as an investment of sustainable development

Abstract

Governments cannot always prevent things from happening, but they can work to mitigate their impact. Disasters have the potential to set back the development of a country by damaging its social, economic, and physical infrastructure, all of which are necessary to ensure sustainable development. Communities and organizations are in need of strengthening risk and consequence management principles to mitigate or prevent cascading events that may lead to catastrophic consequences. The overall objective of this study is to enhance governments´ resilience through continuity of government and continuity of operations. Governments are providers of critical services to communities and work in partnership with others (branches of government and private sector) to deliver and prioritize those services and processes needed for the functioning of society. It is vital that governments are able to ensure that its most critical services and functions are maintained, and resources protected during and after a disaster. Continuity of Government ensures constitutional authority and critical government functions processes. This study proposes the integration of preparedness and response, resilience and continuity capacities to ensure that government s´ capacity to perform is maintained in the aftermath of major disasters. More specifically, the research focuses on two interrelated and complementary means for a rapid and effective response to recovery, generating safety and security conditions to protect the economy and local sustainable development: (1) developing an integrated government resilience capability (policy) and (2) building a continuity of governance instrument (planning).

Bio

With more than 20 years of political experience in Mexico and Central America, Ana Lucia was chosen Rising Star of Politics 2002 by the prestigious magazine Campaigns & Elections, being the first Latin-American woman receiving this distinction. In June of the 2003, Paul E. Patton, Governor of the State of Kentucky, offered Ana Lucia the highest distinction in the State naming her Honorary Kentucky Colonel (HKC). The distinction was made by her contribution to the Latin-American community through consultoriopolitico.org, an electronic political column offering practical political advice.

Originally from Sonora, Mexico, Ana Lucia earned a Master´s Degree in Political Management from the George Washington University (GSPM-GWU) and a Degree in Social Sciences from the Instituto Tecnológico Autónomo de México (ITAM). Ana Lucia is a Doctoral Candidate (2005) in Crisis, Disasters and Risks Management at the George Washington University (IDCRM-GWU). Currently, Ana Lucia is studying a second PhD on Innovation and Social Responsibility at Universidad Anahuac.

From April 2007 to December 2012, Ana Lucia was Director General of Civil Protection at the Secretary of the Interior in Mexico, position to which she arrived through the Professional Career Service of the

Federal Government. She was President of the Standardization National Committee in the field of Civil Protection and Disaster Prevention and Mexico´s Focal Point to the United Nations Disaster Assessment and Coordination (UNDAC) and in the International Search and Rescue Advisory Group (INSARAG).

Ana Lucia has provided consulting services to the United Nations Development Program (UNDP) and the Latin American and the Caribbean Economic System (SELA) on Continuity of Government and Business Continuity, Business Continuity as a Social Responsibility Strategy and Public-Private Partnerships for Disaster Risk Reduction.

Dr Solmaz Hosseinioon
Azad University (south branch) and IEES (International institute of earthquake engineering and seismology).

Resilience and Informality: Effects of formalization processes as agents of transformation

Abstract

As the world problems have become more complex and unpredictable, Resilience thinking have emerged for dealing with the ever-changing unpredictable, multifaceted problems. encompasses evovlement of the socio-ecological systems. Informality and resilience have common features, because both are considered as solutions and survival strategies. Informality has been considered as a negative aspect by many professionals until recently, but it is one of the means of the poor to adapt their environment according to their needs. Informality is perceived by necessities, “it can change and adapt to meet the needs of the people” which reverberates_with_adaptation_capacities.

Informal settlements have become an important part of urbanity. This phenomena is not a problem anymore rather a new type of urbanity which needs to be studied, analyzed and learned from. These areas can be more vulnerable to disasters due to their socio-economic and spatial nature. On the other hand, they have characteristics which make them more resilient. These areas are not planned and designed but demonstrate adaptation capacities, they are self-built, self-organized and self-run can have high levels of social capital and sense of community.

This research is in Golestan, in Iran, a former informal settlement under the process of urban formalization which has gone through different phases of life cycle of formalization which makes the changes in its resilience attributes, traceable. While these areas become formalized, their characteristics change and so will their resilience capacities. The formalization processes are considered as variables of regime shift. Urban codes are the agents of change for upgrading process in the cases of this study. Following the transformations in an informal settlement in Tehran conurbation reveals the mutual effects of formalization of informality on resilience and adaptation which reinforces the relativity of resilience concept and the need to consider the agencies which shape the built environment. Keywords: Resilience, Informal, Formalization, Agency, Transformation

Bi*o*

Dr Solmaz Hosseininoon is a lecturer at Azad and IEES (International institute of earthquake engineering and seismology).

She did her PhD at the University of Melbourne in 2016. She has 2 masters in urban design and Architecture from Shahid Beheshti University, Iran, awarded as the distinguished student of the year. She is well-experienced in both practical and academic fields, in architecture, urban design, resilience and disaster risk mitigation. She has several publications in academic and professional journals as well as conferences and has translated a few professional books to Persian. She has been teaching as a lecturer in 2 branches of Azad university of Tehran as well as working with the University of Melbourne. Solmaz is interested in urban design and the multidisciplinary connections such as, resilience, informality, urban policies and codes, sustainable design and assemblage theory. Email: solmaz.hosseinioon@gmail.com

Dr Takako Izumi

Dr Takako Izumi is an associate professor at the International Research Institute of Disaster Science (IRIDeS), Tohoku University, Japan since 2013. She also serves as Program Director of the Multi Hazards Program under the Association of Pacific Lim Universities (APRU), which comprises 50 universities and academic institutes in the Pacific Lim. Her research interests include international and regional frameworks/strategies for disaster risk reduction (DRR), international humanitarian assistance, and DRR initiatives at the local and community levels.

Previously she worked for international NGO and UN agencies such as Un Habitat, UN Office for the Coordination of Humanitarian Affairs (UNOCHA) for disaster response and its coordination in Asia, and UN Office for the Recovery Coordinator for Ache and Nias (UNORC) to assist the recovery efforts after the Indian Ocean Tsunami. She was appointed as a member of UNISDR's Asia Science Technology and Academia Advisory Group (ASTAAG) in May 2015. She holds Ph.D. in Global Environmental Study from Kyoto University, Japan.

Professor Helen James

Director, IRDR ICoE for Integrated Research on Disaster Risk Science, School of Culture, History and Language, College of Asia Pacific, Australian National University

Risk, Vulnerability and Inequality: Dilemmas of theory and practice in post-disaster reconstruction along the Sendai Coast, Japan, after the Tohoku Triple Disaster, 2011.

Abstract

The Sendai Framework for Disaster Risk Reduction (SFDRR) 2015 – 2030 highlights the 'strengths-based' approach to recovery and reconstruction for communities impacted by large scale disasters. It advocates an 'inclusive policy' based on community participation in the design of the post-event reconstruction programs. But what does this mean for those social groups traditionally considered as 'vulnerable' in the disaster context? Disaster theory and practice are often non-aligned in face of real crisis events. This paper explores the impact of the Tohoku Triple Disaster of 11 March 2011 along Japan's Sendai Coast on elderly survivors, one of those social groups traditionally considered as 'at risk', their adaptive capacity and resilience, and how they are re-framing Risk.

Bio

Professor Helen James, is Director of the IRDR International Centre of Excellence for Integrated Research on Disaster Risk Science, School of Culture, History and Language, College of Asia Pacific, ANU. She obtained her PhD (1972) and MA (1970) from the University of Pittsburgh. Her current research focuses on disaster risk, resilience and recovery in relation to natural disasters impacting the Asian region. She is particularly interested in the intersection of disaster risk science and sustainability, and how innovative research at the STEM-HASS interface may produce better societal and ecological outcomes. A related field is the demographics of disasters, and how population dynamics are integrally related to post-disaster societal resilience, recovery and reconstruction. She has published 123 items including 10 books, many chapters, peer reviewed articles, and conference papers. Her most recent book (2016, with Douglas Paton) is The Consequences of Disasters: Demographic, Planning and Policy Implications (Springfield, Illinois: Charles C. Thomas Publishers).

Dr Christine Kenney
Massey University, NZ

Na Ara Ahurea: Envisioning collaborative governance in disaster risk reduction in Aotearoa, New Zealand

Abstract

New Zealand has recently experienced a range of natural hazard disasters, including the 2010-2011 Canterbury earthquakes, the 2016 Kaikōura earthquake as well as Cyclones' Debbie and Cook, in 2017. Following each of these disasters, Māori communities rapidly drew on core assets such as marae (Māori community centres) and other material resources as well as operationalised cultural networks and personnel in order to assess and address the needs of devastated communities. Research findings (Kenney et al, 2014; Kenney & Solomon, 2014; Phibbs et al, 2015) have suggested that in every instance, the Māori response was efficient and effective. Subsequent to a ministerial review of the formal responses to the aforementioned natural hazard disasters, the New Zealand Government has determined that there is a key role for iwi (Māori tribes) at every level of the nation's disaster governance infrastructure. Legislation is proposed as a mechanism for fostering the creation of a fully collaborative go-governance partnership between the Crown and Iwi to manage all aspects of disaster risk reduction. The programme of research outlined in this presentation will inform that outcome through creating the first comprehensive Māori disaster management theory and implementation framework. Research findings will equally innovate New Zealand's disaster management legislation and infrastructure through facilitating development of a collaborative co-governance framework for managing disaster contexts. The proposed framework, the first partnership between a government and colonised Indigenous peoples to ensure effective disaster preparedness, management and resilience throughout a nation state, will also align with core priorities outlined in the Sendai Framework for Disaster Risk Reduction.

Bio

Dr Christine Kenney leads the Indigenous Disaster Management programme at the Joint Centre for Disaster Research, GNS Science/Massey University, New Zealand and Co-Chairs New Zealand's Natural Hazards Research Platform Social Science Panel. She has a background in sociology and public health, as well as international expertise in implementing community-based research and policy projects with

the governments, local authorities and Indigenous peoples of New Zealand, Canada, and Australia. Her research focuses on building Māori and Indigenous community resilience in response to adversity through enhancing community disaster risk reduction capacities and capabilities and identifying ways Indigenous knowledges and practices can enhance formal disaster risk management infrastructure. Christine's work is well recognized; she was appointed to New Zealand's diplomatic delegation to the September 2014 intergovernmental preparatory meeting for, and subsequently participated at the 3rd World Conference on Disaster Risk Reduction in Sendai, Japan. Christine also participates in national and ministerial funding review panels, is an invited contributor to key United Nations' publications and conferences, and a member of the UN women's major group.

David Lallemant
Earth Observatory of Singapore, Nanyang Technological University

Modeling Dynamic Risk Driven by Changing Hazard, Vulnerability and Exposure.

Abstract

Asia-Pacific is the world's most highly-exposed region to natural hazards. In the past decade alone, the region has witnessed 1600 natural disasters, accounting for 40% of total global disasters and resulting in over half a million fatalities and 1.4 billion people affected. Climate change will likely worsen the region's hazard profile further. At the same time, rapid urbanization has tended to concentrate people and infrastructure in areas prone to high-levels of hazard (coastal, riverine, etc), while also creating new patterns of urban vulnerability. Yet, while risk managers and the catastrophe insurance industry have highlighted urbanization of Asian cities as a major concern, such urbanization also presents an amazing opportunity to redirect cities towards trajectories of resilience and sustainability (since the risk has not yet been created). Key to making the policy, investment and legislation decisions to guide cities towards virtuous rather than worsening risk trajectories is the ability to forecast risk as it relates to dynamic changes in the urban and natural environments. This work describes a disaster risk analysis framework that accounts for and simulates changing hazards, exposure and vulnerability over time. By predicting future risk, these models are much more useful for the design of engineering systems, design of risk-reduction policy and the management of natural and urban environments.

Keywords: Risk; Resilience; Urban; Analysis

Bio

David Lallemant is a Nanyang Assistant Professor and National Research Fellow at Nanyang Technological University in Singapore. His research focuses on urban disaster risk and impact analysis. He uses hazard modeling, engineering analysis, predictive modeling and spatial statistics for application in large-scale natural disaster risk analysis (see details here: http://david-lallemant.com/). David is co-founder of the Stanford Urban Resilience Initiative and Co-Risk Labs. The transdisciplinary and policy-oriented nature of his work has led him to build collaborations with the World Bank, Google, the Red Cross, the Global Facility for Disaster Reduction and Recovery, the Natural Capitals Project and others. He holds a PhD from Stanford University (2015), a master's degree from UC Berkeley (2010) and bachelor's degree from MIT (2007). Email: dlallemant@ntu.edu.sg

Christie Lam
Osaka University, School of Human Sciences

Resilience and Disaster Governance: Lessons Learned from 2015 Nepal Earthquake

Abstract

With the 2015 Sendai Framework for Disaster Risk Reduction (DRR) calling for a historical shift from disaster management to disaster risk management, the concept of resilience has emerged as the new preferred paradigm in international and national policy circles to cope with the effects of a changing environment, natural and manmade disasters. Influenced by this new disaster policy direction, the Nepali government has released the Post Disaster Recovery Framework (2016) that outlines the recovery and reconstruction plan for the Great Gorkha Earthquake.

In this paper, I will critically examine the Nepali government recovery policies by particularly looking at how the concept of resilience is used and its implications for recovery strategies. Three years have passed since the earthquake, but most severely-hit districts remain as destroyed as they were right after the earthquake and most people are still living in temporary shelters or non earthquake-resistant rebuilt houses. Being directly involving in recovery and reconstruction projects for over three years and on-going research work regarding post-earthquake Nepal, I will share my field observations on the effectiveness of the current recovery program with a focus on resilience and disaster governance. According to the field study, by mobilizing earthquake victims, it is possible to rebuild houses and revitalize communities. Conversely, little progress can be expected in Nepal's rebuilding as long as poor governance and poor coordination between major reconstruction actors prevail. The study shows that resilience may be merely another fashionable word used by policy makers; positive changes are minimal if poor governance remains. Furthermore, the study concludes that the strict regulations and inflexible reconstruction plan have undermined the chance for community resilience in resource-poor countries like Nepal. Keywords: Resilience, Disaster Governance, 2015 Nepal Earthquake, Post-disaster Recovery

Bio

Dr Christie Lam is Associate Professor of Anthropology at Osaka University. She earned her PhD in Anthropology from the University of Adelaide, Australia. She has been carrying out research on the welfare impact of conservation-led displacement on local communities, particularly in Nepal, since 2002. Over the past 11 years she has dedicated her life to improving the livelihoods of rural populations, and she is the founder of Future Village Nepal. When the 2015 earthquake hit rural Nepal, her NGO not only provided emergency relief, but also implemented long-term disaster recovery and reconstruction projects. Email: christie.lai.lam@gmail.com

Dr Jonatan A. Lassa
Charles Darwin University, Australia

Political commitment for disaster reduction and climate adaptation in Asia and Pacific

Abstract

In order to make resilient society a reality, a set of social, administrative and political commitments must exist at all levels of governance. Under auspices of both the Sustainable Development Goals 2030

and Sendai Framework for Disaster Risk Reduction 2030, governments around the world should substantially develop risk reduction strategies and set targets to reduce both global disaster mortality and mitigate loss and damage of economic assets and infrastructures. The key questions are: can political will and government commitment to be adaptive to disaster risks and climatic risk be measured? How can an index be developed to systematically assess administrative and political commitments of governments across the globe to reduce and mitigate risks? This paper aims at measuring political will to reduce disaster risks, climate risk, including investment in early warning systems and disaster vulnerability reduction activities such as fiscal allocation for mitigation, risk awareness, conditions and incentives created by stakeholders to participate in managing risks. It exemplifies our recent work in developing a new global political will index with the intention to trigger bolder political commitment for disaster risk reduction worldwide. Specific attention will be given to Asia and Pacific regions.

Bio

Dr. Jonatan A. Lassa is a Senior Lecturer at the Postgraduate Program for Humanitarian, Emergency & Disaster Management at Charles Darwin University. He is an interdisciplinary social scientist with an engineering background. His contributions to global disaster studies include macro and micro level disaster governance, complex network theory application in disaster management, institutions and institutionalisation framework in disaster reduction. He currently works on two projects: first, a global assessment of political will on disaster risk reduction using quantitative approach; second, understanding the evolution of disaster risk management policy from selected counties in Southeast Asia using longitudinal observation. He has gained real world professional experience with third world NGOs, INGOs, United Nations organisations, private sector, think tanks and consulting industry as well as academic organisations in Indonesia, Australia, United States, Germany and Singapore.

