Annual Report 2017

GADRI
Global Alliance of
Disaster Research Institutes

Global Alliance of Disaster Research Institutes

We thank all our members for their inputs to the GADRI Annual Report 2017.

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GADRI Annual Report 2017

Contents

In November 2011, when the First Global Summit of Research Institutes for Disaster Risk Reduction was held at the Disaster Prevention Research Institute (DPRI), Kyoto University, Uji Campus, Kyoto, Japan, participants recognized the need to bring together research institutes working on disaster risk prevention and mitigation in various disciplines. The Summit Resolution proposed to establish an international alliance fostered by DPRI, Kyoto University.

This proposition was seconded during the Second Global Summit held at DPRI, Kyoto University, Uji Campus, Kyoto, Japan and the Global Alliance of Disaster Research Institutes (GADRI) was established in March 2015 soon after the UN World Conference on Disaster Risk Reduction (WCDRR, 2015) that was held at Sendai, Japan with a mandate to support the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030.

GADRI is a member of the Scientific and Technical Advisory Group (STAG) of the United Nations Office for Disaster Risk Reduction (UNISDR). GADRI works closely with the science and technology community endorsing policies related to disaster risk reduction, and disseminating and sharing cutting-edge knowledge and information supported by evidence-based research among research institutions, international organizations and the private sector in various nation states.

Today, GADRI has more than 150 member institutes to its credit. Its partners and research networks continue to evolve and strengthen research activities towards disaster risk reduction and management.

Global Alliance of Disaster Research Institutes (GADRI)

Our Mission

Strive to build a collaborative global platform to bridge the gap between policy makers and academicians to examine challenges in disaster risk management and contribute to disaster resilience in the world.

Our Vision

To deepen the understanding of disasters and find implementable solutions to achieve disaster resilience, by integrating knowledge and technologies from around the world.

Our Values

- To support the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030
- To establish a global research network that promotes and engages disaster research.
- To provide a research road map, with plans that help facilitate the organization of disaster research groups.
- To promote capacity building and development of disaster research institutes and enhances researcher and student exchange.
- To promote exchange and sharing of data and information for scientific research across the globe.
- To serve as an advocacy organization presenting evidence-based approaches that influence decision-making processes.

GADRI One of a kind Network

We seek to contribute to enhancing disaster risk reduction and disaster resilience in close collaboration with organizations around the world through sharing of information, knowledge, experiences, ideas and initiatives on relevant research.

With Unique Activities

- Planning and organization of regionally or globally collaborative disaster risk research initiatives
- Formation of international research groups to investigate current global disasters, and implement new research methodologies for disaster risk reduction and implementation
- Establishment of an international network for timely communication related to research on disasters
- Organization of conferences, workshops and meetings
- Dissemination and sharing of information, publications, reports, data and other research outputs
- Facilitation of rapid reconnaissance field surveys following disasters
- Preparation of GADRI news releases, policy recommendations, news bulletins, research reports, and other publications.

GADRI and the Global Summit Series

1st Global Summit of Research Institutes for Disaster Risk Reduction

- Held during the aftermath of the Great East Japan Earthquake & Tsunami at DPRI) Kyoto University, Uji Campus, Kyoto, Japan
- Participation of 52 institutes – 88 participants from 14 countries
- Proposed establishment of an international alliance of disaster reduction and risk management fostered by DPRI, Kyoto University

2nd Global Summit of Research Institutes for Disaster Risk Reduction

- Organized by Disaster Prevention Research Institute (DPRI), Kyoto University, Uji Campus, Kyoto, Japan
- Held soon after the 3rd UN World Conference on Disaster Risk Reduction (WCDRR)
- Majority of the attendants were from UN and other organizations attending the WCDRR
- Participation of 186 participants from 21 countries
- Resolution passed to establish GADRI

3rd Global Summit of Research Institutes for Disaster Risk Reduction

- Organized by GADRI and attended by 251 participants from 33 states around the world representing 102 institutes
- Awarded 20 full fellowships to researchers in developing countries
- 24 Oral and 32 poster presentations
- Developed a table of current and future research status of disaster risk reduction
- Proposed to publish the Proceedings of the 3rd Global Summit in major scientific journals
- Proposed to publish GADRI Prospectus containing information of GADRI Member institutes; and
- Held the 1st GADRI General Assembly with participation of 58 institutions

Message from GADRI Secretary-General

It gives me great pleasure to share with you the first edition of GADRI Annual Report 2017. This edition captures reflections of our outcomes during the past year.

In March, the highly successful 3rd Global Summit of Research Institutes for Disaster Risk Reduction: Expanding the Platform for Bridging Science and Policy Making which was held at the Disaster Prevention Research Institute (DPRI), Kyoto University, Uji Campus, Kyoto, Japan from 19 to 21 March 2017 was organized by the Global Alliance of Disaster Research Institutes (GADRI). One major outcome of the conference was the proposal to establish a multi-disciplinary book series by GADRI on disaster risk reduction.

Keeping up with the momentum, and supported by the Kyoto University, GADRI launched the Disaster and Risk Research: GADRI Book Series in July. The Series will provide visions and knowledge to connect with the current status of science and technology with future directions for disaster research to contribute for disaster resilience in communities. Knowledge, regulations and policy measures are failing short to ensure disaster resilient societies as they are applied in an isolated manner. The gap remains wider between what is known and what needs to be done. Applying a multi-disciplinary approach, disaster risk issues could be managed in a holistic and integrated manner which would integrate different disciplines, different stakeholders and experts. The series will focus on deepening the understanding of risks from the perspective of different disaster research domains; and manage and plan disaster risk reduction. The series would be welcome by researchers across disciplines, students, policy makers, planners, practitioners and others engaged in disaster risk management and resilience to disasters. During the editorial meeting held in November, an impressive number of thirteen book proposals in various disciplines were finalized. The proposals were submitted to *Springer Nature* for approval and eventual publication.

Recognition by UNISDR and nomination to the 21-member institute Science and Technology Advisory Group (STAG) for the first-term of two years renewable by one more term (2017-2018 and 2019-2020) is another laudable milestone. The first face-to-face meeting was attended by the GADRI Chair of the Board, Prof. Andrew Collins. Three working groups of core topics were set-up to take forward to the 2019 Global Platform and beyond. GADRI co-lead the group on 'Data' together with EC-JRC.

At the Global Forum on Science and Technology for Disaster Resilience 2017 organized by the Science Council of Japan, GADRI contributed to the "Tokyo Statement 2017" which is committed to join and lead efforts by the science and technology community to work closely with various stakeholders towards achievement of a disaster resilient world. Members of the Board of GADRI are closely working with the group.

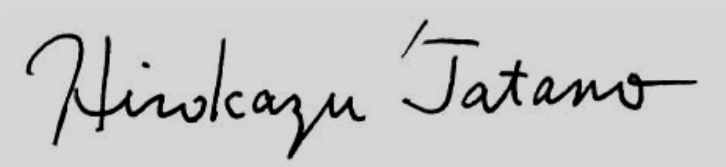
In addition, GADRI actively participated at the World Bosai Forum 2017 held in Sendai, Japan in November and at many other international conferences. GADRI membership continued to increase. As of December 2017, GADRI was significantly represented to nearly 150 institutes in 40 states.

I believe we have accomplished more than was expected during the year 2017. Challenges facing us today are more substantial and complex in nature and I am certain by evolving the expertise of our network, we can improve disaster risk reduction and find solutions for a disaster resilient world.

Learn about the members of GADRI and how the commitment and passion of a diverse based community, dedicate and contribute their efforts to research in disaster risk reduction and resilience to disasters around the world.

I would like to express my gratitude to our members of the Board, Advisers, members and colleagues as none of these accomplishments would have been possible without your support. I thank you for your continued support.

I hope you will enjoy reading GADRI Annual Report 2017.



Hirokazu Tatano
Secretary-General, GADRI

2017

3rd Global Summit of Research Institutes for Disaster Risk Reduction — 19 to 21 March 2017

(L-R) Andrew Collins (Northumbria University), Kaoru Takara (Director, DPRI, and Deputy Executive Director, Kyoto University), Tadashi Yamamoto (Mayor, Uji City), Shuichi Yamauchi (Vice-Governor, Kyoto Prefecture)

The Third Global Summit of Research Institutes for Disaster Risk Reduction: Expanding the Platform for Bridging Science and Policy Making was held at the Disaster Prevention Research Institute (DPRI), Kyoto University, Japan from 19 to 21 March 2017 and was organized by the Global Alliance of Disaster Research Network (GADRI). The Summit was attended by various experts in the international science and technology community, governments, private sector, and academia within Japan and abroad with majority of the participants being members of GADRI.

The Summit paved an opportunity to evaluate existing research projects and practices, collaborative research activities and examine current research gaps in most needed research areas in disaster risk reduction and was concluded with a positive note to work towards improving networking among members and encourage collaborative international research work on disaster risk reduction to bridge the gaps between science and technology and policy making whereby contributing to the objectives of the Sendai Framework for Disaster Risk Reduction 2015-2030. The conference featured eleven keynote speeches out of which five members were from the UN and others from the government, diplomatic mission, national organisations and the academia, and attracted over 250 participants representing 102 institutes within 38 states. There were eight parallel group discussion sessions and three panel sessions which produced a final resolution document. The Proceedings of the 3rd Global Summit including a few selected papers will be published by Springer Japan. One of the recommendations was to establish a multi-disciplinary GADRI Book Series to discuss the current status of disaster risk reduction research.

3rd Global Summit of Research Institutes for Disaster Risk Reduction

Expanding the Platform for Bridging Science and Policy Making

Disaster Prevention Research Institute (DPRI), Kyoto University, Uji Campus, Kyoto, Japan

19 to 21 March 2017

GADRI and the UN

GADRI is committed to work together with multi-disciplinary research institutes in advocating sharing of knowledge and evidence-based research results to reduce disaster risk and make the world resilient to disasters including through the frameworks and vision of the United Nations.