Colleen Lau

Research School of Population Health, The Australian National University

Prevention and Control of Emerging Infectious Diseases in the Pacific Islands: Models, Maps, and Precision Public Health

Abstract

Zoonoses account for the majority of emerging infectious diseases. Examples of dramatic outbreaks of zoonoses include Ebola, SARS, and Swine Flu. Leptospirosis is one of the most common bacterial zoonosis worldwide, with >1 million severe infections annually. Recently, unprecedented flood-related outbreaks have resulted from the combined driving forces of climate change, urbanisation, poverty, and agricultural intensification. These forces have in turn been driven by population growth and planetary overload. A growing concern is that with global environmental and demographic change, the driving forces may independently, or potentially synergistically, further increase the transmission of leptospirosis and other zoonoses in the future.

Many of the environmental and ecological drivers of emerging infectious diseases are beyond the immediate control of individuals or small communities, and sustainable disease control will require effective public health and environmental health management from higher levels. One of the major challenges with developing effective prevention and control strategies is that the risk factors and

drivers of transmission can vary significantly between places and subpopulations, even within small remote islands in the Pacific. To maximise the cost-effectiveness and impact of interventions, efforts should be specifically targeted towards the most important risk factors and drivers in each place and for each subpopulation. Following the principles of 'Precision Public Health', this presentation discusses novel approaches to using data, technology, models, and maps to unravel complex disease epidemiology and transmission dynamics, and translating this knowledge to optimise who, when, how, and where to target prevention and control. Keywords: Environmental Health, Infectious Diseases, Outbreaks, Pacific Islands

Bio

Colleen Lau is an NHMRC Fellow at the Research School of Population Health at The Australian National University. She is a clinician and epidemiologist, with special interest in environmental health, infectious disease emergence and outbreaks, and the environmental and socio-demographic drivers of infectious disease transmission. Email: colleen.lau@anu.edu.au

Andre Le Duc and John Vargo
University of Oregon and Resilient Organisations

Disaster Resilient Universities: The ability to not only survive a crisis but thrive in a world of uncertainty

Abstract

The complexity of our universities is increasing while our resources are decreasing. Our new reality requires the development of collaborative, high functioning, cohesive, intra-disciplinary teams, and networks that focus organizations' resilience. Building more resilient universities is a global imperative, as our universities serve as hubs of employment, economic productivity, and scientific progress and provide essential services that underpin our society. A recent national survey of universities in the United States highlighted that most campuses (83%) have a response plan, but only 30% have plans for academic and research continuity or recovery. The protection of our university's academic and research enterprise as a critical national resource and an economic driver is vital to our shared future.

The session highlights an integrated systems approach to enterprise risk management and emergency management that allows organizations to understand their vulnerabilities, adaptive capacity, and situational awareness. Providing an overview of the core elements of organizational resilience and 13 key indicators you can use to assess your university's resilience. Learning to not only survive in the face of adversity but thrive. The organizational resilience approach supports better governance and enables the university to empower leaders to succeed in times of uncertainty and rapid change. The session will provide an overview of practical tools, processes, examples, and strategies that attendees can use or adapt to reduce disaster risk and make their campus more resilient in our fast-pasted and evolving environment.

Keywords: universities; organizational resilience; enterprise risk management; emergency management

Bio

André LeDuc is the Chief Resilience Officer and Associate Vice President at the University of Oregon. His area of expertise is assisting organizations to understand their vulnerabilities, adaptive capacity, and situational awareness such that they can empower leaders, teams, and individuals to thrive in times of uncertainty and rapid change. LeDuc has over 20 years of demonstrated program development, strategic planning, and disaster and risk management experience. Le Duc's work is at the intersection of the sciences, policy, planning, and strategic decision-making and employs a multidisciplinary systems approach to enterprise risk management, emergency management, and organizational resilience. In his tenure at the university, he developed an applied research center, Oregon Partnership for Disaster Resilience, and founded the National Disaster Resilient Universities Network. LeDuc serves as an incident commander and has led the response and recovery efforts for numerous incidents including a mass shooting on an Oregon campus and a meningitis-B outbreak.

Dr. John Vargo is Executive Director of Resilient Organisations Ltd. (ResOrgs) based in Christchurch New Zealand. His interests focus on building organisational resilience in the face of systemic insecurity in a complex and interconnected world. John was an academic at the University of Canterbury and filled a range of senior management roles during the 2000s at the University, including Dean of the Business School, Chief Operating Officer and Pro-Vice Chancellor for Student Services. John and the Resorgs team have been researching organisational resilience since 2004, including resilience research following the 2010-2011 series of devastating earthquakes that hit Christchurch, New Zealand. Other recent projects have focused on the resilience of public institutions including health, higher education and critical infrastructure organisations and the keystone role they play in the resilience of communities. John is a science leader on the NZ National Science Challenge for Resilience. Email: leduc@uoregon.edu; Email:john.vargo@resorgs.org.nz

Fong-Zuo Lee, Jihn-Sung Lai, Wen-yi, Chang and Yih-Chi Tan
National Taiwan University, National Center for High-performance Computing and Center for Weather Climate and Disaster Research

Assessments of Induced Disaster on Woody Debris and Turbidity Current Venting in a Reservoir

Abstract

Since the completion of a reservoir, sedimentation process decreases reservoir storage and woody debris affects the operation of hydraulic works in many montane areas, especially for the power plant turbines. The flow mechanism of woody debris is usually following with the turbidity current and collection near the plunge point location in a reservoir. Therefore, the collection location of woody debris is valuably to estimate the plunge point location of the turbidity current. If the turbidity current is generated and travelled through a reservoir, successful operation of a sluicing outlet to vent turbidity current depends on accurate prediction of turbidity current movement. In-situ measured data of sediment concentration and velocity vertical distribution during a flood event can help understand turbidity current movement in a reservoir. However, field measurement of the turbidity current in a reservoir is relatively difficult because of large water depth, an unsteady fluid mechanism, and harsh environments during a flood. Therefore, the water elevation, cross-section data and inflow discharge are selected to estimate turbidity current movement. The collection location of woody debris in the field is also adapted to verify plunge point location of turbidity current in this study. A

display interface is also developed in this study to display the plunge location, movement velocity, body thickness and sediment concentration of turbidity current. For turbidity current venting, the plunge point location and turbidity current movement estimation can provide real-time information to assist the operations of bottom outlets. The study results can also be applied to the related disaster prevention issues on water resources sustainable, reservoir sedimentation and water quality issues. Keywords: woody debris, turbidity current, plunge point location, display interface, real-time

Bio

Fong-Zuo Lee is the Assistant Research Fellow of Hydrotech Research Institute, National Taiwan University.
Jihn-Sung Lai is the Research Fellow of Hydrotech Research Institute, National Taiwan University. Wen-yi, Chang is the Research Fellow of National Center for High-performance Computing. Yih-Chi Tan is the Director of Center for Weather Climate and Disaster Research, National Taiwan University. Email: windleft@gmail.com

Dr Anna Lukasiewicz

Visiting Fellow, Fenner School of Environment and Society, ANU

The Emerging Imperative of Disaster Justice

Abstract

'Natural disasters' do not exist. A 'natural disaster' is in fact a 'social disaster waiting to happen', triggered by a particular natural force. In other words, disasters are actually the consequences of societal decisions and priorities: vulnerability is created and/or worsened by our actions (and inactions). Thus disaster risk management, reconstruction and recovery must be explicitly considered as issues of justice, especially in the era of the Anthropocene as climate-related hazards are set to occur more frequently, in more places with greater intensity, generating more disasters.
As a result, significant expectations are placed on managers and leaders to avoid or minimize negative impacts of disasters. In this presentation I outline why the concept of Disaster Justice should be a prominent issue for disaster managers and policy makers. First, and most importantly, the impacts of disasters are dependent on how a society distributes its resources and allocates costs and risks, as those most vulnerable and marginalised will be more affected before, during and after the disaster. Second, disaster risk management (especially in the prevention / preparedness phase) highlights conflicting individual and collective rights and responsibilities. Third, the understanding of disasters as consequences of governing decisions leads to an understanding of certain decisions as an injustice (as opposed to a misfortune), which demands accountability and redress. In this paper, I explain what Disaster Justice looks like and what it can offer to disaster risk managers, emergency response practitioners and policy-makers, and to the broader community. Keywords Disaster justice, vulnerability, natural hazards, risk management

Bio

Dr Anna Lukasiewicz is a justice researcher with an interdisciplinary background in the social sciences and a keen interest in how human societies interact with nature. Since coming to ANU, Anna has focused on justice research in natural resource management and is expanding this focus to natural hazards and disaster justice.

She is working on developing the Social Justice Framework for environmental decision-making. Her research includes projects on resilience to natural disasters, the social aspects of environmental water stakeholder advisory groups, climate change adaptation at a catchment level, and the last three decades of water reform in Australia.

Anna has a PhD from Charles Sturt University in Natural Resource Management, a Masters in Social Science (International Development) from RMIT and a Bachelor of International Studies from the Flinders University of South Australia. Email: anna.lukasiewicz@anu.edu.au

Professor Holger R. Maier

Professor School of Civil, Environmental and Mining Engineering

University of Adelaide

A spatial decision support system for natural hazard risk reduction policy assessment and planning

Abstract

The ability to consider effective risk reduction planning is critical, given the potentially enormous social and economic losses associated with the impacts of natural hazards. However, developing and implementing long term risk reduction schemes is often difficult for a variety of reasons, including an investment preference for shorter term benefits, the perceived inaccuracy of risk attributed to disasters due to their relative infrequent occurrence, and budgetary constraints. Therefore, selecting the optimal trade-off between options can be difficult. This presentation will focus on the development and application of a spatial decision support system (DSS), or integrated model, to support policy makers in considering the long term impacts of disaster risk, mitigation and land use planning. The modelling platform integrates various hazard models and calculates risk dynamically using demographic, infrastructure, and environmental data to explore future disaster risk. Model components include hazards (coastal inundation, riverine floods, bushfires, earthquakes, heatwave), land use change, building stock vulnerability, social vulnerability, climate change, demographic and population change and economic change. The DSS allows decision makers, policy analysts and others in strategic and risk reduction planning to consider how the risk from multiple hazard changes with economic and population change. It also allows for the implementation of risk reduction options, including structural measures, land use planning changes, building hardening, changes to building codes and community education, thereby changing social vulnerability.

Bio

Professor Holger Maier is Professor of Environmental Engineering in the School of Civil, Environmental and Mining Engineering at the University of Adelaide and an Editor of Environmental Modelling and Software. He has also served as an Associate Editor for Water Resources Research for 5 years. His research is focussed on developing improved techniques for the sustainable management of infrastructure and natural resources in an uncertain environment and includes elements of modelling, optimisation and decision support and he is currently the research leader of the Economics and Strategic Decisions research cluster of the Bushfire and Natural Hazards CRC as well as the leader of a project focussed on the development of a decision support system for the assessment of policy and planning investment options for optimal natural hazard mitigation. He has in excess of 150 journal publications and in excess of 12,000 citations (Google Scholar). He has also received a number of national and international awards for his teaching and research, such as the Australian Award for University Teaching and the Biennial Medal from the International Environmental Modelling and Software Society.

Dr Sujan babu Marahatta

Manmohan Memorial Institute of Health Sciences, Kathamandu Nepal

Knowledge and Practice of Earthquake Preparedness and management in secondary school students of Kathmandu District

Abstract

An earthquake is a sudden movement of the earth's crust caused by the release of stress accumulated along geologic faults or by volcanic activity. They are very destructive causing loss of many lives and properties. When earthquake occurs, the shaking ground itself is not responsible for killing people. Collapse of buildings, landslides, avalanches, volcanic eruptions and tsunamis triggered by earthquakes are actually responsible for killing people. Educational institutions like schools are vulnerable in the context of Nepal. Mitigation, preparedness, response and recovery are the steps to manage an earthquake.

The overall objective of this study is to generate the knowledge and practice of earthquake preparedness and management in secondary school students of Kathmandu district.

A descriptive cross-sectional study was carried out in secondary school students from private institution of Kathmandu district with the sample size of 408 using self-administered structured questionnaires. A pre-tested structured questionnaire was used for data collection. This paper discusses the results of the study and shows that students had adequate knowledge but not comparatively adequate practice. Keywords: earthquake, preparedness, school students

Bio

Dr. Sujan B Marahatta M.Sc, PhD, is an Associate Professor in Public Health, Manmohan Memorial Institute of Health Sciences (MMIHS) and Assistant Chief/Director Manmohan Memorial Institute of Health Sciences. He obtained his Doctor of Philosophy in Tropical Medicine 2007 from the Faculty of Tropical Medicine, Mahidol University, Thailand. Email sujanmarahatta@gmail.com.

Associate Professor Alan March

Melbourne School of Design, University of Melbourne

Ways Forward for the Governance of Integrated Urban Planning and Emergency Management

Abstract

Urban planning seeks improvements to–and avoidance of problems in–human settlements that would not be achieved without intervention, organization and facilitation. Emergency management is oriented to the successful treatment of risks by establishing systems that reduce vulnerability to hazards and avoid or cope better with disasters. However, one fundamental but challenging aspect of urban planning is clearly setting out its role in disaster risk reduction - understood here as a wider and integrated approach to the reduction of risks that includes emergency management and urban planning. While significant key policies such as the Sendai Framework (2015) strongly advocate the centrality of urban planning in DRR, it is often unclear how_this_can_be_achieved.

It is clear that dynamic growth changes being experienced in some Australian settlements in the context of worsening extreme weather are bringing about increased risks associated with natural hazards. This paper argues that integrating urban planning and emergency management to achieve DRR goals requires a coordinated framework at strategic, tactical and operational levels, across functional areas and stakeholders to establish effective integrated governance. It sets out a framework to critically review existing approaches to risk management in urban settlements that not only shows shortcomings, but also reveals opportunities for significant improvement. The paper concludes by addressing a number of issues: questions of comprehensiveness; procedural timing and strategic decision making; the challenges of existing and new settlements; links between social, physical and ecological risks; and, the need to reassess the fundamental instruments used by urban planning.

Keywords: Planning, Integrated, DRR, Emergency

Bio

Dr Alan March is Associate Professor in Urban Planning. He is Director of the Bachelor of Design degree at Melbourne University. He has practised since 1991 in a broad range of private sector and government settings and has had roles in statutory and strategic planning, advocacy, and urban design. Alan's publications and research include examination of the practical governance mechanisms of planning and urban design, in particular the ways that planning systems can successfully manage change and transition as circumstances change. He is particularly interested in the ways that planning and design can modify disaster risks, and researches urban design principles for bushfire. His current work also considers the ways that urban planning is seeking to establish new ways to spatialise urban management. Email: alanpm@unimelb.eda.au

Dr Leonardo Nogueira de Moraes is a Postdoctoral Research Fellow in Resilience and Urban Planning at the Faculty of Architecture, Building and Planning of the University of Melbourne, where he is part of the research team for the Integrated Urban Planning for Natural Hazard Mitigation project, funded by the Bushfire and Natural Hazards Cooperative Research Centre - BNH-CRC. His background includes a Bachelor of Tourism (Development and Planning) degree and a Specialisation in Tourism and Hospitality Marketing Management from the University of São Paulo, Brazil. His PhD degree in Architecture and Planning (from the University of Melbourne) focused on the effects of tourism development and the implementation of protected areas on the resilience of small oceanic islands, from a social-ecological complex adaptive systems perspective. His current research on Resilience and Urban Planning also includes the effects of tourism development to the resilience of local communities to natural hazards. Email:leonardo.moraes@unimelb.edu.au

Associate Professor Jay Marlowe and Professor Andreas Neef
University of Auckland

Guiding framework for engaging diverse populations in DRR: Reach, Relevance, Receptiveness and Relationships

Abstract

Emergency managers in Auckland have increased efforts to make the city and its diverse communities more resilient to climate-related disasters and other natural hazards. With nearly 15% of people living in New Zealand identifying as Pacific Islander, the largest city, Auckland has been dubbed the 'Polynesian capital of the world'. Yet, little is known about the specific capacities and vulnerabilities of Auckland's large and increasingly dispersed Pasifika communities. Drawing on semi-structured interviews conducted with Pacific Island community leaders, we identify particular areas that need attention by emergency managers and government officials. These revolve around (1) the role of traditional community leadership and its contestation, (2) differential use of information communication technology, (3) the importance of youth as linguistic and cultural brokers, and (4) churches as important entry points for information on disaster risk reduction. While community leaders identified certain sub-groups (e.g. overstayers, non-English speakers) as being at particular risk from disasters, they also emphasised the resilience of Pacific people stemming from strong community cohesion and transnational experience with disaster response in the Pacific. The findings call for the creation of inclusive and culturally responsive social spaces and activities that can harness Pacific communities' unique capacities and experiences in addressing disaster risk. In particular, this paper forwards the importance of incorporating the guiding concepts of reach, relevance, receptiveness and relationships into a DRR approach with culturally and linguistically diverse groups.
Keywords: DRR, diversity, Pacific Islands, engagement

Bio

Jay Marlowe is an Associate Professor of social work at the University of Auckland. His work focuses on the sociology of migration (particularly with refugees) and how inclusive DRR can be supported and embraced with culturally and linguistically diverse groups. He is currently a member of an EU funded project on crisis translation and is an investigator on the National Science Challenges (NZ) funded project on societal resilience to natural hazards. Email: jm.marlowe@auckland.ac.nz; a.neef@auckland.ac.nz

Mr Andrea Massetti
Monash University

A method for forest fuel assessment and recovery based on satellite remote sensing.

Abstract

Knowledge of the fuel available in wildfire-prone areas is crucial predicting the occurrence and behaviour of potential wildfires, as well as gauging the effectiveness of planned burns. However, fuel assessments are difficult to quantify as past fire history and fuel recovery must be taken into account. Past wildfires of differing severity change both the amount and the structural distribution of fuels, resulting in different patterns of vegetation recovery. The subsequent intensity of future fires depends in large part on these factors. Fire services typically rely on labour-intensive visual inspections of fuel amount and distribution which can only be applied to limited areas and may provide only a subjective measure of fuel state. Remote sensing offers an alternative with the potential for rapidly and automatically assessing fuel state over large areas allowing for continuous monitoring over time. We propose a tempo-spatial method for assessment of fuel state based on remotely sensed data from the Landsat satellite. The method uses a new index, the Vegetation Structure Perpendicular Index (VSPI) that provides a measurement of burn severity and ecosystem recovery in forested areas. The index could be used to gauge effectiveness of planned burns or recovery from past wildfires, informing improvements in wildfire prevention or mitigation measures. The index could also be used to provide up-to-date fuel information for fire behaviour simulations, helping to provide more accurate predictions of fire behaviour in operational or risk management applications. Keywords: continuous fuel monitoring, satellite remote sensing, vegetation recovery, fire danger

Bio

Andrea graduated with BSc and MSc in Rural Development at the University of Perugia in Italy. His MSc project and subsequent research experience at University of Azores developed a strong interest in Remote Sensing of vegetation, computer vision and machine learning. In 2016 he moved to Melbourne to pursue his PhD at Monash University under the supervision of Dr Christoph Rüdiger, Dr James Hilton (Data-61, CSIRO) and Dr Marta Yebra (ANU). Email:andrea.massetti@monash.edu

Dr Marta Yebra is a Senior Scientist at the Water and Landscape Dynamics Group in the Fenner School of Environment and Society, Australian National University. Her main background is in remote sensing of vegetation biophysical properties, such as fuel load and moisture content for spatial fire risk analysis, and canopy conductance for carbon sequestration and water balance studies. Email:marta.yebra@anu.edu.au

Christopher Rüdiger has a BE in Civil Engineering from Germany and wrote his final thesis on groundwater contamination flow at a major European airport. His PhD thesis then looked into the use of streamflow data for soil moisture predictions, which ultimately led him to work on satellite derived soil moisture products. At Meteo France and the French Space Agency (CNES), Christopher developed and analysed frameworks for the assimilation of satellite data into land surface models. Upon returning to Australia he led the ground-components of four major airborne campaigns to central

Australia and southern New South Wales for the validation of the European Space Agency's Soil Moisture_and_Ocean_Salinity_(SMOS)_mission. Since 2011, he has worked as an academic at Monash, teaching into the 3rd year undergraduate and Masters streams. Email: chris.rudiger@monash.edu

Dr James Hilton is a senior research scientist in the Data61 business unit in CSIRO. He joined CSIRO in 2007 as a Postdoctoral Fellow. Prior to this, he was a postdoctoral researcher working in the Complex Systems group in Trinity College Dublin, Ireland. His research interests are in the fields of applied computational fluid and solid dynamics. His current projects involve the development of the propagation model within the Spark framework, as well as research into the fundamental behaviour of fire propagation.

Mrs Tautala Mauala

Disaster Risk Reduction and Recovery in Samoa

Abstract

The world is changing fast and is making Pacific people more vulnerable to natural disaster risks and are forced to cope with acts of violence, financial crises and growing uncertainty, often without adequate support from their governments. With new challenges to humanitarian coordination, concerns over standards and accountability, more capable states and National Societies[I] exercising leadership over humanitarian response and presenting new opportunities to mobilize available resources in non-traditional ways, National Societies on the ground must learn, adapt, innovate and lead to ensure that we remain relevant and achieve greater impact with our humanitarian work.

With regards to how hazard risks have been previously managed in Samoa, its National Action Plan embodies a significant change of approach that addresses all stages of disaster risk management, factored into normal development activities such as land use and physical planning, environmental monitoring, building reinforcements, health and education services. Continuous commitments by all actors are also required to maintain explicit disaster risk management capabilities; public awareness, early warning, emergency medical care, search and rescue, the maintenance of emergency equipment etc

The frequent and severity of natural disasters that devastated Samoa recently, have not only helped our affected communities' test their DRM capabilities and resilience, but also provided significant lessons learnt for all to be more skilled and knowledgable in DRR aspects, in order to be more effective in future disasters. These actions further portrayed Samoa's progress in implementing disaster risk reduction activities against the Hyoko Framework for Action (HFA) and further committing in the implementation of the SDGs. Similarly, the Samoa Red Cross Society (SRCS) in its auxiliary role to government in the humanitarian field, helps build safer communities by providing basic health services, first aid training, blood donor recruitment, HIV/STIs, care for PLHIV, training young peer educators on life skills against gender based

violence, water and sanitation and hygiene promotion including vector control, and much more.

Whenever disasters strike, SRCS is ready to help vulnerable communities. From building disaster resiliency to providing vital assistance to meet people's basic needs, our large pool of volunteers are there to give support.

Bio

Current Secretary General for the Samoa Red Cross Society (SRCS) in 17 years. A Medical Laboratory Technologist by profession, and worked for the Samoan Government in 28 years as the Technologist In-Charge of the Blood Transfusion Services with the National Health Laboratory Services at the TTM Hospital, Moto'otua Road, Apia, SAMOA.

Leonardo Nogueira de Moraes
Melbourne School of Design, The University of Melbourne

Natural Hazard Mitigation for Disaster Risk Reduction – knowledge, research and stakeholder engagement

Abstract

With increased frequency and intensity of natural hazards stemming from environmental change and settlement changes, natural hazard mitigation for disaster risk reduction is gaining greater attention from governmental, non-governmental and academic organisations worldwide. In Australia, the development of the 2011 National Strategy for Disaster Resilience was an important step towards building a unified vision for the multitude of stakeholders involved with disaster risk reduction, including emergency management and urban planning portfolios in different levels of governance. Nonetheless, it is at the local level where most consequences of the deployment–or absence–of natural hazard mitigation is felt. Acknowledging the shared nature of risk, the National Strategy calls for shared action to be undertaken by residents and agencies when it comes to reducing risk levels. However logical this task seems, risks are perceived, experienced and acted on differently by stakeholders, who also carry differing levels of risk acceptance. In turn, these stakeholders also understand collective risks in different ways and weigh them differently against their individual interests. It is argued here that access to knowledge and reliable research outputs are key elements to inform decision-making that can lead to natural hazard mitigation by supporting public engagement and governmental action. This paper looks at how this process has taken place in the case of the 2015 Wye River – Separation Creek bushfires from preparedness and prevention to response and recovery. It concludes by highlighting the potential for academia to increase its engagement with different stakeholders as a key knowledge and research agent. Keywords: Wye River, Urban Planning, Resilience, Governance

Bio

Dr Leonardo Nogueira de Moraes is a Postdoctoral Research Fellow in Resilience and Urban Planning at the Faculty of Architecture, Building and Planning of the University of Melbourne, where he is part of the research team for the Integrated Urban Planning for Natural Hazard Mitigation project, funded

by the Bushfire and Natural Hazards Cooperative Research Centre - BNH-CRC. His background includes a Bachelor of Tourism (Development and Planning) degree and a Specialisation in Tourism and Hospitality Marketing Management from the University of São Paulo, Brazil. His PhD degree in Architecture and Planning (from the University of Melbourne) focused on the effects of tourism development and the implementation of protected areas on the resilience of small oceanic islands, from a social-ecological complex adaptive systems perspective. His current research on Resilience and Urban Planning also includes the effects of tourism development on the resilience of local communities to natural hazards. Email:leonardo.moraes@unimelb.edu.au

Dr Alan March is Associate Professor in Urban Planning. He is Director of the Bachelor of Design degree at Melbourne University. He has practised since 1991 in a broad range of private sector and government settings and has had roles in statutory and strategic planning, advocacy, and urban design. Alan's publications and research include examination of the practical governance mechanisms of planning and urban design, in particular the ways that planning systems can successfully manage change and transition as circumstances change. He is particularly interested in the ways that planning and design can modify disaster risks, and researches urban design principles for bushfire. His current work also considers the ways that urban planning is seeking to establish new ways to spatialise urban management. Email: alanpm@unimelb.edu.au

Sandra Carrasco M. (BArch, MSc, PhD) is a Research Fellow at the University of Melbourne, Australia, under the MacKenzie Postdoctoral Fellowship. Sandra graduated from Kyoto University, Japan, where she completed her master and doctorate studies. Her research and professional experience include Japan, the Philippines, Malaysia, Chile, Indonesia and Peru. She focuses in topics related to post-disaster reconstruction and community resilience, as well as studies on NGOs' involvement in reconstruction and community recovery. Recently she is looking for alternatives to connect post-disaster housing reconstruction to the processes of the informal development of housing as the expression of people's self-production of their habitat. Dr Carrasco's research is centred on resident issues in massively built housing projects after disasters, the analysis of the transformation of the built-environment and the appropriateness of rebuilt settlements, incremental housing, informal settlements and multi-stakeholder processes for post-disaster recovery, governance and city planning. Email: sandra.carrasco@unimelb.edu.au

Professor Dr Osamu Murao

International Research Institute of Disaster Science, Tohoku University

Tsunami Mitigation Strategies in the Coastal Areas Affected by the 2011 Great East

Abstract

The 2011 Great East Japan Earthquake and Tsunami severely damaged to the coastal areas in north-east region of Japan. However, notwithstanding its magnitude of Mw 9.0, it seems less casualty than those caused by other recent tsunamis such as the 2004 Indian Ocean Tsunami. One of the factors of those disaster risk reduction was tsunami mitigation strategies which had been adopted along coastal areas in Japan since 20th century. In order to clarify the effect of tsunami mitigation strategies, this

research comprehensively gathers dataset of related construction situations such as levee, water gate, tsunami height, and damage conditions for each coastal district. Then it analyzes relationships between several tsunami mitigation strategies and damage conditions.

Firstly, the authors collected information on how tsunami mitigation construction or space had reduced tsunami disasters in the 2011 event from previous research papers, newspapers, and website, and arranged the dataset about those examples provided by Reconstruction Agency. Secondly, using the dataset, the authors grasped the basic information and tsunami damage level of the affected cities, towns and villages. Thirdly, we analyzed the relationships between damage conditions of buildings and casualties, and regional geographical environment. Finally, the dataset was compared with the damage conditions due to the 1896 Meiji Sanriku Tsunami and the 1933 Showa Sanriku Tsunami. It refers to the current situation of the post-tsunami recovery.

Keywords: 2011 Great East Japan Earthquake and Tsunami, Levee, water gate, land-use

Bio

Dr. Osamu Murao is a professor at the International Research Institute of Disaster Science (IRIDeS) at Tohoku University, which was established in order to disseminate learning from the 2011 East Japan Earthquake and Tsunami Disaster, and the founder of the International Strategy for Disaster Mitigation Laboratory (ISDM). His current researches focus on post-disaster recovery process and urban design, and the relationship between physical environment (architecture and urban design) and disaster. To date, with research grants, he has investigated the post-disaster recovery process for damaged areas in Taiwan, Turkey, Sri Lanka, Thailand, Indonesia, Peru, Philippines, and World Trade Center in New York. Particularly he kept tracking the recovery process of Chi-Chi Township since the 1999 Chi-Chi earthquake in Taiwan as a visiting researcher of National Taiwan University in 2005. Dr. Murao has been involved in some research projects about post-disaster urban recovery and disaster risk reduction in the world. Email: murao@irides.tohoku.ac.jp

Associate Professor Carol Mutch
The University of Auckland

The role of schools in disaster response and recovery in the Asia-Pacific

Abstract

This presentation is a synthesis of the author's six-year study across six Asia-Pacific settings examining the role of schools in disaster response and recovery. The settings include three developed nations (New Zealand, Australia and Japan) and three developing nations (Nepal, Samoa and Vanuatu). The events included earthquakes, bush fires, tsunami and cyclones. Participants included principals, teachers, students and parents, who participated in semi-structured interviews, focus groups and arts-based activities. The presentation will argue that because schools are located in centres of population and responsible for the wellbeing of children in their care, they are automatically engaged in all phases of the disaster cycle and need to be considered as such. I will highlight three finding from my study. First, schools play a role in their communities prior to a disaster event by building of community connectedness and resilience. Second, that, despite possibly being victims themselves, schools remain places of safety, calm and support for their students, families and communities. Third, all this is done with little or no training or recognition. My recommendations align with that in the grey literature,

such as the Comprehensive School Safety framework (GADRRRES, 2017) that: (a) schools are located in safe, central, easy to access locations; (b) built to the current building codes; (c) designed with multiple community activities in mind; (d) contain facilities that can provide for a wider range of purposes, including post-disaster shelters and relief hubs; and (e) that better pre-service and in-service training is provided for teachers and principals. Keywords: schools, communties, disaster response, disaster recovery, Asia-Pacific

Bio

Carol Mutch is an associate professor in the School of Critical Studies in Education, in the Faculty of Education and Social Work at the University of Auckland. She teaches and researches about educational policy, curriculum, research methods and social justice. She is the author of six books and multiple chapters and articles on these topics. Most recently, these themes have come together in her research on the role of schools in disaster response and recovery following her experience of the 2010/2011 Canterbury earthquakes. Her disaster research has extended into other countries in the Asia-Pacific region as she advocates for the role of principals, teachers and schools, during and post-disaster. She has published over 20 articles on the role of schools in disaster response and recovery and is currently completing a book on her research. Emailc.mutch@auckland.ac.nz

Professor Andreas Neef

Development Studies, Faculty of Arts, The University of Auckland

The Tourism-Disaster-Conflict Nexus: Lessons Learned from the Asia-Pacific Region

Abstract

Tourism crises in Southeast Asia and the South Pacific have been regularly precipitated by natural disasters, as exemplified by the 2004 Indian Ocean Tsunami that devastated many coastal tourist destinations or the recent category 5 cyclones Pam and Winston that ravaged small island countries in the South Pacific. At the same time, the tourism industry has often been assigned a pivotal role in the reconstruction and recovery efforts. Prospective tourists have been lured into supporting post-disaster rehabilitation simply through visiting disaster-affected areas. Yet prioritising the tourism sector in the recovery process may have unintended consequences: less touristic areas that have been severely affected by the disaster may receive less humanitarian relief support. Disaster recovery processes in the tourism industry can also be highly uneven, as multinational hotel chains tend to recover more swiftly and increase both their market share and their control over important resources. Insecure, customary land rights of ethnic minority groups and indigenous people may be prone to exploitation by opportunistic tourist operators in the aftermath of a disaster. Drawing on fieldwork in Fiji, Vanuatu and Thailand, this paper investigates the interface of tourism, disaster and conflict in socio-political settings that differ with regard to (1) the acknowledgement of indigenous and customary land tenure by statutory law and (2) the role of the government in prioritising certain types of tourism operations over others. The paper will conclude with a discussion of policy implications for the renewal of tourism-state-community relations in post-disaster response and recovery contexts. Keywords: disaster recovery, land tenure, tourism, Asia-Pacific

Bio

Andreas Neef is Professor in Development Studies at the University of Auckland, New Zealand. His current research focuses on climate change adaptation and mitigation, post-disaster response and recovery, land grabbing, development-induced displacement, and the tourism-disaster-conflict nexus. He has led several collaborative research projects on disaster risk management in Southeast Asia and the South Pacific. He served twice as scientific adviser to the German Parliament. Andreas Neef is the editor of "Risks and Conflicts: Local Responses to Natural Disasters" (with Rajib Shaw), published by Emerald, Bingley, UK in 2013. Email: a.neef@auckland.ac.nz

Dr Caroline Orchiston

Research Fellow and Deputy Director

Presenting on behalf of:

Dr Caroline Orchiston, C., Johnston, D.; Leonard, G.; Becker, J.; Carter, L.; Potter, S.; Saunders, W.; Woods, R.; Blake, D.; Boersen, K.; Power, W.; Crawford, M.; Fraser, S.; Ronan, K.; Paton, D.; Johnson, V.; Tarrant; R.; Tipler, K.