GADRI is in a better position today to play an important role to further facilitate contributions from the Science and Technology community towards the implementation of the Sendai Framework through reinforcing various channels to deliver on the key actions of the UNISDR Science and Technology Roadmap which was established during the Science and Technology Conference held in January 2016.

Yuichi Ono (Tohoku University), Andrew Collins (Chair of GADRI Board of Directors), Hirokazu Tatano (Secretary-General, GADRI) at the UNISDR 2017 Global Platform for Disaster Risk Reduction, Cancun, Mexico)

Message from the Chair of the Board of Directors

There is a fundamental problem in that major changes to life on earth are still increasing faster than we have developed sufficient science and technology, political will and human behaviour needed to reduce disaster risk. The act of 'allying' or state of 'being allied' to those aware of and committed to addressing this challenge across the research community globally is one way to help make a difference for future generations. It is a great privilege to serve as Chair for an immense wealth of expertise represented by GADRI.

First General Assembly

The first General Assembly of GADRI was held on 21 March 2017 at the Kyoto City Hall, Kyoto, Japan. The meeting was attended by 58 GADRI member institutes. During the meeting, unanimous endorsement was received on the Chair of the Board of Directors, Secretary-General of GADRI, Charter of GADRI – this was endorsed with a few clarifications raised by the members, current activities of GADRI, and outcomes of the 3rd Global Summit. The meeting was chaired by the Chair of the Board of Directors.

Prof. Shahbaz Khan, Director, UNESCO Jakarta Regional Science Bureau for Asia and the Pacific

Board of Directors

GADRI is governed by an able and geographically balanced Board of Directors representing their affiliated institutions. The term of the Board is for a period of four years with the first half of the members serving two years. The member institutions of the Board are elected by the GADRI General Assembly which constitute the members of GADRI.

Member Institutes of the Board of Directors

Europe and Africa

1. International Institute for Applied System Analysis (IIASA), Austria
   Prof. Pavel Kabat represented by Dr. Stefan Hochrainer-Stigler
2. European Commission, Joint Research Centre EC-JRC), Italy
   Dr. Tom De Groeve
3. Disaster Development Network (DDN), Northumbria University, UK
   Prof. Andrew Collins (Chair of the Board)

Asia and Oceania

4. International Research Institute of Disaster Science (IRIDeS), Tohoku University, Japan
   Prof. Fumihiko Imamura represented by Prof. Yuichi Ono
5. National Research Institute for Earth Science and Disaster Resilience (NIED), Japan
   Prof. Koji Suzuki
6. GNS Science, New Zealand
   Dr. Gill Jolly represented by Dr. Kelvin Berryman
7. National Science and Technology Center for Disaster Reduction (NCDR), Chinese Taipei
   Prof. Wei-Sen Li

Americas

8. Disaster Risk Research, Institute of Geography, National Autonomous University of Mexico (UNAM), Mexico
   Prof. Irasema Alcántara-Ayala
9. Pacific Earthquake Engineering Research Center (PEER), National Information Service for Earthquake Engineering, University of California, Berkeley, USA
   Prof. Khalid Mosalam
10. Natural Hazards Center (NHC), University of Colorado- Boulder, USA
    Prof. Lori Peek

GADRI Secretariat

11. Disaster Prevention Research Institute (DPRI), Kyoto University, Uji Campus, Kyoto, Japan
    Prof. Hirokazu Tatano, Secretary-General

DPRI Research Group

Dr. Subhajyoti Samaddar
Associate Professor

Integrated Arts and Sciences for Disaster Reduction Research Group

Social Systems for Disaster Risk Governance

http://www.dpri.kyoto-u.ac.jp/organization_en/iasdrrg_en/rddms/ssdg/

As part of research exchange and collaborative activities, Dr. Subhajyoti Samaddar undertook site visits to institutes in India. During his site visit to the Nalanda University, Rajgir, India, he delivered a lecture on community partnership during disasters and how disaster after effects can be curbed through disaster risk mitigation through various processes. Prof. G. J. Chakrapani, Dean, School of Ecology and Environment Studies welcomed and introduced Dr. Samaddar to the audience.

The lecture was focused on his research work done in the fields of Dharavi and Bhuj, where due to uneven and mismanaged urbanization, ripple effects of earthquakes cause havoc. He introduced the idea of minimizing disaster impact through adaptation and mitigation processes based on location specific opportunities and risks.

He focused on the effectiveness of community participation strategies during and before the calamity. Such mechanisms will contribute to sustain or minimize the impact. He placed emphasis on social consciousness, community participation, public and private stakeholder's role including the role of media to deliberately handle the issue in such troubled water times. Dr. Samaddar was felicitated with a memento by Dr. Prabhakar Sharma and thanked by the administration for his inspiring thoughts on the topic.

He also visited the Indian Institute of Technology, Roorkee which is a member of the GADRI Board of Directors. He delivered a lecture on "Implementing Community Participation in Disaster Management and Climate Change Adaptation: on whose terms?". The lecture discussed about his field experiences in Ghana, Mumbai, Japan and Bangladesh. He explained the conflicting views on risk management and the role of community in urban planning. He taught various techniques and methods of participatory based disaster management. He also explained roles and responsibilities of different stakeholders.

Geohazards Research Group

Research Division of Geohazards

Mountain Hazards Section
http://www.slope.dpri.kyoto-u.ac.jp/english_ver/index.htm

DPRI Research Group

Prof. Masahiro Chigira
Head, Mountain Hazards

In addition to engaging in various research activities, international conferences and presentations, the Mountain Hazards Group proposed and discussed a book on Landslides and Surface Processes Related to be published under GADRI book series. A tentative list of chapters and authors was presented during the first meeting of the GADRI Book Series held in Tokyo in November 2017. Further details of our group's research activities can be found at DPRI website.

DPRI Research Group

Prof. Ana Maria Cruz
Professor, Disaster Risk Management

Integrated Arts and Sciences for Disaster Reduction Research Group

INTER-Asian initiative on joint NAtural and TECHnological (Natech) (*Intera-Natech*) Project

http://www.dpri.kyoto-u.ac.jp/organization_en/iasdrrg_en/drs/drm/

The INTER-Asian initiative on joint NAtural and TECHnological (Natech) (***Intera-Natech***) Project, aims at strengthening societal resilience focusing on industrial estates located at earthquake, tsunami and flood affected Asian coastal areas.

It proposes the development of an international comprehensive area-wide risk management framework for mitigating the impact of natural disaster triggered chemical accidents. Towards the development of the project and with the support and funding of DPRI, several activities were conducted during the fiscal year 2017.

The 8th Conference of the International Society for Integrated Disaster Risk Management (IDRiM) held in Reykjavik, Iceland from 23-25 August was a platform to show the Preliminary stages of a new comprehensive Natech performance rating system. We participated in the Young Scientist Session (YSS), with an oral and poster presentation. An award and recognition was received as one of the 10 best presentations in the YSS. Later on in October 14th-18th, we attended to the 9th China-Japan Joint Workshop on Sustainable Management of Cities and Regions under Disaster and Environmental Risks held in Beijing. We gave an oral presentation and had an enriching experience that contributed to our research with discussions and comments from the participants.

December 2017 was the opportunity to conduct a field trip in Colombia, with the aim to introduce the area-wide risk management framework currently under development and its associated methodologies. Meetings and industry visits were arranged in order to obtain input that could help refine the proposed framework. Eight multi-stakeholder meetings were conducted with the participation of more than 80 experts. In addition, more than 20 public and private organizations were contacted as well as three industrial visits were carried out. The main aim of the visits was to obtain expert feedback on the proposed framework in addition to data collection for understanding the current state regarding Natech risk and risk management in Colombia. As a result, expert feedback was positive indicating the need for and usefulness of the proposed framework.

Later on, in January 19th, 2018 we were able to share the results and findings from our Site investigation of Natechs in Colombia at the Working Group meeting in Osaka University. Finally, we also had the chance to participate on the recent DPRI annual meeting 2018 to show the main findings and contributions from the field trip to the framework.

Field visit in Colombia

DPRI Research Group

Prof. Masato Iguchi
Head

Seismic and Volcanic Hazards Mitigation Research Group

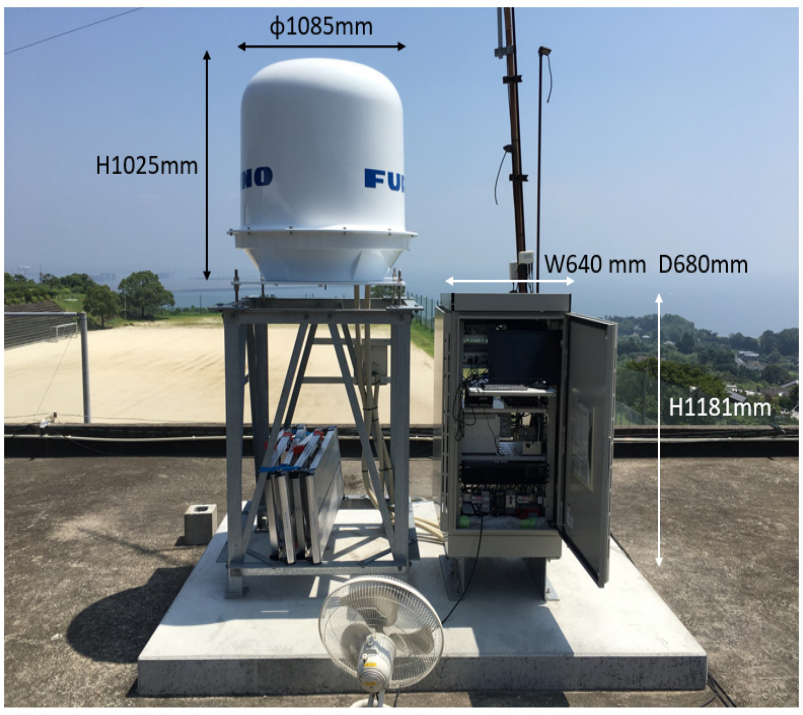
Sakurajima Volcano Research Center

http://www.svo.dpri.kyoto-u.ac.jp/svo/english-top-page/

Sakurajima volcano Research Center has conducted research task D2 “Development of real-time volcanic ash hazard assessment method” under “Integrated Program for Next Generation Volcano Research and Human Resource Development (NGVR)” consigned from Ministry of Education, Culture, Sport, Science and Technology-Japan. We installed 6 X-band MP radars at 5 volcanoes (Sakurajima, Kirishima, Satsuma-Iwojima, Kuchinoerabujima and Suwanosejima) in South Kyushu to detect volcanic ash cloud.

Sakurajima volcano frequently erupts with vulcanian style at the summit crater of Minamidake or Showa crater east of it. Shinmoedake volcano in Kirishima volcano complex resumed eruptive activity in October 2017, after 6 years dormancy. Volcanic clouds were successfully detected, even invisible volcanic cloud. Volcanic cloud by an explosive eruption on November 13, 2017 at Sakurajima volcano was not seen due to weather cloud covering the summit of the volcano, however the radar detect echo until the elevation of 4-5 km. The elevation well coincides with plume height estimated from GNSS and discharge rate estimated by ground deformation and seismic activity.

In 2014, the technology was well applied to Sinabung volcano, in Indonesia where “Integrated study on mitigation of multimodal disasters caused by ejection of volcanic products” has been conducted under the Science and Technology Research Partnership for Sustainable Development (SATREPS). Sinabung volcano has been frequently erupting since 2014 with vertical emission of volcanic ash clouds and pyroclastic flows. The X-band MP radar detected a dense volcanic ash cloud which elevated up to 8 km.



X-band MP radar

Seismic and Volcanic Hazards Mitigation Research Group

Research Division of Earthquake Hazards

Earthquake Source Mechanisms—

http://www.eqh.dpri.kyoto-u.ac.jp/src/index.htm

DPRI Research Group

Prof. James Mori
Head

As part of the activities for the Earthquake and Volcano Group, a book on earthquakes and earthquake engineering was proposed and discussed to be published under GADRI book series. A tentative list of chapters and authors was presented at the kick-off meeting of the GADRI Book Series meeting held in Tokyo in November 2017. Refer to DPRI webpage to find out more about our research activities.

DPRI Research Group

Dr. Kantoush Sameh
Socio and Eco Environment
Risk Management

Atmosphere and Hydrosphere Research Group

Water Resources Research Center

http://www.dpri.kyoto-u.ac.jp/organization_en/ahrg_en/wrrc/

The Water Resources Research Center (WRRC) and Global Alliance of Disaster Research Institutes (GADRI) of Disaster Prevention Research Institute (DPRI), Kyoto University initiated the International Symposium on Flash Floods in Wadi Systems (ISFF) to investigate flash floods disasters, and implement new research methodologies, and emphasizing transdisciplinary approaches in this ever more important field of research.

In recent years, flash floods in Wadi systems have caused severe damages, especially in the Arab regions. Human lives, infrastructure such as roads and buildings as well as the environment are endangered and have been heavily destroyed. Flash floods are caused by extreme weather conditions, and their occurrence is highly random and associated problems are expected to increase in the near future due to climate change.

The first International Symposium on Flash Floods (ISFF) in Wadi Systems held at DPRI, Kyoto University, Kyoto, Japan in October 2015 was attended by about one hundred scientists, practitioners and stakeholders from 11 countries (Japan, Arab Region, Europe; see (http://ecohyd.dpri.kyotou.ac.jp/en/index/1.html).

ISFF is focusing on existing research gaps in the area of flash floods based on case studies from five Arabian countries, to ensure an integrated strategy and water resources management for wadi systems in the Arabian region. Finding solutions to these challenging problems requires close collaboration between scientists – established as well as young ones, practitioners, and stakeholders from federal and public organizations. Through the ISFF, various stakeholders are encouraged to contribute to the development of future solutions.

The first event brought together experts from governments, universities, and companies in flash floods field from Japan, Egypt, Sudan, Jordan, Oman, Saudi Arabia, and Europe, to provide a platform to present the current areas of investigation especially in the fields of atmospheric and water related disaster and integrated disaster risk management to encourage the forming joint research cooperation programs.

Subsequently, with the success of the first symposium, the second symposium was held at Technische Universitat Berlin, Campus El Gouna, Egypt from 25 to 27 October 2016. For further details visit the website. (http://www.campus-elgouna.tu-berlin.de/home/international_symposium_on_flash_floods/).

The third ISFF in Wadi Systems on Disaster Risk Reduction and Water Harvesting in the Arab Region was successfully held in Muscat, Sultanate of Oman from 5 to 7 December 2017.

(http://isff2017.gutech.edu.om/)

Plans are under to organize the 4th ISFF in Casablanca, Morocco in 2018. (http://isff2018.com)

Third ISFF, Muscat, Sultanate of Oman from 7 to 8 December 2017

Keeping in Touch with Members

Keeping in Touch with Members

Dr. Yetta Gurtner
Coordinator

Centre for Disaster Studies
James Cook University

https://www.jcu.edu.au/centre-for-disaster-studies

Research, publications and projects within the Centre for Disaster Studies in 2017 continue to reflect our extensive knowledge base and fieldwork experience, particularly in tropical regions. Published research over this period addresses a diversity of themes including mitigation and evacuation behaviours; effective risk and hazard communication; social/community based disaster assessment research methodologies; and, social network analysis for disaster risk reduction and climate change adaptation (refer to website for full list of outputs).

Case studies in 2017 were primarily based around fieldwork investigations regarding the impacts and learnings from Tropical Cyclone Pam (Vanuatu 2015) and Tropical Cyclone Debbie (North Queensland, Australia 2017). This research was partially supported by a number of small external grants. Subsequent findings and recommendations have been presented at a number of stakeholder forums including local communities, government agencies, non-government agencies, academics, industry and other relevant emergency/disaster management practitioners. Researchers from the Centre also retain specialist/consultative positions on a number of associated committees to advise on relevant policy development and decision making.

AWARDS

In 2017 the journal article: Gurtner, Y (2016) “Returning to Paradise: Investigating Long term Tourism Crisis Recovery on the Island of Bali”, *Journal of Hospitality and Tourism Management. Special Issue: Crisis Response and Recovery for the Tourism Industry*. Vol 28. pp. 11-19 was Awarded **Highly Commended Paper by Journal of Hospitality and Tourism Management 2016 .**

Airlie Beach Government Recovery Service Trailer—7 April 2017

Prof. Carlos de Oliveira Galvão

Federal University of Campina Grande (UFCG)

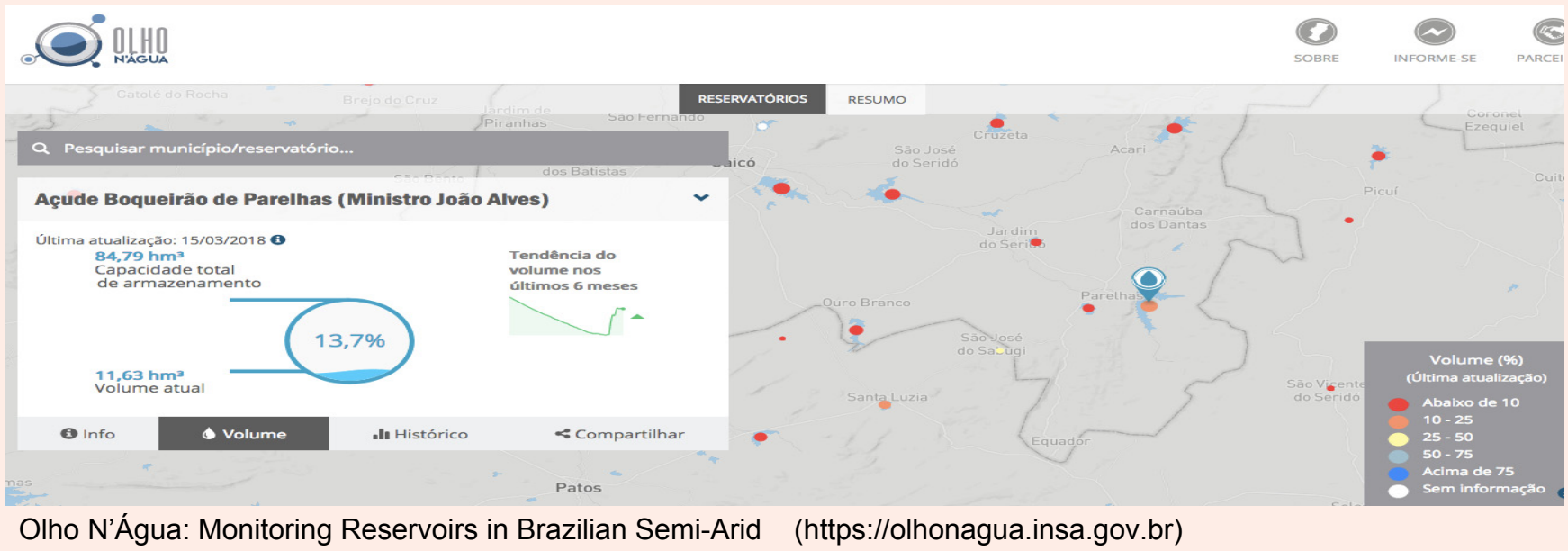
http://www.ufcg.edu.br/

The Federal University of Campina Grande conducts studies and research on environmental disasters in a broad sense, spanning several areas. This is partly motivated by the institution's location in the a semiarid region of Brazil, high populated and socially and economically vulnerable to environmental hazards, such as droughts, desertification, land degradation, flash floods, health vulnerability, leading to social inequality. Our present interests are on understanding local and regional needs and the social aspects of Disaster Risk Reduction.