Towards tsunami-safer communities in New Zealand: Evaluating real events, exercises, drills and awareness programmes.

Abstract

Tsunami awareness in New Zealand has evolved over the last 58 years since the 1960 Chilean tsunami, which struck New Zealand without official warning and caused significant damage, despite occurring at low tide. From 1960 to 2004 various measures were put in place, such as becoming part of the Pacific Tsunami Warning System, which led to improvements in official warning mechanisms. However, surveys in 2003 showed that public understanding of tsunami risk and correct warning-response action still had room to improve. Following the 2004 Indian Ocean tsunami the New Zealand government initiated an extensive review of national tsunami hazard, risk and preparedness. New initiatives represented significant steps forward in our preparedness for future earthquakes and tsunami. Recent evaluations of real events, exercises, drills and awareness programmes have shown a steady improvement. However, there is still a way to go to ensure adequate awareness and preparedness of individuals and communities. This paper outlines the results of recent tsunami social science research and highlights future opportunities for building tsunami-safer communities in New Zealand and other at-risk countries.

Bio

Caroline joined the Centre in March 2016 as a Research Fellow involved in Resilience to Nature's Challenges (National Science Challenge). This research focusses on building a more resilient New Zealand by transforming how we prepare for and mitigate against rapid (earthquakes, floods) and slow onset (climate change-related) disasters. Caroline is contributing to two projects relating to rural and cultural resilience in the Challenge programme.

Caroline's background in both earth and social sciences has involved research on aspects of tourism disaster resilience and recovery, community and business resilience, and scenario planning for impacts to critical infrastructure and emergency management during

earthquake disasters. She is an Affiliate Researcher at both the Joint Centre for Disaster Research (Massey Wellington and GNS Science) and Resilient Organisations (Christchurch). Her PhD and Postdoctoral research investigated tourism in areas of high seismic risk (Southern Alps and Canterbury, New Zealand), focussing on pre-disaster planning and preparedness (Alpine Fault zone) and post-disaster impacts and recovery amongst tourism enterprises and stakeholders (Canterbury earthquake sequence). Since 2010, Caroline has also been involved in a longitudinal study of community preparedness and awareness to natural hazards in Washington State, USA in collaboration with GNS Science, Washington State Emergency Management and the United States Geological Survey.

Professor David Johnston is a Principal Scientist at GNS Science and Director of the Joint Centre for Disaster Research in the School of Psychology at Massey University, Wellington, New Zealand. His research has developed as part of multi-disciplinary theoretical and applied research programme, involving the collaboration of physical and social scientists from several organisations and countries. His research focuses on human responses to volcano, tsunami, earthquake and weather warnings, crisis decision-making and the role of public education and participation in building community resilience and recovery. In 2016 he became Co-chair of World Meteorological Organisation's (WMO) High Impact Weather Project (HIWeather) Steering Group. This follows his role as the Chair of the Integrated Research on Disaster Risk Scientific Committee (IRDR) (2013-2015), a program co-sponsored by the International Council for Science (ICSU), the International Social Science Council (ISCC), and the United Nations International Strategy for Disaster reduction (UNISDR). He is the Editor of The Australasian Journal of Disaster and Trauma Studies; and was the founding Editor of the Journal of Applied Volcanology.

Dr Indrajit Pal
Asian Institute of Technology

Social Resilience and Flood Vulnerability Assessment at the Local level: A System Approach in Sakon Nakhon Province, Thailand.

Abstract

Flood resilience is a complex system consisting of physical, environmental, socio-economic, and institutional processes and is characterized by a significant degree of interdependence between the processes. It is also influenced by the actions and decisions of a wide range of actors. Field-based academic researches play a vital role in identification of key issues contributing to disaster vulnerability and in uncovering of policy recommendations that will help in reducing vulnerability and improving community resilience. Vulnerability to disasters is embedded in a complex system of societal structures and processes. It is driven by a combination of social, economic, environmental, institutional, and other relevant processes that interact with and influence each other. Thus, assessment of disaster vulnerability requires an approach that captures the dynamics of drivers of disaster vulnerability and accounts for the interactions among them. The system approach seeks to look at a problem in its entirety, considering all the facets, all the intertwined parameters to identify the optimum solutions to the problem. Thus, the primary objective of this paper is to review the existing field-based approaches to flood vulnerability assessment aimed at understanding the extent

to which system approach has been adopted and identifying gaps in current approaches. Present research aims to understand the complex and interconnected issues associated with the community level flood risk management and social resilience. This paper will also use learnings from an on-going research projects on flood vulnerability assessment using system approach at the local level in Sakon Nakhon Province, Thailand. Keywords: Flood Vulnerability, System Approach, community resilience, complex system. Risk drivers.

Bio

Indrajit is presently working as Assistant Professor and Chair at Disaster Preparedness, Mitigation and Management (DPMM) at Asian Institute of Technology, Thailand. He holds Doctoral degree and two Master's Degree, in Applied Geology and Sociology with urban sociology specialization. Dr. Pal also holds Diploma in Management. Indrajit having more than 15 years of experience on teaching, training, research, curriculum development, advocacy, consultancy focused on Disaster risk Governance and Assessment, Climate Change Adaptation, Public Health Risk and Private Sector Resilience. Dr Pal authored and edited six books and published more than 55 research articles in national, international journals, conferences, book chapters. Indrajit is currently supervising 11 Doctoral and Masters' research students across Asia and Africa in the field of disaster risk management and governance. In 2017 lndrajit has been recognised as IRDR Young Scientists. Indrajit is member of Board of Directors for the Global Alliance of Disaster Research Institutes (GADRI) Japan. Email: indrajit.pal@gmail.com

Dr Melissa Parsons

University of New England, Armidale, New South Wales

The Australian Natural Disaster Resilience Index

Abstract

The Australian Natural Disaster Resilience Index is Australia's first national-scale standardised snapshot of disaster resilience. Because of its national extent, the index takes a top-down approach using indicators derived from secondary data. The Australian Natural Disaster Resilience Index has a hierarchical design based on coping and adaptive capacities representing the potential for disaster resilience in Australian communities. Coping capacity is the means by which people or organizations use available resources, skills and opportunities to face adverse consequences that could lead to a disaster. Adaptive capacity includes the arrangements and processes that enable adjustment through learning, adaptation and transformation. Coping capacity is divided into themes of social character, economic capital, infrastructure and planning, emergency services, community capital and information and engagement. Adaptive capacity is divided into themes of governance, policy and leadership and social and community engagement. Indicators are collected to determine the status of each theme. This talk will present some of the findings of the assessment of disaster resilience as strengths and opportunities for disaster resilience in Australian communities. It will also discuss how the findings highlight potential focal areas for national, state and local policy and program development to enhance disaster resilience.

Keywords: resilience, composite index, assessment

Bio

Dr Melissa Parsons is a senior lecturer at the University of New England (Armidale) with broad-ranging and interdisciplinary research interests in social-ecological systems, disaster resilience, resilience assessment, large flood disturbances and river ecology and management. Melissa works at the interface between theoretical and applied science, examining the ways that concepts such as resilience can be applied to deliver management and policy outcomes.

Melissa currently leads a project within the Bushfire and Natural Hazards CRC to develop an Australian Natural Disaster Resilience Index. Other projects examine attitudes towards natural hazards, the psychology of flood driving behaviour, social capital in disaster recovery, citizens' juries for community engagement and emergency management in the University sector. She also teaches a course in natural hazards. Email: melissa.parsons@une.edu.au

Dr Gulsan Ara Parvin

Disaster Prevention Research Institute (DPRI), Kyoto University

Cyclone Warning and People`s Expectation- A case study of Cyclone Aila Affected Area, Bangladesh

Abstract

Bangladesh is one of the most disaster-prone countries in the world. Especially, climate related disasters like flood and cyclone are most common in Bangladesh. About 6-10% of the world's tropical cyclones generate at the Bay of Bengal. Because of its geographical feature, frequent cyclones and cyclone induced storm surge is one of the critical issues of development concern of Bangladesh. Historical records show that Bangladesh experiences severe cyclone every four and one-half years and it cost huge loss of lives and damages. It is about 2 decades it was calculated that approximately 75% of global deaths due to cyclone take place in Bangladesh. Though the number of death has been reduced, in the last decade, Cyclone Sidr caused deaths of about 3,460 people and by latest severe cyclone Aila approximately 190 people were died across 11 districts and 4.8 million people were affected.

Due to introduce Cyclone Preparedness Program (CPP), Multipurpose Cyclone Shelter Program and such other disaster management initiatives of Government and Non-Government Organizations, the number of deaths in cyclones has been reduced significantly. Nonetheless, the cyclone warning system is not yet so familiar to the local rural community. According to the local people`s perception due to lack of different expected information, during cyclone, people become panicked and fail to take right and timely decisions that can save their lives and assets. Cyclone warning system needs to incorporate such information and guidance to minimize loss and_damage.

With an empirical study in the cyclone Aila affected area of Bangladesh, this paper aims to examine the limitations of warning system during cyclone Aila. At the same time, it intends to explore people`s expectation related to cyclone warning system. It is expected that this research outcome would facilitate to an improved need oriented cyclone warning system for the coastal community of Bangladesh. Keywords Cyclone, Warning, People`s expectation, Bangladesh, Aila

Bio

Gulsan Parvin is a researcher of Disaster Prevention Research Institute (DPRI), Kyoto University. She has wide expertise in Disaster Risk Reduction and Community Resilience. She is basically an Urban and Rural Planner. She has 20 years of teaching and research experience. She has published about 50 research papers in different National and International journals and books. She has research and working experiences in Bangladesh, Japan, Malaysia, Thailand and USA. Last year she worked as a visiting scholar at Department of Urban Studies and Planning of Massachusetts Institute of Technology (MIT), USA. Email: niruurp@yahoo.com

Mr. Masashi Sakamoto is a graduate from Kyoto University. He has expertise in working with remote rural communities and disaster vulnerabilities. Mr. Sakamoto is a Project Officer of Pacific Consultant, Tokyo, Japan. Email: masashi.sakamoto@tk.pacific.co.jp

Rajib Shaw is a professor in Graduate School of Media and Governance in Keio University's Shonan Fujisawa Campus (SFC). Earlier, he was the Executive Director of the Integrated Research on Disaster Risk (IRDR). He is also the Senior Fellow of Institute of Global Environmental Strategies (IGES) Japan, and the Chairperson of SEEDS Asia, a Japanese NGO. Previously, he served as a Professor in the Graduate School of Global Environmental Studies of Kyoto University.He is the chair of the United Nations Science Technology Advisory Group (STAG) for disaster risk reduction, and also the Coordinating Lead Author of Chapter 10 (Working Group II) of IPCC AR6. He is also the member of Science Committee of IRDR, and series editor of Springer series on disaster risk reduction. Email:rajib.shaw@gmail.com

Hajime Nakagawa (born on June 1955, Kyoto, Japan) is a professor of the Disaster Prevention Research Institute (DPRI) of Kyoto University. He is also a Director of Ujigawa Hydraulics Laboratory of DPRI. He has published 14 books in Japanese as a partial collaboration and one book in English as one of editors. Email:nakagawa@uh31.dpri.kyoto-u.ac.jp

Douglas Paton, Petra Buergelt, Etan Pavavalung, Kirby Clark, Li-Ju Jang and Grace Kuo

Charles Darwin University, Darwin, Northern Territory

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Monash University, Melbourne, Australia

National Pingtung University of Science and Technology, Pingtung, Taiwan

All singing from the same song sheet: DRR through engagement and the visual and performing arts

Abstract

When faced with a need to make decisions and take about to prepare for natural hazard events characterized by considerable complexity and uncertainty, people's risk beliefs and the actions they decide to take are influenced by several social interpretive processes. Analyses of preparedness activities has highlighted how information alone generally fails to motivate action; for it to be effective, it must be delivered into social contexts that can render the information meaningful and

actionable. This paper explores several approaches to how the social interpretation component of this process might be facilitated. The paper opens with a discussion of the community engagement theory and the lessons it suggests for the development of community-based disaster reduction (CBDRR) strategies. The paper explores the development of a community engagement theory and its implications for strategy implementation. It then discusses how the performing and visual arts can be mobilized to facilitate CBDRR outcomes and discusses some examples of work being undertaken in this area. The paper closes with an overview of the work being implemented to further understanding of the use of the arts for CBDRR.

Bio

Professor Douglas Paton is Professor of Psychology at Charles Darwin University. He is also a Senior Research Fellow and the Bandung Resilience Development Initiative in Bandung, Indonesia and a Research Fellow at the Joint Centre for Disaster Research in New Zealand, and a Technical Advisor on risk communication to the World Health Organization. His research focuses on developing and testing models of community and organizational resilience (adaptive capacity) for natural hazards. His work adopts an all-hazards, cross cultural approach with work being undertaken in in Australia (bushfire, flooding, tsunami), New Zealand (earthquake, volcanic hazards), Japan (earthquake, volcanic hazards), Indonesia (volcanic hazards), Taiwan (earthquake, typhoon), and Portugal (bushfire) and how comprehensive analyses of community disaster recovery can inform understanding of resilience and how it is developed and enacted in communities. Current interests include developing transdisciplinary approaches to disaster risk reduction research and practice and exploring the links between disaster risk reduction and recovery and the visual and performing arts.

Mr Aslam Perwaiz
Asian Disaster Preparedness Center

Private Sector Investment in Enhancing Disaster and Climate Resilience

Abstract

The paper aims to address the current barriers to private sector investment in resilience in developing countries in order to increase finance for the implementation of priority resilience actions identified in developing country strategic frameworks, including the Sendai Framework for DRR (SFDRR) and National Adaptation Plans (NAPs). Through national DRR stragies , NAPs and other strategic frameworks, developing countries lay the groundwork for, in an iterative manner, identifying resilience priorities and specific activities to promote resilient growth in key economic sectors. Such strategies are essential for enabling national governments to identify their medium- and long-term risks and resilience needs. It is an attempt to pivot away from ad-hoc investments in resilience to a more coherent and strategic approach to reducing climate risk. Developing countries have identified the private sector as a critical partner in achieving resilience targets and overall national development goals. The private sector engagement is operationally important to address the effects of disaster risks and climate change since the private sector owns and controls important assets and infrastructures, creates and provides products and services, and engages and supports communities, all of which will be affected by the disaster risk excerbated by climate change. Moreover, the private sector can be an important source of expertise, management talent and innovation to understand disaster and climate risks.

The technical paper will closely examine improved developing country ability to attract private sector resilience investment that incentivizes and allows businesses to integrate climate change considerations in investment decision-making. It will also explored imperial evidences for improved private sector understanding and awareness of viable resilience investment opportunities: Keywords: MultiHazard Risks, Private Sector, Resilience

Bio

Mr. Aslam Perwaiz is the Deputy Executive Director of Asian Disaster Preparedness Center (ADPC). He holds a Master's degree in Statistics and over 24 years of experience in Asia and the Pacific, and Africa on economic analysis, sustainable development, and disaster and climate risk management. At ADPC, he oversees and manages the day to day operation of the program Departments (e.g. ADPC Academy, Risk Governance, Climate Resilience, Urban Resilience, Health Risk Management, Preparedness for Response and Recovery, Geospatial Information Departments) and ensures that Gender, Poverty and Regional Cooperation are promoted through all the work undertaken by ADPC. Mr. Aslam brings with him extensive analytical experience of disaster database, damage and loss assessment in public and private sector through the "iPrepare Business" facility and post-disaster needs assessment initiative "Ready4Recovery". Email: aslam@adpc.net

Ignatius Ryan Pranantyo
Research School of Earth Sciences, the Australian National University

Understanding the past for a better future hazard assessment: Eastern Indonesia tsunami case studies

Abstract

Understanding historical events is an important step that needs to be done before conducting future tsunami hazard assessment in a region. Historical records from catalogues, field tracing, or local stories might not give complete information on the source, particularly where and how the tsunami was generated. But even incomplete information can be crucial input for future hazard assessment. Here I present two historical events in Eastern Indonesia that have been reinvestigated to show they were generated by sources that have never been considered in any tsunami_hazard_studies_in_this_region.

A devastating earthquake and tsunami occurred on the northern coast of Ambon Island in 1674. It caused more than 2000 deaths with up to 100 m tsunami run-up reported from three villages. Our study suggests that this event was caused by a local submarine landslide triggered by an earthquake.

Another devastating event occurred in 1852 in the Banda Islands, for which a tsunami was also observed at Ambon Bay and the ground shaking felt as far away as Semarang on Java Island. Almost all studies suggest that it was due to a giant megathrust earthquake from the Banda Arc. On the other hand, a recent tectonic study and our own research show that a smaller earthquake on the Banda Detachment fault system is more likely to have produced the tsunami reported_in_1852.

From these examples, two 'new' tsunami sources have been suggested which have never been

considered before. By including these sources, the tsunami hazard potential in this region will be changed as well. Keywords: Eastern Indonesia, historical tsunamis, hazard assessment

Bio

Ignatius Ryan Pranantyo is a PhD student at Research School of Earth Sciences, the Australian National University, Australia. His research topic is 'Tsunami source reconstruction and hazard assessment in Eastern Indonesia'. He finished his masters and undergraduate degrees at the Institute Technology of Bandung, Indonesia in Earth Sciences and Oceanography department. Email: ryan.pranantyo@anu.edu.au

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Dr Harkunti P. Rahayu

School of Architecture Planning and Policy, ITB Bandung

Building Coastal Resilience Through Tsunami Evacuation Plan: Pre-Disaster v. Post-Disaster – Learning from Indonesia

Abstract

In many tsunami events, the high death toll in densely-populated cities is due to the lack of several critical factors, which includes the existence of tsunami warning, the readiness and preparedness of the city for tsunami events. The readiness and preparedness of tsunami high-risk cities are characterized by not only the existence of sufficient supporting infrastructure for emergency response and evacuation, but also how the whole population from the tsunami prone area could evacuate safely after the tsunami warning is issued. Each community in this tsunami prone area should have the same right and opportunity to evacuate safely. However, in many tsunami prone areas, beside the level of awareness and preparedness of the people, the high number of population, population density, building density and vulnerable groups of people such as the elderly, women and children coupled with insufficient tsunami evacuation infrastructure such as evacuation routes have prolonged the estimated time for evacuation. There are many cases that the estimated time for evacuation is much longer than the estimated tsunami arrival time minus time needed for warning dissemination. Thus, the capacity of horizontal evacuation infrastructures should be increased. Otherwise the existence of vertical evacuation infrastructure such as shelter in that area is necessary, e.g. using the existing tall structure, building especially the Tsunami Vertical Evacuation Shelter (TVES) and artificial hills. Vertical evacuation infrastructure is very complex and costly to build compare to horizontal evacuation, however for the aforementioned condition the existence of vertical evacuation shelter is a must. Many issues associated with the design criteria and planning should be reviewed and solved, from physical to socio economic factors.

The existence of TVES and all supported evacuation infrastructures are expected to reduce public's anxiety toward tsunami hazard and to build better coastal community resilience. However, this has

not been shown during the 2012 tsunami event in Banda Aceh, as if there were no disaster risk reduction intervention in place. Thus, this situation has encouraged in-depth research funded by PEER Cycle 3 Research Grant in 2015-2017 in Padang City and is presented in this paper. The research found several significant issues, i.e. how the disaster risk reduction intervention through building TVES has influenced social capital of the coastal community to build their resilience, and how this improved social capital factor can be accommodated in designing the tsunami evacuation plan. It has been also found that the existence of TVES in the case study area has attracted the coastal communities who moved inland to move back to their abandoned houses in the coastal region, renovating and upgrading into two-story houses; several new settlements have appeared in several empty lands with *massive investment for housing*. Using the DRR, migration and adaptation of logical model approaches, several factors related to perception of disaster, perception of tsunami threat and triggering factors for decisions for move out were recognized and mapped from the perspective of social demography, financial, physical environment and policy condition. Results of this study not only map the supporting and hindrance factors, but also the influence from these factors *to the communities' trust in their home's safety before and after the TVES built. Before TVES was built, the influence of these factors on the people's trust in their own safety was strongly influenced by the hindrance factor which came from* perception of tsunami and disaster, triggering factors for the decision to move out, level of trust in their home before and after the existence of TVES. There are three components which mostly affected people's trust toward their residence, i. e. the perception of disaster, the perception of tsunami threat, and the support factors for the migration decision. Thus, it is expected that by integrating all these improved social capital factors in the tsunami evacuation plan, which is used to develop the Indonesian Tsunami Evacuation Guideline, the public's anxiety will be reduced and eliminated. Then the efficient disaster risk reduction measures through the evacuation plan will be enhanced and coastal resilience will be improved.

KEYWORDS: disaster risk reduction, tsunami vertical evacuation infrastructure, estimated time for evacuation, risk perception, migration, coastal resilience, tsunami evacuation design and planning.

Bio

Dr Harkunti Pertiwi Rahayu is affiliated as a Faculty Member of the Urban and Regional Planning Department, School of Architecture, Planning, Policy and Development, The Insitute of Technology Bandung. She is currently active as Chair of the Indonesian Disaster Expert Association (IABI) 2017-2020, and as Chair of Working Group 1 of Intergovernmental Coordination Group on Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS) 2012 - 2019, focusing on Tsunami Risk, Community Awareness and Preparedness, with 24 active Member States. She has over twenty years in teaching, conducting research, training, workshops, national guideline and policy development in Disaster Mitigation and Management especially on tsunami, Disaster Risk Assessment, Mainstreaming Disaster Risk Reduction into Policy Planning, and Behavioural Science in the Disaster Risk Reduction field. She currently receives international research grants as PI for coastal hazard resilience and mitigation from the Newton Fund and PEER Science Cycle 6 - NAS USAID and capacity building for higher degree

education in disaster resilience (MHEWS) from Erasmus – EU. Email address: harkunti@pl.itb.ac.id; harkunti@gmail.com

Tabassam Raza

Disaster Risk Management Unit, Philippine School of Business Administration-Manila

Development and Implementation of a Disaster Risk Management Specialization: Philippine School of Business Administration – Manila

Abstract

The destruction caused by natural and climate-related disasters during 20th century in the Philippines has been associated with the lack of Institutional Coping and Adaptive Capacities (ICAC), indicating the neglect of Disaster Risk Management (DRM) education from Higher Education Institutions (HEIs). Thus, the main objective of this research is to assess the ICAC of Quezon City Government (QCG), a pilot local government in the Philippines, by determining if its officials have undergone Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA)-related training programs or have attained diplomas or specializations from any HEIs. It was done by assessing 142 barangays of QCG through participatory process by conducting three symposia and a survey questionnaire. Both the Institutional Coping and Adaptive Capacities of the barangays were “Unsatisfactory”, based on the analysis of research data. This led to the estimating of demand and development a curriculum for a formal DRM specialization by the Philippine School of Business Administration – Manila (PSBA-Manila) as the pilot HEI. Consequently, PSBA-Manila requested formal authorization from the Commission on Higher Education to offer the DRM specialization in its existing Master in Business Administration (MBA) Program. After keen evaluation and acquiring proper authorization, the MBA-DRM program was launched in the first semester of Academic Year 2017-2018. Presently, 24 Scholars from the QCG are enrolled in the program. The curriculum can be adopted and customized by other institutions to fill the demand of producing Planners and Decision Makers in mainstreaming DRR and CCA in national and local planning. Kewwords: Disaster Risk Reduction (DRR), Climate Change Adaptation (CCA), Institutional Capacity, Higher Education Institution (HEI), Mast

Bio

Dr. Tabassam Raza has a multidisciplinary academic background i.e., Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) sensitive Urban and Regional Physical and Development Planning (Ph.D. and MA in Urban and Regional Planning, University of the Philippines (UP)), Disaster Economics and Allied Knowledge on developing Institutional Setup and Policy Design (Doctor in Business Administration DBA, Philippine School of Business Administration), Knowledge Support Procedure in Investigating Environmental Hazard Prone Areas (MS Geology, UP), Application of Technical Knowledge in Analyzing and Mitigating Hazard Prone Areas (M.Sc. and B.Sc. Applied Geology, University of the Punjab, Pakistan), Civil Engineering (BSCE, University of the Philippines). Dr. Raza has advanced professional working experience of over 20 years in the fields of DRM and CCA. At present, he is serving as an Associate Dean and Director DRM Unit of the GSB, PSBA Q.C. Philippines. In addition, Dr. Raza is also the Division Head of UP PLANADES. Email: tabassamr@psba.edu

Professor Stephen Roberts

Mathematical Sciences Institute, Australian National University

Towards Efficient Uncertainty Quantification as Applied to Tsunami Runup.

Abstract

Given a numerical simulation, the objective of uncertainty quantification is to provide an understanding of the variation of a quantity of interest to changes in underlying parameter values. However, exploring this variation requires a high number of numerical simulations, which can make the problem impracticable within a given computational budget.

A well-known approach to reduce the number of required simulations is to construct a surrogate, which --- based on a set of training simulations --- can provide an inexpensive approximation of the simulation output for any parameter configuration. I will comment on various techniques which are used to reduce the total cost of estimating this variation. For instance, we can use a combination of inexpensive low-fidelity simulations as well as a limited number of expensive high-fidelity simulations to construct our surrogates. Finally I will present a method we have investigated to produce such a multi-fidelity surrogate-based estimator. The method is applied to the quantification of uncertainty for the inundation due to a tsunami runup. We can demonstrate a speedup of 20 for a four dimensional parameter estimation problem.

Bio

Professor Stephen Roberts was Head of the Department of Mathematics at the Australian National University from 2006-2012. He is heavily involved in the computational science community in Australia. From 2003-2006 he was the national coordinator of the Australian Partnership for Advanced Computing (APAC) Education, Outreach and Training program.

He works on the development of efficient and robust numerical methods which are applicable to practical and real-world applications. He has achieved this with collaborations with industry and through the education of the next generation, and also by empowering those who are needing to prepare for natural disasters.

Examples include his work with fluid flow solvers, high dimensional approximation and uncertainty quantification. His leading research has been translated into a working system, the open source software package Anuga, which has been used extensively for tsunami and flood modelling by researchers world-wide, Australian and International government organisations and consultant engineers.

Katelyn Rossiter, Douglas Paton and Petra Buergelt

Social Media: A Valuable String in the DRR Governance Bow throughout the DRR Cycle

Abstract

Social media has become an engrained part of everyday life, and also increasingly important to DRR management strategy. Recently, social media has been identified as useful to all phases of the DRR cycle: pre-event, during, and post event, not just during crises (Dufty 2015; Houtson et al., 2015). We present a grounded theory that emerged from the analysis of 22 interviews with social media

coordinators from a range of community, NGO, and Government stakeholder from Australia, New Zealand, and the US. The theory suggests that social media can both facilitate and suppress community engagement at any phase of the DRR cycle, and provides an in-depth understanding of the factors and processes that contribute to each outcome. We discuss the diverse factors and processes that contribute to social media being used in ways that facilitate community-based DRR practices at different phases of the DRR cycle. These processes parallel those identified for effective disaster risk governance (Ahren & Rudolph, 2006), suggesting social media can be used to help govern effectively in the DRR space. This finding implies that it would be valuable for social media and risk governance research to inform each other to provide a more holistic approach to DRR in communities. We propose that rather than only employing social media at times of crisis, social media is a valuable new "string" to the DRR governance bow for facilitating collaboration between stakeholders, building capacity amongst stakeholders throughout the DRR cycle.

Bio

Katelyn Rossiter is in the final stages of completing her PhD thesis titled, “Natural Disaster Risk Reduction Using Social Media: Development of An Evidence-based Community Engagement Model”, supervised by Professor Douglas Paton and Dr Petra Buergelt. Her thesis presents a Grounded Theory about how communities, emergency management and NGOs use social media as a part of their Natural Disaster Risk Reduction practices. Katelyn has contributed to a number of natural hazard related research projects including: The Joint Centre of Disaster Research Synthesis Project and CERA Wellbeing Research Project (2014-2015), the Greater Bendigo Community Resilience Building Pilot Project (2014), and the 2013 Tasmania Bushfires BCRC Taskforce. She is also a collaborating researcher on the BNHCRC project, "Community understandings of the tsunami risk and warnings systems in Australia" and until recently worked as Editorial Assistant for the International Journal of Mass Emergencies and Disasters (2014-2017).

Dr Alan Ryan

Executive Director, Australian Civil Military Centre, Department of Defence, Canberra

Improving multiagency governance arrangements for preparedness, planning and response: Implementing the Integrated Approach in Australia.

Abstract

Systems of public sector governance are adjusting to the requirements of Digital Age resilience and response. The traditional hierarchical structure of the public sector, in Australia and elsewhere, was optimised for the circumstances of the Industrial Age and for a professional public service model that relied on the concentration of expertise in distinct departments of state. Contemporary pressures for multi-hazard risk-reduction, resilience and crisis response require government, civil society and private sector organisations to coordinate their efforts more effectively. Within the public sector civilian, military and police officers and officials have to develop systems to build national preparedness, share information and work across boundaries for both domestic and offshore contingencies. This paper considers the lessons of recent offshore operations and the efforts that are being made to introduce the concept of the Integrated Approach in Australia.

Bio

Dr Alan Ryan is Executive Director of the Australian Civil-Military Centre, developing Australia's capabilities to prevent, prepare for and respond to conflicts and disasters overseas. He has served as: The Principal of the Centre for Defence and Strategic Studies at the Australian Defence College; the Strategic Adviser to the Minister for Defence; the Senior Research Fellow in the Land Warfare Studies Centre; and as an Assistant Dean at the University of Notre Dame Australia. He has worked as an international consultant on strategic crisis management and was employed on commercialising intellectual property for Australian universities. He has a Ph.D from Cambridge University and a BA (Hons.)/LL.B from the University of Melbourne. In 2016 he completed the Senior Managers in Government Program, John F. Kennedy School of Government at Harvard University. His publication list can be found on LinkedIn and Google Scholar.

Mr Sebak Saha

PhD student, CAP, Australian National University

Responses to cyclone warnings: the case of Cyclone Mora (2017) in Bangladesh

Abstract

This paper examines responses to cyclone warnings during Cyclone Mora (2017) in Bangladesh. The paper is based on both qualitative and quantitative data collected through fieldwork conducted in the two villages of Khulna District, Bangladesh. Although the paper uses both qualitative and quantitative data, the paper is primarily based on quantitative data collected through a household survey in the two villages. The paper conceptualizes evacuation as taking refuge in any place (including cyclone shelters) other than one's own house. The paper is divided into three sections: the first section examines reception and sources of cyclone warnings. The second section examines evacuation behaviour (evacuation with all members of the household, partial evacuation, and non-evacuation) and other precautionary measures taken; while the third section examines the reasons for not taking refuge in any place and the reasons for not taking refuge in cyclone shelters for the respondents who took refuge in places other than cyclone shelters during Cyclone Mora.