The year 2017 was marked as the sixth year of the most prolonged drought in the region, leading to severe consequences both in rural and urban areas. This climate extreme has impacted several sectors, such as family-based agriculture and livestock, water security in rural and urban settlements, health, soils and biodiversity. Research challenges addressed by our team during 2017 were strongly related to, among other topics, water availability, pollution, access and management, epidemics of dengue, Zika virus and Chikungunya, resilient agroecology and family -based agriculture, climate variability and change, waste management, regional sustainability, disaster monitoring in rural and urban environments, risk communication, land cover and change, desertification.

Our research has been conducted in regional, national and international networks, consortia and partnerships. They include the Brazilian Excellence Institutes on Global Change, on Metropolis Observatory and on Pharmaceutic Products.

As 2017 highlights, we can share initiatives related to disaster monitoring. Two satellite-based systems for monitoring land use cover and changes, and their relationships to climate change are the Bioclimate and the SAPS, produced in cooperation with European organisations, research centres and universities. Olho N'Água and Água Nossa are two IT-based platforms for monitoring storage of water supply reservoirs, a collaborative system with the Brazilian National Institute for the Semi-Arid (INSA), and inequalities in the access to water in urban areas. The sociodemographic profile of women infected by Zika virus during pregnancy was a relevant survey for monitoring the impact of this health disaster. The Metropolis Observatory team at UFCG has established a monitoring effort on the right to the city, an ongoing national effort on urban processes. Among disaster mitigation strategies, UFCG's Program on the Semi-Arid has consolidated in 2017 initiatives on technology innovation for rural communities in the region. UFCG is a supporting University of the UNESCO Chair on Geoenvironmental Disaster Reduction, established at Shimane University, Japan, in 2017.



Olho N'Água: Monitoring Reservoirs in Brazilian Semi-Arid (https://olhonagua.insa.gov.br)

Bulgaria

Prof. Dimiter Velev
Director

Science Research Center for Disaster Risk Reduction (SRCDRR) University of National and World Economy (UNWE)

http://www.unwe.bg/en/

The Science Research Center for Disaster Risk Reduction (SRCDRR) at the University of National and World Economy (UNWE), Sofia, Bulgaria, has co-organized the ***2nd IFIP Conference on Information Technology in Disaster Risk Reduction (ITDRR 2017)***, October 25 - 27th, 2017, UNWE, http://itdrr.unwe.bg/.

ITDRR-2017 has provided an international forum for researchers and practitioners to present their latest R&D findings and innovations. The conference has been especially focused on the various IT aspects and challenges of copying with disaster risk reduction. ITDDR-2017 invites experts, researchers, academicians and all other who are interested to disseminate their work. The conference continues to establish an academic environment that fosters the dialogue and exchange of ideas between different levels of academic, research, business and public communities.

The conference has focused on topics, such as: Advanced ICT and disasters, Big Data and disasters, Climate change and disaster risk, Communications in disasters, Crowdsourcing and emergency management, Disaster information processing, Disaster prevention and mitigation, Disaster relief, resilience and research, Disaster risk management capability assessment, Emergency preparedness, Hazard, vulnerability and risk mapping, ICT challenges in emergency management, Disaster monitoring, Disaster risk assessment, Security and privacy issues in disaster management, Simulation and gaming for disaster management, Socio-economic impacts of disasters, etc.

The Program Committee received 48 paper submissions, out of which 18 research papers were finally accepted and presented at the conference. The ITDRR-2017 Proceedings will be published by Springer.

Disaster Training through International Cooperation

SRCDRR members took part in the ***2017 International Training Workshop on Natural Disaster Reduction on Regional and Local Best Practices of Post-Disaster Recovery: Building Sustainability and Resilience through Scientific Approaches***, 17- 21, July, 2017, Taipei, Taiwan, organized by the National Science and Technology for Disaster Reduction (NCDR). NCDR is also a GADRI member.

New R&D project

SCRDRR has started a R&D university project titled: "***Research on the Applicability of Virtual Reality in Education and Training***", with a 2017-2019 period. Special focus of the project is investigating the VR application for personnel training in disaster preparedness and relief operations.

China

Prof. Jiquan Zhang
Director

Natural Disaster Research Institute
Northeast Normal University of China

http://ndri.nenu.edu.cn/

The year 2017 has been filled with results and the following provides a few of the highlights:

1. The Study on Risk Assessment, Early Warning and Emergency Decision-making Support Technology of Grassland Fire Disaster. Second-class award of progress prize in scientific and collective technology for Jilin province. 2017.8. Department of Science and Technology of Jilin province.
2. National Natural Science Foundation of China NSFC ：Study on dynamic assessment for integrated disaster risk of multi-agro-meteorological hazards: Case study of mid-west maize-growing region in Jilin Province. Project duration is from January 2017 to December 2019.
3. Key Scientific and Technological Research and Development Projects of Science and Technology Development Plan for Jilin province: The Study on Risk Assessment, Early Warning Technology and Application of the Collapse and Landslide Geological Disaster Triggered by the Eruption of Changbai Mountain. Project duration January 2017 to December 2020.
4. Key Scientific and Technological Research and Development Projects of Science and Technology Development Plan for Jilin province: The Study on Formation Mechanism and Prediction Method of Extreme Rainstorm, Blizzard under the Complex Terrain of Changbai Mountains. Project duration January 2017 to December 2020.
5. Held the Academic Conference of National Agricultural Disaster Risk Theory and Application in Changchun City, Jilin Province from 15 to 17 September 2017.
6. Over 50 academic papers related to disasters were published in high-level international academic journals.
7. Invited 4 experts in the field of disaster from the United States and other countries to conduct academic exchanges and cooperative research.

Academic Conference of National Agricultural Disaster Risk Theory and Application in 2017

Prof. Pingping Luo
School of Environmental Science and Engineering (SESE)

School of Environmental Science and Engineering (SESE) Chang'an University

http://esec.chd.edu.cn/index.htm

School of Environmental Science and Engineering (SESE), Chang'an University focus on the research fields of water conservancy as well as environmental science and engineering. The SESE has undertaken more than 4 research projects of Chinese Natural Science Foundation project, 8 projects provided by Natural Science Foundation of Shaanxi Province for 2017.

The 2017 annual research funding is about 22 million RMB. SESE outputs include publication of 97 SCI academic papers in 2017. SESE held two international conferences which are "International Scientific Symposium on Water Resources Management and Comprehensive Reclamation of River Basins, Nanjing, China, 17-19 November 2017" and "The invitation of International Workshop on Constructed Wetland-Microbial Fuel Cell (IWonCW-MFC2017), Xi'an, China, July 5-7, 2017", and one international workshops which was on "2017 International Workshop for Sustainable Water and Environment Management", November 21, 2017, Xi'an, China. More than thirty international researchers were invited to visit our school for international communication and invited more than fifty internal researchers for research cooperation and communication. Our school has appointed five guest professors such as Kaoru Takara, Kyoto University, Japan), Samuel Geoffrey Schladow (UC Davis), Satoru OISHI（KOBE University, Japan), Van-Thanh-Van NGUYEN（McGill University, Canada). Our school welcomed the international researchers to promote the SESE college undertaking an important place for sustainable water resource management, disaster prevention, and environmental protection. SESE college have the plan to carry the international communication with the famous university and organization from all the word. We have several international communication projects and talent scholarships which encourage the famous professor and research team as well as the younger researcher to do the research and communication actives in Chang'an University. Our college will assist the global researchers to apply some jointed research grants and talent scholarships, and carry the jointed research in Chinese study area. Let's do our best to help the global society becoming more and more safety and sustainable.

International Scientific Symposium on Water Resources Management and Comprehensive Reclamation of River Basins, Nanjing, China

Prof. Felipe Muñoz Giraldo
Department of Chemical Engineering

Department of Chemical Engineering
Universidad de los Andes

http://www.ufcg.edu.br/

Prof. Felipe Muñoz Giraldo, Department of Chemical Engineering, Universidad de los Andes, completed a semester of independent academic work (STAI) as Visiting Research Professor in Disaster Reduction Systems Research Center of the Institute for the Prevention of Disasters from Kyoto University in Japan in 2017. He was engaged in advising students of masters and doctorates in related topics in Natech, his main area of research. During his stay in Kyoto, Professor Muñoz, was part of the Scientific Committee of a workshop in order to perform a practical demonstration of some tools available for Natech risk assessment, risk mitigation and planning of emergency operations for various types of natural threats.

Another major event in 2017, was a Japanese commission composed of Professor Ana María Cruz (Kyoto University), Professor Shin-ichi Aoki (Kyoto University), doctoral student María Camila Suárez (Kyoto University) and Dr. Syamsidic (Tsunami and Disaster Mitigation Research Center - TDMRC) in conjunction with Professor Felipe Muñoz Giraldo (University of the Andes) and within the framework of the project "INTER-Asian initiative on joint NAtural and TECHnological (Natech) risk reduction at industrial estates" carried out visits techniques to different industrial plants in Colombia, in order to advise different private and public entities on Natech risks to those who are vulnerable in order to take the appropriate preventive measures to mitigate the possible consequences in case of a natural event. Visits were made to process plants both in central areas and in coastal areas, finding great findings with opportunities for improvement. Within the scope of the visits, advice was provided on Natech risk taking into account that the Colombian government is currently in the process of joining the OECD.

Finally, the Universidad de los Andes (Uniandes) (member of GADRI) proposed a model to evaluate the probabilities of landslide and pipeline failure due to landslides, as well as a vulnerability assessment methodology for storage tanks subject to flooding, winds, tidal waves and earthquakes (Alvaro -Franco et al., 2017; Ramirez et al., 2018).