Keywords: Cyclone Mora, Cyclone Warnings, Evacuation, Cyclone Shelter

Bio

Mr. Sebak Kumar Saha is currently a PhD candidate (awarded the Endeavour Postgraduate Scholarship 2016) at the Australian National University, Canberra, Australia. Mr Saha is a faculty member (on leave for undertaking PhD research) in the Department of Sociology at Shahjalal University of Science and Technology (SUST), Bangladesh. Mr. Saha earned his Bachelor of Social Science (Hons.) and Master of Social Science (MSS) degrees in Sociology from Shahjalal University of Science and Technology (SUST), Bangladesh. He also earned a Graduate Diploma in Environmental Management and Development and Master of Environmental Management and Development from the Crawford School of Public Policy, the Australian National University, Canberra, Australia. Before starting his career as a teacher at the university level, Mr. Saha worked in international non-government organisations. He has published his research in international journals like Disasters and International Journal of Disaster Risk Reduction.

Dr Minako Sakai
The University of New South Wales

Fostering community resilience by connectivity between victims and supporters in post-disaster areas in the Asia Pacific Region

Abstract

The Asia-Pacific region is prone to natural disasters and the recovery of the community involves more than just rebuilding physical infrastructure (Sakai et al 2014). A major challenge for post-disaster recovery is to secure livelihood sources in order to rebuild the community. This is because pre-existing social problems linger and compound post-disaster recovery issues. Furthermore, the attention of out of area volunteers and supporters wanes as time passes by and the task of post-disaster recovery tends to revert to a rather isolated socio-economic activity of_the_victims.

This paper will draw from case studies from two disasters, the 2011 Tohoku earthquake/tsunami disasters in Japan and 2010 Merapi volcano eruptions in Central Java, Indonesia. This paper shows that while the Indonesian disaster recoveries often have been dealt with on a case-by-case basis and the degree of recovery varies from region to region, the Japanese cases highlight the importance of integrated measures to address the underlying depopulation issues by forging emotional ties between supporters and disaster-affected areas, particularly in rural areas. These ties are fostering business activities which have promoted and sustained social and economic recovery in the disaster area. Keywords: community resilience, business activities, Indonesia, Japan, post-disaster recovery

Bio

Dr Minako Sakai is Director of Social Sciences Research group at the School of Humanities and Social Sciences, The University of New South Wales, Canberra. She has been working on inter-linked research themes, religion (Islam), regional identity, civil society, and social change in Asia with a focus on Indonesia. She is a co-editor of Disaster Relief in the Asia Pacific: Agency and resilience (2014), http://dx.doi.org/10.4324/9781315884356, ROS ID: 169915. Email: m.sakai@unsw.edu.au

Professor David Sanderson
UNSW (Sydney), Faculty of Built Environment, Kensington Campus, Sydney

How can humanitarian aid strengthen governance structures to build urban resilience to disasters and climate change?

Abstract

Asia Pacific is one of the world's fastest urbanising regions. It is also home to the largest number of people living in low-income settlements. The region is susceptible to a wide range of natural hazards, while climate change is also expected to both increase urban risk and exacerbate migration. Against this backdrop, humanitarian actors (United Nations agencies, NGOs, donors and to some extent host governments), with tools and experiences that are rurally-derived, have been slow to understand how the challenges and opportunities of responding to urban disasters necessitate changes in how they

operate. Diverse and mobile populations complicate needs assessments, and close coordination with other, often unfamiliar, actors is necessary. Yet these actors are not mere barriers to overcome, but key partners for engagement during any humanitarian response – whether neighbourhood committees, municipal governments or local community groups, they are often part of wider active and indispensible city 'systems'.This presentation is based on research currently being undertaken by the author into humanitarian action in urban areas for the UK's Overseas Development Institute (ODI). The research will culminate in a Good Practice Review, due for completion in September.The presentation therefore will present lessons from the research that are applicable to the Asia Pacific region, asking, 'how can humanitarian aid strengthen governance structures to build urban resilience to disasters and climate change?

Keywords: disasters, urban, humanitarian, governance

Bio

Professor David Sanderson is the Faculty of Built Environment's Inaugural Judith Neilson Chair at UNSW. He has over 25 years of experience working in development and emergencies. He has held senior posts in both NGO and academic sectors. He is a member of several NGO and donor advisory boards and has published articles and papers concerning chronic poverty, urban livelihoods and resilience. David worked for eight years for the NGO CARE International UK, as head of policy and subsequently regional manager for southern and west Africa. From 2006-2013 David was Director of CENDEP, a centre at Oxford Brookes University focusing on development and emergencies. Between 2013-14 he was a Visiting Professor at Harvard University. David was co-editor of the 2016 IFRC World Disasters Report and is currently undertaking a Good Practice Review on urban humanitarian action for the UK's Overseas Development Institute (ODI). Email: david.sanderson@unsw.edu.au

Jane Sexton
Geoscience Australia

Access to hazard and risk information to underpin decision-making

Abstract

Understanding risk is a key tenet of the National Disaster Resilience Strategy and inherent to this is the discoverability, accessibility and availability of risk information. Access to this information is critical for decision making for disaster risk reduction, as well as land use and infrastructure planning decisions. Not only is this information required prior to the decision being made, but at some future date investment is required to mitigate any created or residual risk. The community affected by these decisions also require the risk information, so they can understand the hazard and risk and make decisions accordingly.

Here, we showcase a suite of risk information developed by Geoscience Australia that can support these decisions. GA officially adopted the Creative Commons 4.0 licence in 2009, recognising the investment made by the Australian Government in its development and the value it can serve to a range of stakeholders in government, industry, academia and the public.

We contrast this with the case-study of the National Flood Risk Information Project where procurement practices of flood hazard and risk data have failed in delivering on the requirement of improving the community's understanding of flood hazard and risk. We show how these challenges can be overcome so that ultimately decisions can be made to minimise risk to the Australian community.

Keywords: risk information, open data

Bio

Dr Jane Sexton joined Geoscience Australia in 2005 to work collaboratively with Australian Government agencies to manage tsunami risk. Since then, Jane has contributed to the development of a range of modelling tools that can be used for natural hazard risk management and the application of these tools for emergency management purposes. Prior to starting with Geoscience Australia, Jane worked with the Defence Science and Technology Organisation (DSTO) applying a variety of modelling approaches to support defence acquisition and operations projects. Email: jane.sexton@ga.gov.au

Professor Vinod K. Sharma
Indian Institute of Public Administration

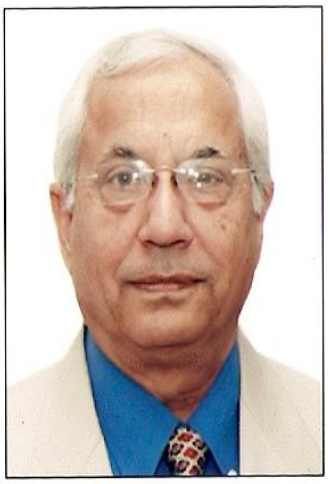
Use of Scientific Knowledge and Public Participation in Disaster Risk Reduction in post-earthquake reconstruction in the state of Sikkim, India

Abstract

Sikkim state is one of the smallest Himalayan states of India located in North-East India. The state is highly environmentally sensitive and was declared as the first 'Organic State' of India in 2016. The state has maximum forest cover and is very rich in biodiversity. In 2011, Sikkim had a major earthquake of 6.8 on the Richter scale. It suffered major human and economic losses. The government took this as an opportunity for sustainable development of the state. Being one of the Himalayan states, apart from earthquakes, landslides and forest fires, Sikkim is very vulnerable to climate related natural hazards. Substantial increase in the frequency and magnitude of such disasters can be expected under the impact of climate change.

After the earthquake, reconstruction and rehabilitation of the state set an example for the region. The entire reconstruction in the state was participatory, 'in-situ', earthquake resistant and transparent. After the Nepal earthquake, a group of senior officers from Nepal visited Sikkim to take lessons and copy some of the aspects of Sikkim reconstruction such as use of debris for village road construction, awareness and capacity building programmes, masons' training and use of MIS technique for transparent reconstruction.

This paper deals with some of the state policies, plans and strategies for use of Science, Technology and people's participation in resilient reconstruction disaster risk reduction in Sikkim. Reconstruction on the principal of 'Build Back Better' is a success story of resilient construction as articulated in the Sendai Framework 2015-2030.



Bio

Professor Vinod Kumar Sharma is currently Senior Professor, Disaster Management/Consultant at Indian Institute Of Public Administration; Vice Chairman, Sikkim State Disaster Management Authority, Govt. of Sikkim and Adjunct Professor of Disaster Management, Amrita University. He is member of UN ISDR Asia Science, Technology and Academia Advisory Group.

Professor Sharma has served in a number of Universities in India and Middle East before joining the Indian Institute of Public Administration. He is instrumental in setting up National Centre for Disaster Management at IIPA which is now National Institute of Disaster Management under Ministry of Home, Govt. of India. He is founder Chairman of a non-profit organization, SEEDS India and member of executive committee of Sphere India (a network of NGOs and UN organizations working in disaster management). He is Visiting Professor, Kyoto University, Japan and many other Universities and training cum academic institutions. He has published more than 50 research papers and 12 books in area of disaster management.

Associate Professor Jason Sharples
School of PEMS, UNSW, Canberra

Reassessing building resilience to bushfire in the age of violent pyroconvection

Abstract

Wildfire is a worsening global problem. The combined influences of climate change, forest management policy and the ongoing growth of the wildland-urban interface are not only producing more extreme wildfire events, but are increasing the likelihood of these events impacting society. Unlike typical wildfires, which tend to only involve the surface and lower levels of the atmosphere, extreme wildfires are characterised by a high degree of coupling between the surface and upper layers of the atmosphere. Indeed, their defining feature is violent pyroconvection, driven by large areas of intense fire activity and convective flows that penetrate deep into the atmosphere – sometimes reaching the top of the troposphere and into the lower levels of the stratosphere. Recent research has identified a number of dynamic modes of fire propagation that drive extreme wildfire development, and has provided a more comprehensive understanding of the anatomy of extreme wildfires. Extreme wildfire propagation does not tend to follow the rules adhered to by typical wildfires. As a consequence, the predictions of models that have been derived based on observation of far more benign wildfire behaviour, generally provide poor guidance when it comes to predicting extreme wildfire propagation. This, in particular, has a number of significant implications for building standards in bushfire prone regions. In this talk, I will outline the current state-of-the-science of extreme wildfires and use this as a platform to provide a critique of the current Australian Standard for building in bushfire prone areas.

Keywords wildfire, bushfire, resilience, building standards

Bio

Jason Sharples is Associate Professor in Applied Mathematics at the University of New South Wales, and is a Fellow of the Australia and New Zealand Modelling and Simulation Society. He is part of the Applied and Industrial Mathematics Research Group and the Computational Science Initiative in the School of Physical, Environmental and Mathematical Sciences at UNSW Canberra, where he specialises in combustion and bushfire dynamics modelling and simulation. Jason has lead a number of research projects that consider extreme and dynamic fire behaviour, the development of large conflagrations and bushfire risk management. He is also an Advanced Firefighter with the ACT Rural Fire Service. Email j.sharples@adfa.edu.au

Dr Bev. Sithole **with Hmalan Hunter Xenie, Otto Bulmaniya Campion and the ARPNet Ramangining Field Team**

Charles Darwin University

Hazard Smart Remote Communities in Northern Australia

Abstract

One of the outcomes of the BNHCRC supported project on scoping resilience in remote communities in Northern Australia (as part of the Northern Hub Projects), has been a strong grassroots interest to build what elders in Arnhem land have started to call Hazard Smart Remote Communities. Being hazard smart requires that communities go beyond current aspirations to be resilient, requires that they make smart choices about actions, lifestyle and more importantly that they transform from recipient communities to actively responsive communities. Elders in Arnhem land are having conversations about what they need to do for the transformation to happen through the BNHCRC funded project called, Developing Effective Partnership. The community based Aboriginal research practitioners from the Aboriginal Research Practitioners' Network are working in Central Arnhem with thirteen clan groups to address this question. But this idea of Hazard Smart Remote Communities is slowly evolving and elements are now being articulated in discussions with local elders. One of the key pillars in this transformation is effective cooperation with the government and other agencies which would require efforts to understand existing Indigenous leadership and management structures and then creating effective pathways for engagement. Another of the key pillars for building hazard smart communities is the recognized need to build strong reliable knowledge systems that draw on both old and new knowledge systems in a way that makes sense and can produce readily usable knowledge. The third important component is the importance of strengthening ties between families and clans, making sure that obligations during hazard times are not a burden, but a shared responsibility. In this presentation, we will share some of the early thoughts and conversations on what could constitute a Hazard Smart Remote Community in Northern Australia.

Bio

Dr Bev Sithole is a social scientist and participatory research practitioner who works with and supports the Aboriginal Research Practitioners Network (ARPNet) in the Northern Territory. She is team leader

on a component of the BNHCRC funded project called "Developing Effective Management Partnerships" which is being implemented through RIEL at Charles Darwin University. This project is a continuation of an earlier project undertaken by ARPNet called "Scoping resilience in remote communities in Northern Australia" which was also funded by BNHCRC and was implemented through RIEL at CDU. ARPNet is a loosely coordinated network of community based research practitioners in remote communities that work in research and evaluation using locally adapted participatory tools – called the ARPNet Dilly Bag. Hmalan Hunter Xenie is the coordinator of the network and supports the Ramangining community based research practitioners in the field as they work on this project.

Stephen Sutton, Petra Buergelt, Douglas Paton and Saut Sagala

True, but trivial?: The value of grass-roots cultural local stories and songs as effective DRR strategy

Abstract

This paper discusses research into the cultural drivers of a successful community-wide disaster risk reduction (DRR) strategy on Simeulue Island, Aceh, Indonesia. While the 2004 Indian Ocean tsunami killed more than 200,000 people in neighbouring Acehnese communities, only 7 of a coastal population of 80,000 were killed in Simeulue. This paper discusses how deep-seated cognitive processes derived from a tradition of stories and songs about a previous tsunami event that affected the Sumatran coast 100 years before resulted in the people of Simeulue rapidly recognizing the signs of the tsunami and responded in the appropriate ways. These stories and songs became an integral part of adat or traditional culture of the island. However, these stories and songs were not recognized as valuable DRR strategy by authorities and researchers until after the 2004 event. The stories and songs were largely invisible precisely because they were such an embedded, integral, taken-for-granted part of the culture and thus were 'low-key', 'in-house' and 'grass-roots'. Authorities also considered stories and songs trivial, and discounted them in favour of 'more important' official information. The paper also discusses how the predominant use of quantitative research approaches obscured access to and appreciation of the relevance and workings of stories and songs. Exploring the role of narrative and music on human cognition is used to explain why and how the stories and songs of the Simeulue Islanders constituted an effective DRR strategy. Lessons for enhancing risk communication in Australia are presented.

Bio

Steve Sutton completed an honours degree in archaeology in 1985. During 25 years working for the Queensland and Northern Territory governments his work migrated through cultural heritage to environmental assessment. His final government position was Director of Bushfires NT, a role that involved the management of bushfire and other natural disasters in the Northern Territory of Australia. In an environment with an annual cycle of cyclones and bushfires he became aware that most people failed to prepare for natural hazards, despite the emphatic risk communication efforts of government and documented benefits of preparation. A desire to comprehend why humans misperceive risk and why most fail to take steps to ensure their safety led Steve to enrol in a PhD at Charles Darwin University in 2015 to investigate the cultural drivers of disaster risk reduction under the supervision of Prof Douglas Paton and Dr Petra Buergelt.

Adam D Switzer
Earth Observatory of Singapore

On the need for enhanced research on the historical and geological record of past tropical cyclone events in the western Pacific

Abstract

Recent Tropical Cyclones (TCs) including 2013 Typhoon Haiyan, Philippines, 2016 Cyclone Winston, Fiji, and 2017 Typhoon Hato, southern China were extremely intense. All events caused significant economic and social disruption with Haiyan claiming > 6000 lives. Although these events were clearly large TCs it is near impossible to state with confidence how they compare to past events beyond a few decades. Although many coasts of tropical Australasia have long detailed written histories that extend back several centuries e.g. China, Japan and Philippines the historical record is commonly fragmentary, incomplete and lacks spatial balance. Despite the limitations, the historical record provides a key link between instrumental datasets and the geological record that allows for detailed reconstruction of past events. Beyond historical accounts lies the realm of paleotempestology, the study of past TCs using geophysical archives. This rapidly advancing discipline is based on a variety of data including traditional sedimentary techniques applied to coastal sequences and new techniques such as speleothem and tree ring geochemistry. To date paleotempestological studies in Australasia are limited to very few locations and the present spatial coverage of these studies limits the usefulness of such records. Here, we synthesize the state of knowledge in the region, reviewing new proxies and discussing their strengths and limitations at resolving past TC activity. We conclude with some statements on future research directions for paleotempestology and TCs with the aim of preparing the populations of the Western Pacific for potential changes in TC intensity and periodicity with changing climate? Keywords: climate change, cyclones, palaeotempestology, historical hazards

Bio

Adam D. Switzer is Associate Professor and Associate Chair at the Asian School of the Environment (ASE) and a Principal Investigator at the Earth Observatory of Singapore (EOS), Nanyang Technological University. Adam has been PI or Co-I on 20 grants (worth >$5M) and has authorship on >70 peer-review publications. His research focusses on coastal hazards with subthemes include sedimentary geology, time series analyses, mathematical models, visualisation, complexity and confronting models with data. Email: aswitzer@ntu.edu.sg

Professor Syamsidik
Presenting on behalf of:

Professor Syamsidik, Rina Suryani Oktari, Eko Pradjoko, Louise K Comfort, Ella Meilianda, Putra Dwitama

Challenges in Preparing the Unprepared: coastal communities in Indonesia in the context of coastal hazards and impacts of climate change

Abstract

Impacts of coastal hazards, such as tsunami, erosion, and coastal flooding, have the potential to become worse for coastal communities in Indonesia as the sea level rise induced by climate change has increased in recent years. The rate of the sea level rise could be faster than the speed of preparing the coastal communities to anticipate the impacts. The less prepared ones are often found within those who are economically weak. In Indonesia, fisher folks are classified as the most vulnerable class of communities to the impacts of climate change coupled with other types of coastal hazards. However, combining the two processes, i.e. sea level rise (SLR) and impacts of coastal hazards (CH), in city planning in Indonesia is still rare. There are vast areas of the impacts that are still unknown in coastal cities of Indonesia. This research is aimed at assessing the coastal cities' preparedness in Indonesia to include the two processes, i.e. SLR and CH, into their development planning. Two cities were selected as the study areas of this research, namely Banda Aceh of Aceh Province and Mataram of West Nusa Tenggara Province. The two cities represent the northern part and the southern part of Indonesia. A series of surveys was conducted to gather some 600 respondents that represent 600 households from the two cities. Two focus group discussions were also conducted to gather key stakeholders' views on the topic of SLR and CH in the cities. This paper concerns the challenges in preparing the communities and advocating a sustainable ecology-based economic development as a large number of the population does not have many choices to adapt to the impacts of the SLR coupled with CH. Coastal erosion has severely affected the coastal communities in Mataram. On the other hand, the city is planning to manage its coastal area since it relies significantly on the tourism sector. In Banda Aceh, the city has to invest largely in mitigating the impacts of future tsunamis and this is still beyond the economic capacity of the city. The paper investigates the two cities' development planning documents which are among the loopholes for integrating the disaster risk reduction and CCA into mid- and long-term development of the cities.

Keywords: Sea level rise, climate change adaptation, preparedness, coastal hazards.

Bio

Professor Syamsidik is a researcher at the Tsunami and Disaster Mitigation Research Center (TDMRC) of Syiah Kuala University, Banda Aceh-Indonesia. He is also a lecturer at the Civil Engineering Department of Syiah Kuala University. In 1998, Syamsidik graduated from Toyohashi University of Technology (TUT) in Japan. He completed his doctoral degree at the Coastal Engineering Laboratory at TUT in Japan. Since returning to Indonesia, he has been working on a number of Disaster Risk Reduction projects at TDMRC. Now, he is also a coordinator of the tsunami research cluster at the research center. In 2013, he also coordinated a team for Indonesia national scientific assessment on tsunami mitigation. Between 2013-2014, he was a principal investigator for Strengthening Resilience of Coastal and Small island communities towards impacts of hydro-meteorological hazards and impacts of Climate Change (StResCOM Project of UNESCO) involving Indonesia, the Philippines, and Timor-Leste. Between 2014 until 2016, he won a research grant from Partnership Enhanced Engagement in Research (PEER) USAID Cycle 3 with the title Tsunami Waves Impacts on Coastal Morphological Changes based on Sediment Transport Numerical Simulations. Later in 2016, he won another PEER USAID Research Grant for a research title Incorporating Climate Change Induced Sea Level Rise Information into Coastal Cities' Preparedness towards Coastal Hazards. The research project is expected to run until the end of 2019. Beside these, he has been involved in South-South and Triangular cooperation (SSTC) on the topic of Disaster Risk Management since 2014. SSTC is a flagship program from the Government of Indonesia to facilitate transfer of knowledge and skills from

Indonesia to other developing countries. Recently, he has been working with a supplemental grant of PEER USAID Cycle 5 to conduct a series of activities related to disaster risk reduction in Timor-Leste. His research focuses on tsunami risk reduction and coastal zone management by means of numerical simulations and geo-spatial analysis.

Mojgan Taheri Tafti
The University of Tehran

Urban life inpost-disaster temporary settlements in Iran

Abstract

The literature on the post-disaster transitional phase has mainly focused on temporary housing types, policies and their impacts on disaster-affected populations. Collectively this body of work demonstrates that the failures of these policies are mainly due to misunderstandings and misconceptions of temporary housing. In this study we present a different perspective into this transitional phase, focusing on urban life in temporary settlements and their connections to the functioning urban areas. This paper presents the findings of ongoing research on the transitional phase of the post-earthquake urban life in the city of SarPol Zahab in Iran. The city of 45,481 people was hit by a magnitude 7.3 earthquake in November 2017. The city presents an interesting case study, because of two main reasons: first, at the time of the earthquake one third of the city population were tenants, which is surprising for a small-sized city in Iranian context. This high proportion of tenants implies a complicated transitional phase, as previous studies indicate that tenants are often the last ones who move from transitional housing to permanent housing. The second reason involves the introduction of a new policy for temporary housing. The reconstruction authority gave people a choice between receiving temporary housing and receiving a lump sum. Those who chose the latter option stay in a tent before moving to their permanent housing. Drawing on government data, interviews with 43 people and participatory observation, the study provides new understanding of how temporary housing is conceived, used and experienced by residents. Keywords: temporary housing; transitional phase; urban disaster; tenants; housing recovery

Bio

Mojgan Taheri Tafti is Assistant Professor at the School of Urban Planning, the University of Tehran. She completed her PhD in Melbourne School of Design, the University of Melbourne. Mojgan has worked in a number of teaching, research, and operational roles in the areas of resilience, post-disaster reconstruction and housing projects for disadvantaged households in different countries. In 2015-2016, she was a postdoctoral fellow at Melbourne Social Equity Institute, University of Melbourne. Her main research interests are policy analysis, justice, vulnerability and political ecology. Her work has appeared in peer-reviewed journals and edited volumes like Urban Planning for Disaster Recovery and The Routledge Companion to Architecture and Social Engagement. Email: m.tafti@ut.ac.ir

Yih-Chi Tan
National Taiwan University

How to Make Flood Prone Communities Resilient: Case Study in Taiwan.

Abstract

Out 100 natural disaster victims, the ratio of self-help, mutual aid and public rescue is 7:2:1. Since 2010, the Taiwan government has started to give guidance to local governments to establish flood disaster prevention autonomous communities (FDPAC) in flood-prone areas. By the end of 2018, 458 FDPACs have been established in Taiwan.In addition to developing self-help and mutual rescue capabilities, the purpose of establishing FDPACs also plays the role of education promotion. It is also necessary for the community to play a role in promoting awareness of disaster prevention among the general public in the community through members of the Patrol Team who have received disaster prevention education.

The operation of FDPACs is to divide the community teams into patrol alert group, emergency rescue group, notification evacuation group, caring medical group, administrative logistics group, and mobile support group. According to the characteristics of each groups, the task before and after the disaster are distinguished. Through disaster prevention, self-rescue and assistance reduce the impact of community disasters.FDPACs can further condense the centripetal force of the community, and quickly mobilize members of community organizations to prepare for disaster prevention and disaster relief during typhoon and heavy rain, reducing the loss of life and property. Keywords: Community, Flood, Risk, Resilient, Self-help, Education Promotion

Bio

The Center for Weather Climate and Disaster Research of National Taiwan University is the important institution for main water disaster prevention related talent cultivation and promoting engineering practices in Taiwan. The goal is to strengthen the communication and cooperation function in disaster prevention and rescue related fields and assist governments and civil agencies to enhance disaster prevention and rescue capabilities to establish a safe environment. Professor Yih-Chi Tan is the director of the center. Wu-Chueh Hung is a doctoral student in the center. Ya-Ting Chuang is a research assistant in the center.

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Dr Thong Anh Tran

Asia Research Institute, National University of Singapore

Institutional effects on rural adaptation in the Vietnamese Mekong Delta: Evidence of farmers' responses to post-dyke environmental change

Abstract

Rural communities in the Vietnamese Mekong Delta (VMD) have experienced tremendous impacts of climate change (e.g., droughts, floods, sea level rise), and upstream development (e.g., hydropower construction) and local dike systems. These combined factors have increasingly aggravated farmers' agriculture-based livelihoods and constrained their capacity to deal with change. While the impacts of such externalities are evident, less attention has been devoted to how the flood management governed by localised institutional systems influences rural adaptation. Based on the qualitative research approach, this paper aims to examine how these institutional systems shape farmers' responses to post-dyke environmental impacts across the floodplains. The paper argues that, although subject to the comprehensive national water governance framework,

differential governance approaches have been exercised in the construction, operation and management of flood control schemes in the delta. These processes rendered the mixed effects of the dyke-based agricultural production which on the one hand disturbed traditional flood-based livelihoods, but on the other hand created stimuli for farmers to develop innovative farming practices in dealing with environmental change. The paper highlights the crucial role of informal institutions in promoting farmers' collective learning and diffusion of adaptive knowledge across the wider farming communities.

Bio

Dr. Thong Anh Tran is a research fellow at Asia Research Institute, National University of Singapore (NUS). He is also a visiting fellow at Fenner School of Environment and Society, College of Science, the Australian National University (ANU). He earned a PhD in Human Ecology at the ANU in 2017 and a Masters' degree in Conflict Transformation at Eastern Mennonite University (EMU), the US in 2007. He is currently affiliated with the Research Center for Rural Development, An Giang University (AGU), Vietnam. His research interests include the human-nature interactions related to water governance, rural livelihoods, social learning, and climate change adaptation. Currently, he is involved in the SSRC project entitled "Sustainable Governance of the Transboundary Environmental Commons in Southeast Asia," focusing on the hydropower development and its transboundary impacts in the Lower Mekong Basin. Dr. Tran has had several publications in *Water Resources and Rural Development*, *International Journal of Water Resources Development, Learning, Culture and Social Interaction* and a book chapter (forthcoming) in "*Population, Development and the Environment: Challenges to Implementing the Sustainable Development Goals in Asia and the Pacific*" (ed. Helen James, Singapore: Palgrave Macmillan).

Luigi Toda
Oxfam, The Philippines

RISE from floodwaters: An Integrated Risk-based Approach to Flood Management

Abstract

The efficiency of flood management measures has been faced with challenges of reliance on traditional flood management approaches. Flood costs continue to grow while demand for flood protection systems has increased, yet traditional hard-engineering approach has left more harm than good, much as flooding itself has its own set of consequences. Reliance on hard engineering solutions take away the opportunity cost of regulating the natural protection function of floodplain and river ecosystems, making their costs far outweigh the benefits to the society, the economy, and the environment. These costs have prompted a shift from hard-engineering solutions to an integrated flood risk management approach that builds on current engineering-focused strategies that would help ensure that reduced risks are distributed evenly across society, and structural and non-structural measures are economically efficient and ecologically sustainable, through RISE (1) regulating built capital through risk-sensitive land use planning; (2) introducing risk thinking; (3) strengthening natural defences; and (4) enhancing preparedness and response through social capital.

Bio

Luigi Toda is a young geographer and climate and disaster specialist with a demonstrated history of working in the development, research, and government organizations. He is currently the Climate Change Adaptation and Risk Reduction Advisor of Oxfam in the Philippines where he provides strategic leadership for all climate change adaptation and disaster risk reduction related programming and influencing for the country programme. He has published extensively on LiDAR-based flood mapping, social vulnerability, disaster governance, and climate science and policy. Luigi holds a Master of Environmental Management and Development from the Australian National University under the Australia Awards Scholarship. He received the Highly-Commended Award for a co-authored paper entitled "LiDAR-based flood mapping for agricultural resilience and food security" by the Emerald's Research Awards during 6th International Conference on Building Resilience in Auckland, New Zealand in 2016.

Dr Amelia Turagabeci and Professor Paul Jagals

School of Public Health & Primary Care, College of Medicine, Nursing and Health Sciences, Fiji National University

Building Capacity for Disaster Management – the role of Fiji National University as a regional educator

Abstract

Pacific Island Countries are particularly vulnerable to natural disaster risks for communities – with recent examples of Fiji, Vanuatu and Tonga experiencing devastation by Category 4+ cyclones.

This presentation aims to show how Fiji National University builds capacity through teaching and learning, research and community outreach at locally, nationally and regionally.

As a local level primary response, FNU would post-disaster send response teams supported by its own mobile response units to support recovery in affected areas. Teams would include academic staff and students from Environmental Health, Engineering, Humanities, Health Sciences, Nursing and Medicine disciplines.

For building capacity, FNU trains local, national and regional graduates. For instance, FNU is the primary regional trainer of health / medical and engineering graduates, with its degree programs infused with modules on resilient infrastructure construction, disaster management, emergency rescue, hazard risk reduction and climate change. FNU also develops disaster management leadership though postgraduate training and research in Disaster Risk Management, Emergency Medicine and Engineering. FNU is consistently upgrading its teaching and learning facilities and infrastructure - including improved online delivery - to respond to demands for increased capacity building across the Pacific as well as ensuring that the content and context is recent and relevant. All training is done with program oversight of Industrial Advisory Committees consituted of members from across the region. This ensures close collaboration between academia and governance.

Keywords: disaster resilience, postgraduate training, capacity building, South Pacific

Bio

Dr Turagabeci holds a Doctorate degree in Medical Science, Tokyo Medical & Dental University (2003-2007) and specialises in International Health as well as Environmental health, which is her first degree. She is the Head of Department of Epidemiology and Environmental Health at the School of Public

Health at the Fiji National University and currently the chair for the Postgraduate Advisory Committee. At the time of joining FNU (2008), she was the only native PhD graduate at the School. The institution is very young (established in 2010 and incorporating the well-known Fiji School of Medicine) and thus is more learning and teaching driven with a limited research focus. This included mentoring supervisors, teaching research methodology and proposal and ethics submission and data analysis and interpretation. During her term of mentoring masters students, there were 3 consecutive full graduations of single cohorts from 2009-2011, with 1 semester of implementation including writing dissertation. Email:amelia.turagabeci@fnu.ac.fj

Paul Jagals holds a Doctorate in Environmental Health and a Master's in Public Health, and is an internationally recognised academic (research, teaching and engagement) in Environment and Health. He is an Honorary Professor of Environmental Health at The University of Queensland as well as Professor of Environmental Health at Fiji National University. He is based in Brisbane Australia since 2011 from where he practices, aside from academic roles, as Environmental Health Specialist consultant for agencies such as WHO - especially in the Pacific region. He is a recognised specialist scientist for the South African (RSA) National Research Foundation as well as Water Research Commission (1997 – 2010), Professor of Environmental Health (2008 – 2010 Tshwane University of Technology RSA); Professor, founder and Director of the Centre of Water and Health (2003 – 2008 University of Johannesburg RSA), Associate Professor, founder and Director of the Centre Health and Environmental Research and Development (2000 – 2002 Central University of Technology RSA). Email:paul.jagals@fnu.ac.fj

Dr Shinya Uekusa and Dr Steve Matthewman
University of Auckland

Theorizing disaster communitas and disaster capital

Abstract

The what? and why? of "therapeutic community" (Barton 1969) in the wake of disasters are well known to scholars. Therapeutic community speaks to improvisational social connections that render mutual aid in the wake of disasters. At such times, prevailing power structures dissipate. Mutual aid may thus be the only coping resource that people have available to them. Threats, damage and pain are public, and as such, shared (see e.g. Portes 1998). This bonds survivors and provides the basis for physical and emotional support; it is also what "gives disaster the characteristics that distinguish it from other forms of crisis" (Fritz 1961:141-142). Here we adopt Turner's (1969) notion of communitas to speak to this "society of equals" that emerges in disasters. The emergence of such togetherness to render mutual assistance has been one of the most consistently observed phenomena within disaster literature since the 1920s (Prince 1920). While plenty has been written about its efficacy (Solnit 2009), all who observe it suggest that it is only ever temporary (Hearn 1980). Given its social utility, we ask: how can it be sustained to promote disaster risk reduction (DRR) and who should be responsible for this? Drawing upon Bourdieu's theories, we further conceptualize this phenomenon as "disaster capital", which may be intertwined with, and converted to/from, other capitals. We explore what enhances and challenges disaster capital, giving particular attention to the resilient system of social

structure and the role of symbolic capital. Keywords: Communitas, disaster capital, resilience, social capital, symbolic capital.