Visiting various plants in Colombia— photo provided by Camila Suarez

Dr. Ahmed Sefelnasr

Department of Geology
Assiut University

http://www.aun.edu.eg/

The Ninth International Conference on the Geology of Africa (ICGA 2017) was held at Assiut University, Egypt.

The Geology Department of Assiut University invited scientists to gather in the capital of Upper Egypt for the Ninth International Conference on the Geology of Africa (ICGA 2017).

This conference was the premier forum for presentation of new advances and research results in the fields of theoretical, experimental, and applied geological and environmental sciences. The "ICGA" is a biennial event which has been taking place since 1999 for eight times in Assiut, Egypt; bringing together leading researchers, scientists and engineers in the domain of interest from around the world. The next version of this conference will take place in November 2019. Conference Website: www.aun.edu.eg/conferences/9goa/

Topics of interest for submission included, but not limited to the following:

- Environmental Geology and Hazards.
- Hydrogeology and Water Management.
- Petroleum Geology and Mineral Resources.
- Structural Geology and Tectonics.
- Sedimentology, Stratigraphy and Paleontology.
- Remote Sensing, Engineering Geology and GIS.
- Igneous, Metamorphic Petrology and Geochemistry.
- Exploration Geophysics.
- Geoparks and Geoheritage in Africa.
- Geoarcheology and Geotourism.

Dr. Nicolas Taillefer
Head, Seismic and Volcanic Risks Division

French Geological Survey (BRGM)

http://www.brgm.eu/

BRGM teams achieved two major research projects concerning risk reduction. In the SAMCO project, a set of methodological tools was developed in order to better take into account multiple natural hazard in mountainous area and develop resilience strategies. The TANDEM (coordination CEA) project studied impacts of tsunamis in the Atlantic and English Channel.

BRGM took part in a real-scale preparation exercise in the Caribbean Islands (RICHTER Caraïbe), which involved civil France's protection teams, local authorities and partners from different countries of Europe. The exercise simulated a major earthquake followed by a tsunami, which would have hit both Guadeloupe and Martinique Islands. The SPICY project developed preparation procedure and exercise for cyclones in La Reunion, a French Island located in the Indian ocean. During the Irma cyclone crisis, BRGM offered technical and scientific support to the emergency operations in the Caribbean's French Islands.

Seismic team also realized studies aiming at reducing risks in Haiti. One concerned the preservation of the heritage buildings of La Citadelle and Milot Palace, another one proposed retrofitting strategies for three high schools in northern Haiti. BRGM realized technical studies to assist Haitian local authorities of two major urban areas for developing operational multi-hazard, risk reduction action plans, combining prescriptions for landslide, earthquake, inundation, cyclones and storm surges.

Seismic measures on Milot Heritage sites, Haiti

Germany

Prof. Ortwin Renn
Scientific Director

Institute for Advanced Sustainability Studies (IASS)

https://www.iass-potsdam.de/en/institute

Outstanding Research Award of the International Society for Integrated Disaster and Risk Management (IDRiM) 2017, Reykjavik, Iceland

The Outstanding Research Award has been granted to Prof. Ortwin Renn for his accomplishments in interdisciplinary research on risk governance with emphasis on integrating technical and social aspects of risk. The award was specifically related to his basic research on the nature of systemic risks and their characteristics. In addition, the award acknowledges the major insights of his empirical research on risk perception and risk communication. Finally, Prof. Renn's involvement in the International Risk Governance Council and the development of the Risk Governance Framework that he developed for this Council was mentioned as a major step forward to making risk analysis a part of international risk governance.

Prof. Michael Kunz
CEDIM Spokesman

Center for Disaster Management and Risk Reduction Technology (CEDIM)

https://www.cedim.kit.edu/english/

The **Center for Disaster Management and Risk Reduction Technology (CEDIM)** is an interdisciplinary research center in the field of disaster and resilience research. The interdisciplinary approach of CEDIM enables to examine and to assess the entire process chain from causes to hazard to risk, and to the impact on society and environment. By synergistically combining competences from different disciplines, CEDIM develops new models and concepts for novel solutions in the fields of natural disasters, hazards and resilience.

Within the current research focus on **near-real time Forensic Disaster Analysis (FDA)**, CEDIM adopts the IRDR concept of Forensic Disaster Analysis (FORIN) by incorporating a real-time component to the assessment and evaluation process. The overall aims are to investigate the dynamics and interrelations of disasters, to identify major risk drivers, to estimate the impact as quickly as possible, and to infer implications for disaster mitigation. Direct damage assessment, for example, include information from CATDAT, the world's largest natural disaster database with more than 60,000 records created and developed by CEDIM employees over recent years. Within the framework of an FDA activity, CEDIM prepares and publishes reports with different focus points. In 2017, CEDIM produced FDA reports for the hurricanes Harvey and Irma in August and September, which caused substantial damage in the Caribbean and in the US in the order of $ 192 bn according to our estimation. CEDIM's scientifically-based loss estimations were published only a few hours / days after the catastrophes.

Furthermore, close cooperation with the insurance industry enables to put CEDIM's expertise on disaster and risk into practice. Highlights of 2017 include the finalized hail and flood risk models that are now used operationally by one of the world's largest direct insurer. One of the flagship projects of Willis Tower Watson, the world's largest insurance broker, is CEDIM's hail modeling for Europe and Australia. Another highlight in 2017 was the development of a global risk index for wine regions regarding different hazard types (cold spells, frost, hail, earthquake, fire).

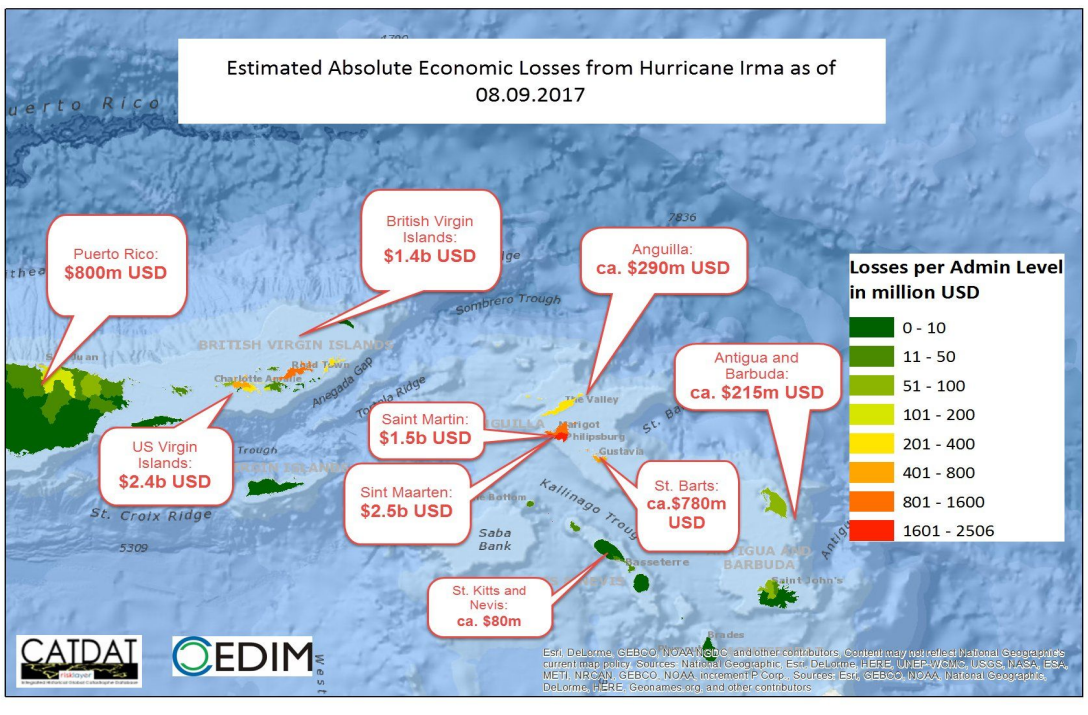


Fig: Damage caused by hurricane Irma in the Caribbean in billion US$. (Image: James Daniell; CEDIM/KIT)

Dr. Richard W. Nartey Yeboah
Director

University for Development Studies (UDS)

http://www.uds.edu.gh/ktcsr

2017 was a busy and a productive year for the University for Development Studies with one of the highlights being the inauguration of the Kazuhiko Takeuchi Centre for Sustainability and Resilience (KTCSR) in March within the University in Tamale as a research, development and extension centre for issues of sustainability and resilience in the context of climate and ecosystem change.

The Centre was named after Prof. Kazuhiko Takeuchi, the Principal Investigator through whose effort a joint research team of Japanese and Ghanaians successfully executed the Climate and Ecosystem Change and Adaption Research (CECAR-Africa) Project. The Centre is headed by Dr. Richard W. N. Yeboah and a Deputy Director Dr. Godfred Jasaw.

The Centre has since continued with dissemination engagements with various stakeholders on strategies for enhancing resilience against climate and ecosystem changes in Africa through workshops and peer review journal article publications:

In collaboration with United Nations University Institute for Natural Resources in Africa UNU-INRA, we have secured a 3-year funding from USAID to carry out joint research with Hophoubouny University in Cote D'ivoire on Fresco Coastal landscapes under the West Africa Biodiversity and Climate Change Project (WA BiCC).

The Centre has secured support from the UNDP adaptation fund to collaborate with an NGO, ProNET North in upscaling the adoption of locally constructed improved mud cookstove by shea butter and food processors across the three northern Regions of Ghana.

KTCSR have been invited to participate in the Economics of Land Degradation (ELD) -Initiative Ghana Kick-off Workshop under the umbrella of the EU funded Project "Reversing Land Degradation in Africa through Scaling-up '**EverGreen Agriculture'**.

Inauguration of Kazuhiko Takeuchi Centre for Sustainability and Resilience (KTCSR) by Japanese Ambassador to Ghana

India

Prof. B. K. Maheshwari
Director

Centre of Excellence in Disaster Mitigation & Management, Indian Institute of Technology, Roorkee

https://www.iitr.ac.in/

CoEDMM members engaged in following activities:

- Prof. B.K. Maheshwari attended a meeting as a member of CED39 (Earthquake Engineering Section) of Bureau of Indian Standards (BIS) at New Delhi on February 27, 2017
- Dr. Sudip Roy awarded by the Early Career Research Award from SERB, DST, Government of India.
- Dr. B.K. Maheshwari delivered a presentation entitled "Dynamic Properties of Solani Sand at Small Strains using Resonant Column Apparatus" in 16th World Conference on Earthquake Engineering (16WCEE) held in Santiago, Chile during Jan. 09-13, 2017.
- Dr. B.K. Maheshwari attended a meeting as a member of CED39 (Earthquake Engineering Section) of Bureau of Indian Standards (BIS) at New Delhi on February 27, 2017.
- Dr. M. L. Sharma presented a paper on stochastic simulation of strong ground motions for western Himalaya region, Neha Kumari, M. L. Sharma and I. D. Gupta at 16WCEE, Santiago, Chile, Jan 09-13, 2017.
- Dr. M. L. Sharma represented as National Delegate from India in Executive committee meeting of International Association of Earthquake Engineering in Santiago, Chile, Jan 09-14, 2017.
- Dr. M. L. Sharma presented Technical talk on Trends in Uttarakhand and its implications in future seismicity, in Workshop on Earthquake Risk Management, Disaster Mitigation and Management Centre, Department of Disaster Management, Government of Uttarakhand, Dehradun, Jan 20, 2017.
- Dr. M. L. Sharma chaired a session TS 6: Emergency action plan for dams towards disaster resilience, Third National Dam Safety Conference, February,18 – 19, 2017, organized by CWC, UJVNL and IITR, MAC Auditorium, Roorkee.
- Dr. B.K. Maheshwari invited to deliver a **Key Note Lecture** entitled "Disaster Management in India and Characterization for Geohazards" in Third Indo-Japan Workshop on "Geotechnics for Natural Disaster Mitigation and Management" held at IIT Guwhati on Dec. 13, 2017.

Projects :

- To Check Feasibility for Installation of Lift at LBSNAA Mussoorie. Sponsored by CPWD Mussoorie
- Repair and Retrofit of Foundation at LBSNAA Mussoorie, Sponsored by CPWD Mussoorie
- Peer Review of the Report on Vibration Control, Sponsored by ISRO, Bangalore
- Vulnerability and risk analysis of geohazards in Himalayan Region, sponsored by ISRO, Ahmedabad
- Establishment of Earthquake Early Warning System, Sponsored by USDMA, Dehradun

Project: Establishment of Earthquake Early Warning System, Sponsored by USDMA, Dehradun

Dr. Wahyu Wilopo
Associate Professor

Center for Disaster Mitigation and Technological Innovation (GAMA-InaTEK) Gadjah Mada University

http://gama-inatek.ugm.ac.id/

The Center for Disaster Mitigation and Technological Innovation (GAMA -InaTEK), Gadjah Mada University, Indonesia- Faculty of Engineering Gadjah Mada University has been succeeded to earn an award as World Center of Excellence in Landslide Disaster Risk Reduction which was given by UNESCO and United Nations International Strategy on Disaster Risk Reduction (UN-ISDR) in World Landslide Forum 4 in Ljubljana, Slovenia, on May 30, 2017.

This award is the third time received by UGM since 2011. This award was first obtained in 2011-2014, then 2014-2017 and 2017-2020. GAMA-InaTek also work together with National Standardization Agency of the Republic of Indonesia (BSN) and National Authority for Disaster Management (BNPB) to propose ISO Guidelines for implementation of a community-based landslide early warning system since 2 year ago and this year was approval by all the members.

In addition, in this year also Gama-InaTek was selected by Ministry of Research, Technology and Higher Education of the Republic of Indonesia become on of Center of Excellent in the Science and Technology in Indonesia. There were many other activities undertaken by the institute.

Visit our website to obtain further information.