Bio

Shinya Uekusa is currently a Ph.D. candidate at the University of Auckland (department of sociology) in New Zealand. His main research interest is in social vulnerability and resilience in disasters, focusing on immigrants, refugees and linguistic minorities in Canterbury and Tohoku. His work has been published in International Journal of Disaster Risk Reduction, Resilience: International Policies, Practices and Discourses and Community, Environment and Disaster Risk Management (CEDRM) book series. Email: suek456@aucklanduni.ac.nz

Steve Matthewman is Associate Professor of Sociology at the University of Auckland. He is currently president of the Sociological Association of Aotearoa New Zealand and was formerly head of Sociology at the University of Auckland. His last book was *Disasters, Risks and Revelation: Making Sense of Our Times* (2015). He has longstanding research interests in disasters, social theory, and Science & Technology Studies. His present research project is 'Power Politics: Electricity and Sustainability in Post-Disaster Ōtautahi (Christchurch)' with Hugh Byrd and Christine Kenney. The big question informing this research is: "How do we build sustainability into the city?" The narrow focus is on the place of renewable energy in this process.

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Dr Mittul Vahanvati
RMIT

Build back better, risk reduction and disaster resilience: key determinants of their linkages

Abstract

The primary long-term goal of post-disaster recovery, rehabilitation and reconstruction has been identified as building disaster-resilient cities and communities to withstand future disasters. Implicit in priority 4 in the Sendai Framework for Action (2015-2030) is a view to "build back better" (BBB). BBB includes rebuilding of livelihoods, health and well-being and natural resources, which goes beyond rebuilding of safer homes. In this regard, a process-oriented (goes beyond considerations for outcomes), participatory or an owner-driven reconstruction approach and incorporation of inter-disciplinary and inter-sectorial perspectives are encouraged. However, integrating disaster risks during reconstruction phase amid complexities of a disaster context, poses immense challenges. What more, there is limited research on long-term impacts of reconstruction processes, which hinders our ability to understand key determinants which links reconstruction process to risk reduction and enhanced resilience. The aim of this paper is to address this research gap. A qualitative case-study methodology was employed for investigating good-practice reconstruction projects (at settlement scale) long after disasters in India. Two of the case-studies are investigated 13 years post-earthquake and other two, 8 years post-floods. Three of the most significant findings from empirical evidence are a need for flexibility in time/duration for reconstruction, agility in program/project to adjust to the needs of a particular context and sustained capacity building as part of continuum of disaster risk management. These findings are structured systematically to propose a framework for post-disaster reconstruction to provide a means to enhancing disaster resilience of built environment and communities.

Bio

Dr Mittul Vahanvati is an emerging researcher, lecturer and course-coordinator with more than 5 years of experience in academia. Mittul is trained as an architect and has masters in sustainable development, with over 7 years of professional experience. Her career trajectory changed in 2012, when she started her PhD in long-term recovery, post-disaster housing reconstruction and community resilience at RMIT University in Melbourne, Australia. Since then, she has written 6 articles in scholarly publications, has won award for her research paper at the 5th International conference on building resilience at New Castle University and has co-authored the book Co-building with bamboo. She has been invited to chair 'Build Back Better' track at the International conference on building resilience at Lisbon in Nov 2018. Her research interests are in disasters, community-based architecture, risk reduction and disaster resilience within broader international development and climate change challenges in the Asia-Pacific region.

Rexha Verdhora Ry

Research Schools of Earth Sciences, Australian National University

A Preliminary Result of Microtremor Study for Earthquake Risk Assessment in Jakarta, Indonesia

Abstract

As the city with the largest population in Indonesia, the capital city of Jakarta may be exposed to enhanced earthquake hazard due to basin resonance and amplification of earthquake waves. As has been pointed out by several studies, Jakarta resides on a thick basin filled with geologically young sediments, and therefore it possesses a risk of basin resonance. Meanwhile, microtremor studies have been used widely for evaluating seismic risks and imaging subsurface basin structure. Implementing this approach, we observed the phenomenon using temporary seismometers which were deployed covering the city and its vicinity. In 2013, 96 broadband seismometers were deployed focusing in the area of Jakarta. Then the study was extended in 2018 so that 140 more samples were taken in the city and its surroundings. Horizontal-to-vertical spectral ratio (HVSR) analysis is undertaken to map the dominant frequency and shear-velocity structure. We also invert all the 1-D shear velocities beneath the observing stations representing the basin structure. Thick sedimentary basin (Vs<1250 m/s) is revealed beneath Jakarta with thickness up to 1 km, which thickens to the north. This result shows that higher site amplification is located in the northern part of Jakarta, characterized by the prolonged duration of seismic waves between the period of 5 and 10 seconds. To sum up, Jakarta is threatened by seismic amplification if large earthquakes occurring near the city, and therefore the earthquake risk management is crucial. Keywords: Jakarta basin, HVSR, microtremor, site-effect, amplification.

Bio

Rexha Verdhora Ry is Ph.D. student in the Research School of Earth Sciences, Australian National University focusing in seismology. Rexha is a graduate of Institut Teknologi Bandung (ITB), where he received B.Sc. and M.Sc. in geophysics. Born and raised in Indonesia, Rexha works as a lecturer in ITB, and also as a member of ITB's global geophysics research group. Email: rexha.vry@gmail.com

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Paolo Miguel Manalang Vicerra
Chulalongkorn University Bangkok, Thailand

Vulnerability and risk perception: The 2013 Bohol earthquake

Abstract

The Pacific region of the world is fraught with disasters. Earthquakes are prevalent with varying effects with some causing devastation. The Philippines is particularly vulnerable with its socioeconomic condition as well as the archipelagic feature whereby accessibility during disaster events becomes a predicament.

The vulnerability of the population of Bohol, a province in Central Visayas of the Philippines, is examined. This is gauged with reference to the event in 2013 when a 7.2 magnitude earthquake caused high fatalities, injuries, and homelessness rates as well as substantial public infrastructure damages. The Normalised Vulnerability Index is created using various data points applicable to the year 2013 as reference points involving total population, poverty incidence, good governance index, and human development index among the provinces of Central Visayas where Bohol and three other provinces belong for comparative purposes. It is observed that in this region of the country, Bohol is second in terms of vulnerability which is reflective across all indices, although the issue of exposure may exacerbate this vulnerability due to newly identified hazards and also the state of public physical and social infrastructure support. The issue arises whereby the training on disaster for the communities is claimed to have been performed by respective local governments but there were many losses during the 2013 disaster. Training for specific disasters then may be insufficient to prepare the populations, but a more holistic approach where there is more immediate concern addressing lower socioeconomic status should be considered for social planning. Keywords: Vulnerability; Coping capacity; Philippine disasters; Earthquake risk perception

Bio

Paolo M.M. Vicerra is John Knodel Doctoral Fellow at the College of Population Studies, Chulalongkorn University. His research is on gender equity and the fertility and marital patterns in Thailand. He also works on health demography in Southeast Asia and other population and development issues particularly disaster and vulnerabilities in the context of Philippine communities. Email: paolo.vicerra@phikappaphi.up.edu.ph

Dr Jaime Angelo S. Victor
Institution: University of the Philippines - Diliman

Deterministic Landslide Susceptibility Assessment of Antipolo, Rizal by Stability of Index Mapping.

Abstract

Slope instability associated with heavy rainfall or earthquake is a familiar geotechnical problem in the Philippines. The main objective of this study is to perform a detailed landslide susceptibility assessment of Antipolo City. The deterministic approach for landslide susceptibility assessment used was through stability index mapping. Landslide inventory was done through interpretation of aerial photographs and satellite images with corresponding field verification. In this study, morphologic and non-morphologic factors contributing to landslide occurrence and their corresponding spatial relationships were considered. The analysis of landslide susceptibility was implemented in a Geographic Information System (GIS). The overlay analysis results show that the model classifies 80% of the landslide to areas states of Lower Threshold, Upper Threshold and Defended Slope Zone, which corresponds with high to very high susceptibility to landslide occurrence, which translates to 20% misclassification rate. Keywords: Landslide Susceptibility, Slope Stability, Geographic Information System

Bio

The author is an Assistant Professor at the University of the Philippines Diliman. He is a member of Geotechnical Engineering Group and is a founding member of the Philippine Society of Soil Mechanics and Geotechnical Engineering. He obtained his bachelors degree in Civil Engineering in 2010, and his Master's degree in 2015 at UP Diliman. Email: jsvictor@up.edu.ph

Emeritus Professor Robert J. Wasson
Fenner School of Environment and Society, Australian National University

Estimates of Flood Hazards: The 'Real and the Unreal'

Abstract

The most commonly used method to estimate the probability of extreme floods is to fit a probability distribution to a series of measured flows and then estimate the extremes from the upper tail of the distribution. The limitations of the method are: short measured records, a lack of physical theory underpinning the choice of distribution, and non-stationarity of the series. But an even more profound limitation in the face of climate change is that the past may no longer be an analogue of the future: the future is said to be 'out-of-scale'. The extent of this limitation depends in part on the length of time represented by the 'past'. Extending the record by using sedimentary indicators, documents and oral history can expose extremes not found in the measured record. These extremes are 'real' in the sense that there is evidence of their existence manifest in sediments, eyewitness accounts, and memories, although the last may be suspect. The 'unreal' extremes have no manifestation because they are based on extrapolations to a future that cannot be observed, unless we wait long enough or they can be compared with long reconstructions of past 'real' extremes to which probabilities have

been assigned. Yet even the creation of 'real' records does not do away with the 'out-of-scale' problem, requiring for estimates of future hazards a link between 'real' extremes, climatic controls, and model-based projections of changes of the climatic controls. There is no escaping the 'unreal' in the form of climate model projections, but greater emphasis on the 'real' is warranted as will be demonstrated.

Key words: flood extremes, hazard estimation, climate change

Bio

Professor Robert Wasson has held various positions at the National University of Singapore between 2011 and 2018, and is now Emeritus Professor at the Fenner School of Environment and Society, ANU. Immediately prior to 2011 he was Director of the Centre for Resource and Environmental Studies, Dean of Science and Head of the Department of Geography and Human Ecology at the Australian National University, then Deputy Vice Chancellor Research and International at Charles Darwin University, Australia. He has taught and researched at Sydney University, Macquarie University, University of Auckland, Monash University, and the Australian National University. He was trained in geomorphology and his research interests are: causes of change in river catchments; environmental history; extreme hydrologic events in the tropics; cross-disciplinary methods; and the integration of science into both public and private sector policy He has done research in Australia, New Zealand, Indonesia, Timor Leste, Malaysia, India, Nepal, Pakistan, China, Myanmar and Thailand. His most recent research has focused on flood risk in relation to climate change and human vulnerability over long periods in India and Thailand, and the political economy of disaster management in India and Thailand.

Associate Professor Seth Westra
University of Adelaide

Future Climate Risk: The challenge of compound events

Abstract

Compound weather/climate events refer to situations where multiple drivers and/or hazards combine to contribute to societal or environmental risk. The challenge of understanding compound events results from the intersection of the multi-scale nature of weather and climate phenomena, with system complexity (i.e., that water supply, energy, transport and agriculture and other systems are often comprised of many connected and interacting parts). This can often lead to unanticipated modes of system failure, as systems are exposed to new combinations of climate stressors that they have not been previously experienced, and that may not have been considered in the original system design. This presentation will focus on approaches for maximising system resilience in the face of compound events, including the description of a framework and software tools for (1) understanding the risk of compound events; (2) quantifying system responses to compound events, including articulation of modes of failure; and (3) decision making given the high levels of uncertainty associated with these events. This will ultimately yield better-informed assessments of hazards from compound events, and allow for improved risk analysis, projection and decision-making.

Bio

Associate Professor Seth Westra is the Associate Dean of Research and Innovation within the Faculty of Engineering, Computer and Mathematical Sciences at the University of Adelaide, and has research and consulting experience across both academia and industry. Seth has contributed to the fields of hydrology, water resource assessments and climate risk, and has published over 80 journal and conference papers on these topics. He also co-chairs the Australian Energy and Water Exchange (OzEWEX) Research Initiative—a national research network that seeks to encourage a collaborative environment between researchers and end-users on issues related to the water and energy cycle.

Professor Jiang Xu

Department of Geography and Resource Management, The Chinese University of Hong Kong

Post-disaster reconstruction planning in China: towards a resilience-based approach?

Abstract

China is disaster-prone. Many scholars have documented the rise of urban planning as an indispensable tool in the processes of recovery and reconstruction. Some scholars have discovered that signs of resilience-mindedness are evident in the post-disaster planning processes. Others adopt a more pessimistic view. These almost diametrically opposing arguments herald an enormous uncertainty in academic inquiries.

To fill up this gap, this presentation aims to report one of the first empirical studies of the resilience-mindedness of planners who directly participated in the reconstruction planning in China. Drawing upon a questionnaire survey with target planners, the research considers how these planners have understood reconstruction planning, the extent to which 'resilience-mindedness' has been developed in the planning process, and its strategic significance. Our research findings seem to suggest that despite the fact that planners do not explicitly apply the concept of resilience, there are clear signs of resilience-mindedness in the planning process. However, there is a high degree of variation in applying the 'resilience-mindedness' among different resilience attributes. The study concludes that while post-disaster reconstruction planning gains prominence in China, it may owe less to its normative merits than to its instrumental utility to important societal challenges and to the need for quick economic recovery.

Bio

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The research findings presented here are from the project fully supported by the General Research Funds of the Research Grants Council of Hong Kong Special Administrative Region, China (Project code: CUHK14413014).

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Burn severity estimation of North Australian Tropical Savannas using Radiative Transfer Model and Sentinel-2A MSI Data

Abstract

Fires in the tropical savannas of northern Australia are frequent and extensive, which has been recognized as incurring significant impacts on a variety of ecological attributes. The tropical savanna is normally comprised by open-woodlands, woodlands and open forests, leading to a ubiquitous confusion between severe and non-severe burnt level when observed from remotely sensed data, especially in areas with low tree coverage. In this study, the burn severity of several wildfires ignited from August to October 2016 in the north Australian tropical savannas is estimated using Forest Reflectance and Transmittance (FRT) radiative transfer model (RTM) and Sentinel-2A multi-spectral instrument (MSI) satellite data. All the spectral bands of Sentinel-2A MSI data and the post-fire Normalized Burn Ratio (NBR) were used in the inversion process. To alleviate the spectral confusion between severe and not-severe burnt levels, the MODIS Vegetation Continuous Fields tree cover percentage data is used to constrain the inversion. Results showed that the burn severity estimation accuracy is largely improved by considering the tree coverage (overall accuracy improved from 60% to 77%). The RTM method for the estimation of tropical savannas burn severity propose in this research also performed better than two standard empirical vegetation indices broadly used to map burn severity (dNBR and RdNBR, overall accuracy of 68% and 62%, respectivelly). Future work will be focused on extended the methodology to other ecosystems. Keywords burn severity, tropical savannas, radiative transfer model, Sentinel-2A MSI data

Bio

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Using resilience practice from Indigenous Local Knowledge in Japan and the Philippines

Abstract

I want to demonstrate some simple ways people learn to remember lessons from disaster by retrieving memories inscribed in objects such as markers; place names or chimei, and then mapping it the way local people perceive their environment. First, I will describe how Japanese people, especially those from my research areas, are educated to save themselves in times of disaster. Second, I will describe how I processed the Japanese experience together with the Filipino experience to educate young elementary school children mitigate the effects of disaster within the context of their community. Self-education based on the Japanese and Filipino experiences is a form of their resiliencies.

Bio

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