The International Programme on Landslides (IPL)
Global Promotion Committee

THIS IS TO CERTIFY THAT

University of Gadjah Mada, Indonesia

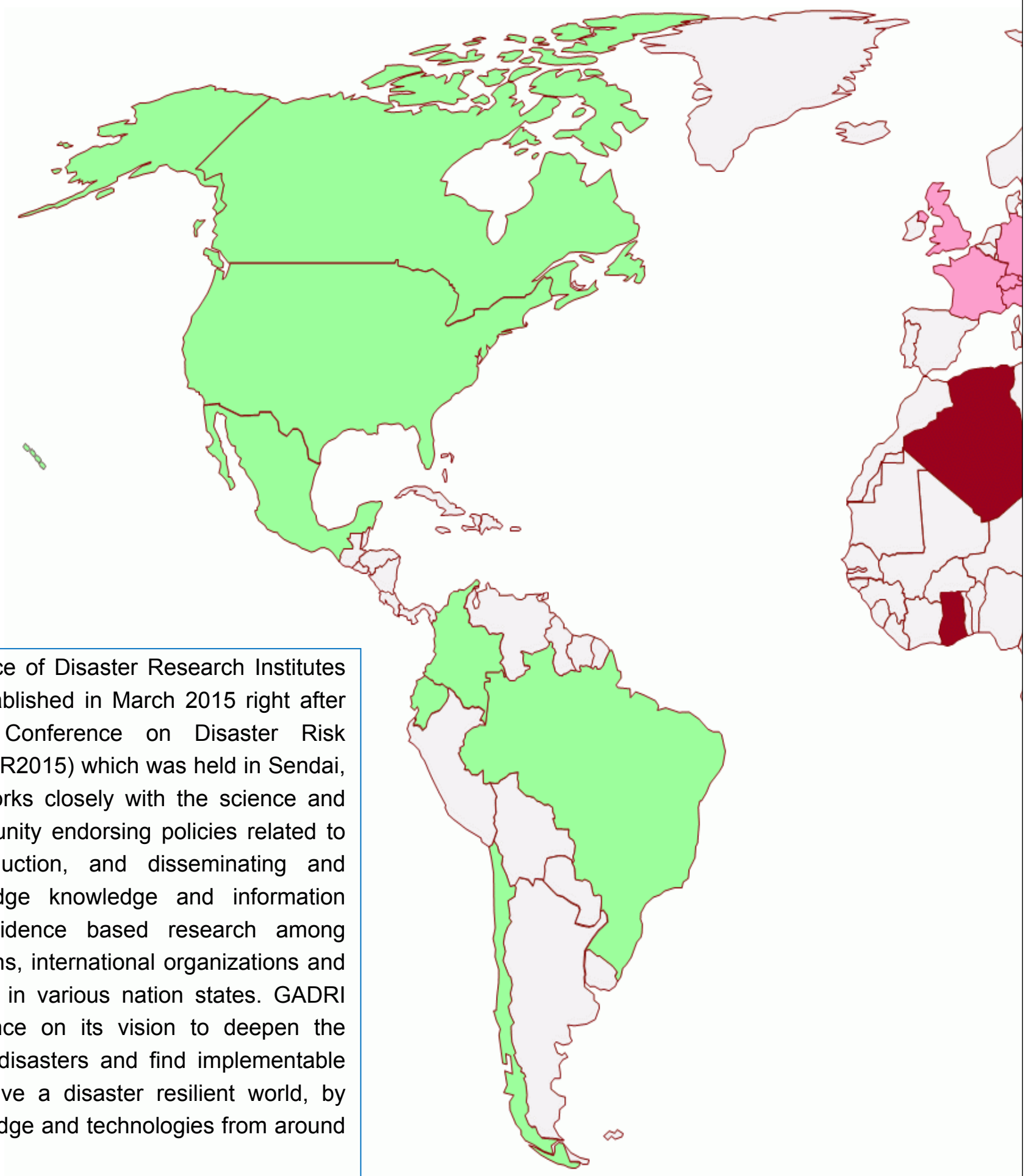
HAS BEEN APPROVED AND ENTITLED TO USE THE TITLE

WORLD CENTRE OF EXCELLENCE ON LANDSLIDE DISASTER REDUCTION
2017 - 2020

AT THE FOURTH WORLD LANDSLIDE FORUM IN LJUBLJANA, SLOVENIA
THIS TWENTY NINTH DAY OF MAY 2017

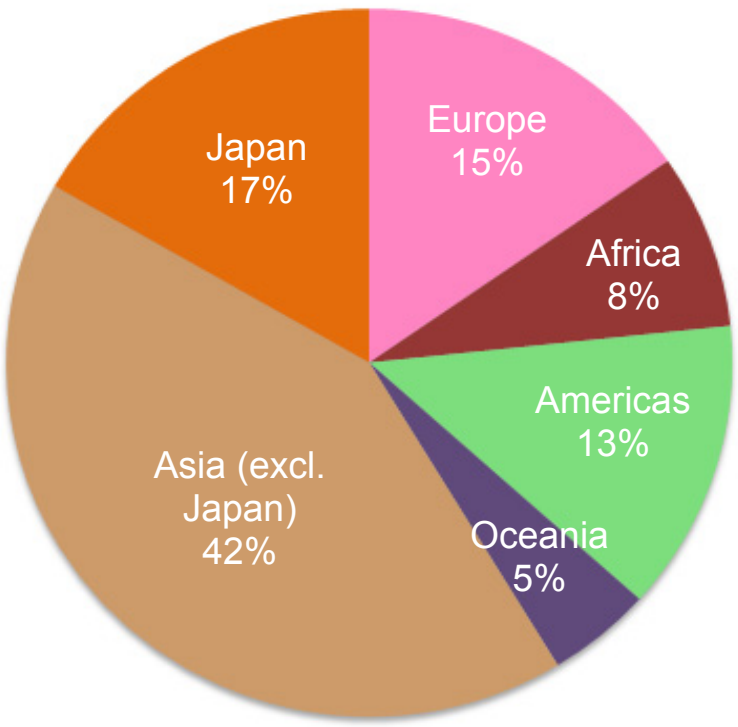
Qunli Han, Chairperson of the IPL-GPC

Global Representation of GADRI

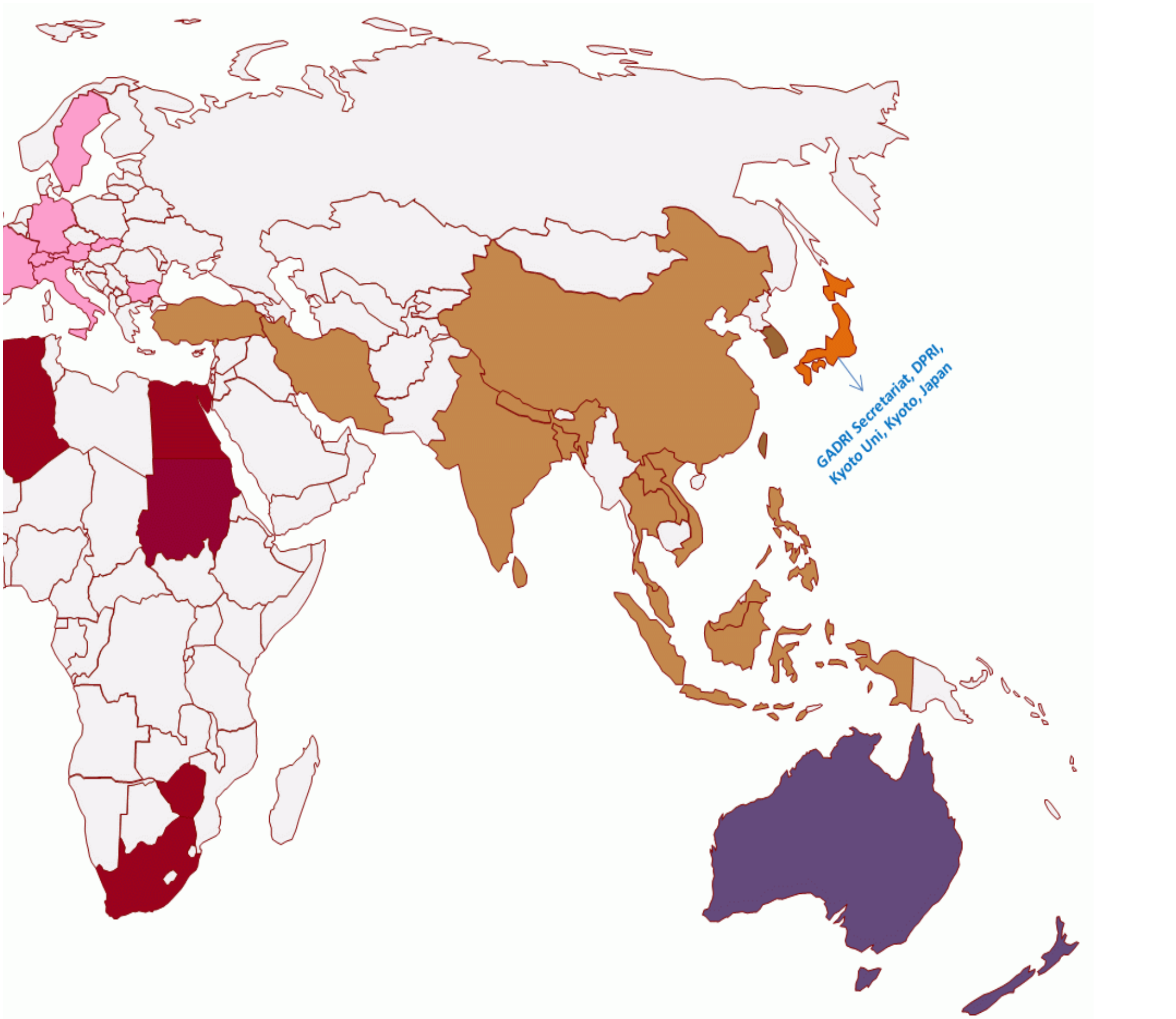


The Global Alliance of Disaster Research Institutes (GADRI) was established in March 2015 right after the UN World Conference on Disaster Risk Reduction (WCDRR2015) which was held in Sendai, Japan. GADRI works closely with the science and technology community endorsing policies related to disaster risk reduction, and disseminating and sharing cutting-edge knowledge and information supported by evidence based research among research institutions, international organizations and the private sector in various nation states. GADRI takes a firm stance on its vision to deepen the understanding of disasters and find implementable solutions to achieve a disaster resilient world, by integrating knowledge and technologies from around the world.

Area	Members
Europe	23
Africa	12
Americas	20
Oceania	7
Asia (excl. Japan)	63
Japan	25
TOTAL	150 (40 States)



Members as of 31 December 2017



GADRI Membership

GADRI membership is open to research institutes with an aim to contribute to science and technology and promotion of disaster risk research and resilience to disasters. Currently, GADRI membership is free of charge and non-binding. As of 31 December 2017, around 150 research institutes have expressed interest to join GADRI.

GADRI Secretariat

GADRI is hosted by the Disaster Prevention Research Institute (DPRI), Kyoto University, Uji Campus, Kyoto, Japan.

Italy

Dr. Tom de Groeve
Deputy Head
Disaster Risk Management Unit

European Commission
Joint Research Centre (JRC)

https://ec.europa.eu/jrc/en

A major achievement of 2017 is the publication of the report 'Science for Disaster Risk Management 2017: knowing more and losing less', a flagship product of the European Commission's Disaster Risk Management Knowledge Centre (DRMKC). The report presents the state-of-the-art in science for disaster risk management, and was authored by over 120 scientists. It contributes to UN efforts to strengthen prevention, preparedness and response to calamities and it is also a key part of the Science and Technology Roadmap of the Sendai Framework for Disaster Risk Reduction. The report was launched at the UN Global Platform for Disaster Risk Reduction in Cancun and has since been widely disseminated, including as a syllabus for academic programmes. The DRMKC started a 3-year process to publish a second flagship report focused on science-based solutions for disaster risk reduction.

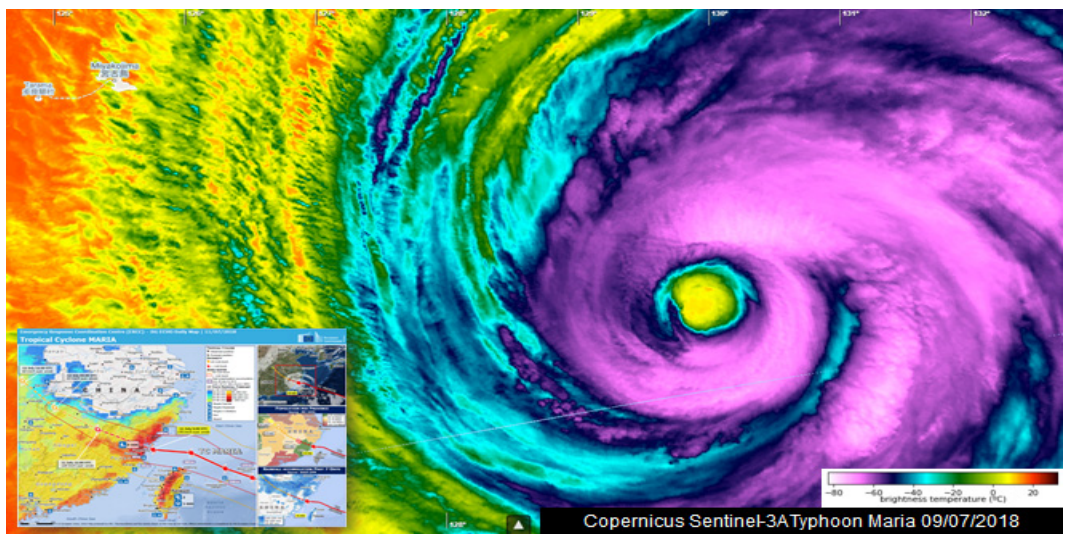
To support the expanded scope of the Sendai Framework to new hazards, the JRC stepped up its research on Natech disasters (with the release of the RAPID-N platform for natural-hazard induced technological disasters) and is doing exploratory research on risk and impact of biological hazards. Mature risk indicators are integrated in the INFORM risk index, which follows an all-hazard approach to risk. It also includes results from the Global Conflict Risk Index, a statistical tool to assess the likelihood of violent conflicts.

In 2017, the Disaster Risk Management Unit of the European Commission Joint Research Centre (JRC) published 41peer reviewed articles and books, with high profile publications on future impacts of extreme events under climate change scenarios. This research supports EU policies on disaster prevention and climate change adaptation.

2017 was a record year for disasters in Europe, notably for wildfires and cyclones. The Disaster Risk Management Unit provided real-time monitoring and forecasting information on hazards and their impacts to EU and national authorities through its improved Global Disaster Alert and Coordination System, Global Wildfire Information System, Global Flood Awareness System and Global Drought Observatory. These systems are continuously improved with the latest research in collaboration with global networks and initiatives (JRC co-leads three GEO initiatives), and most are run operationally under the Copernicus Emergency Management Service (EMS). The Copernicus EMS mapping service, managed at JRC, was activated a record 81 times to produce post-disaster impact maps and risk & recovery maps.

In our European Crisis Management Laboratory, we continued to develop technology for crisis rooms, field-headquarter communication, and sensor networks. For the latter, JRC expanded its network of low-cost sea-level gauges to 30 devices installed in 7 Mediterranean countries, greatly improving the real-time data availability for the regional tsunami monitoring systems.

Finally, the Unit's work on global human settlements resulted in the launch of the 2017 Human Planet Atlas, showing for the first time the increase in human and building exposure to disasters based on globally consistent data from satellites. The release in 2017 of the Global Human Settlement Layer as open data was a major achievement of the JRC.



JRC's Disaster Risk Management Knowledge Centre provides science advice during emergencies through its suite of monitoring and early warning tools. The image shows Typhoon Maria, approaching the Japanese islands of Miyakojima and Tarama, before causing severe flooding in Fujian, China and damage of 410m€. Inset: Situation Map produced by JRC for the Emergency Response Coordination Centre, distributed to Member States and available online.

Italy

Prof. Nicola Casagli

Department of Earth Sciences
University of Florence

https://www.dst.unifi.it/

The World Centre of Excellence on Landslide Risk Reduction (WCoE) for Earth observation advanced technologies for landslide monitoring, management and mitigation. Awarded by IPL (International Programme on Landslides) Global Promotion Committee to The Earth Sciences Department of the University of Florence (confirmed in 2017)

Centre of Competence of the National Civil Protection Service Presidency of the Council of Ministers - Department of Civil Protection. Awarded by Decree of the Head of the Italian National Civil Protection Department (confirmed in 2017)

Recognition to the Research Group for the activities carried out for the Rigopiano avalanche emergency by the President of the Italian Republic (2017)

Establishment of the UNESCO Chair Prevention and sustainable management of geo- hydrological hazards at the University of Florence (2016-2020)

Project: International Programme on Landslides (IPL) - PS continuous streaming for landslide monitoring and mapping (2017-2018)

Project: EC ECHO - SAFETY: Sentinel for geohazards regional monitoring and forecasting (2016-2017)

Project: EC H2020 - RESOLUTE - Resilience management guidelines and operationalization applied to urban transport environment (2015-2017)

Prof. Casagli receiving the Award of World Centre of Excellence on Landslide Risk Reduction

Japan

Prof. Toshio Koike
Director

International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM)

http://www.icharm.pwri.go.jp/

International Centre for Water Hazard and Risk Management (ICHARM) under the auspices of UNESCO was established as a UNESCO category II center and a part of the Public Works Research Institute of Japan on 6th March, 2006.

The mission is to serve as the Global Centre of Excellence for Water Hazard and Risk Management by observing and analyzing natural and social phenomena, developing methodologies and tools, building capacities, creating knowledge networks, and disseminating lessons and information in order to help governments and all stakeholders manage risks of water related hazards at global, national, and community levels.

To achieve the mission, ICHARM has conducted various activities based on its three pillars, i) innovative research, ii) effective capacity building, and iii) efficient information networking, including following special topics;

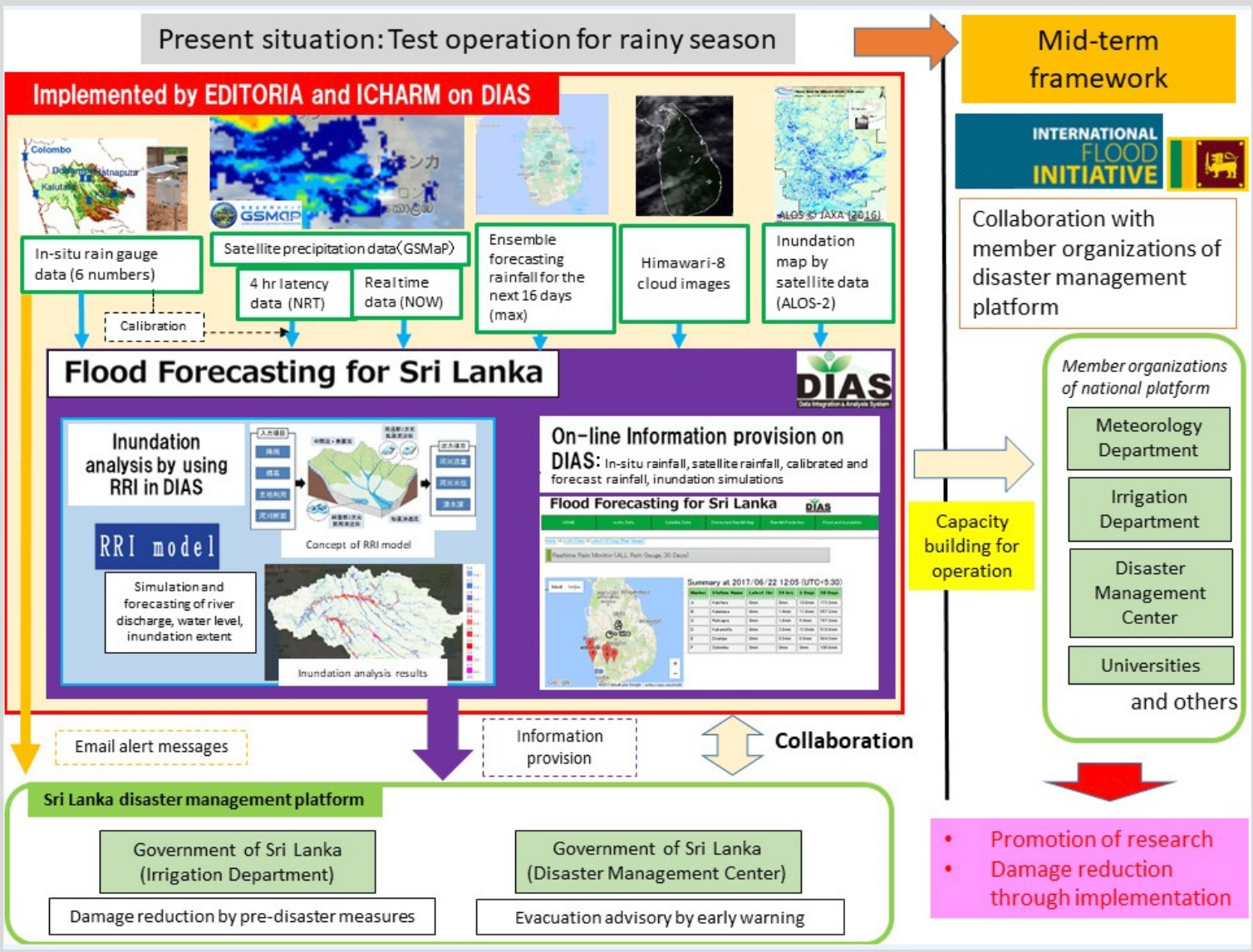
i) Innovative research

After severe flood disaster in Sri Lanka in May 2017, the Earth Observation Data Integration & Fusion Research Initiative (EDITORIA) and ICHARM started providing real-time flood forecasts and other information for Sri Lanka on a trial basis. EDITORIA offered an advanced data processing system called DIAS while ICHARM offered expertise in flood monitoring and forecasting. To support Sri Lanka, ICHARM developed an online system on DIAS that collects hourly ground rainfall data from Sri Lanka, performs rainfall forecasting using the collected data, and delivers the results automatically.

ii) Effective capacity building

ICHARM provides a one-year M.Sc. program as a joint effort with JICA and GRIPS. This program is targeted at officials of administrative organizations and designed for them to obtain master's degree within a single year. In September 2017, the tenth batch of 10 students from eight countries graduated, and in the following month, the eleventh batch of 14 students entered the program from 10 countries.

Graduation Ceremony (3 doctoral course students and 13 Master's course students)



Outline of Support for Sri Lanka

And ICHARM also provides a doctoral program in collaboration with GRIPS to produce experts who are capable of making policies on water-related disaster risk management and taking the leadership in implementing them. In October 2017, one student from Bangladesh joined as the eighth batch.

iii) Efficient information networking

The International Flood Initiative (IFI) is a worldwide framework to promote collaboration in flood management among international organizations such as UNESCO, WMO, UNU and UNISDR. As the IFI secretariat, ICHARM proposed the basic action plan of IFI, which was adopted as the Jakarta Statement. In July 2017, ICHARM co-chaired the Special Session on Science and Technology held in the 3rd UN Special Thematic Session on Water and Disasters. The session discussed a broad range of issues including the IFI framework for establishing a Platform on Water and Disaster. ICHARM has been involved in the establishment of a Platform on Water and Disaster in the Philippines, Myanmar, Pakistan and Sri Lanka.

The 3rd Asia-Pacific Water Summit was held on December in Yangon. ICHARM co-hosted a session with ICIMOD, SPC and HELP. The session was a unique platform for the high-level leaders and representatives of Asia-Pacific states to discuss water-related disasters and environmental risks, explore common challenges and solutions, and collaborate on the development of effective frameworks for action.

Prof. Koike Co-Chaired and Co-hosted the Third Asia-Pacific Water Summit

Prof. Takayuki Okubo
Director

Institute of Disaster Mitigation for Urban Cultural Heritage (R-DMUCH) Ritsumeikan University

http://www.r-dmuch.jp/en/

The UNESCO Chair Programme on Cultural Heritage and Risk Management - 12th INTERNATIONAL TRAINING COURSE (ITC) on DISASTER RISK MANAGEMENT of CULTURAL HERITAGE 2017 was held for 3weeks from 29 August to 16 September 2017 with 11 participants from Bhutan, Philippines, Turkey, Malawi, Malaysia, Brazil, Laos, India, France, Italy and Myanmar. Participants were managers of cultural heritage sites, disaster risk management experts, decision makers and government officials involved in cultural heritage conservation or disaster management.


Exercise for Emergency Response at Kyoto Museum

This year the ITC focused on the theme “Towards Integrated Protection of Immovable and Movable Cultural Heritage from Disasters”. During the course, the trainees have deepened an understanding of not only various aspects of disaster risk management of cultural heritage in Japan, but also the distinctive issues and the previous lessons which involved in the field of cultural heritage conservation and the disaster risk management in the world. All the lectures, site visits, exercises and workshops were performed by the worldwide experts. In addition, they learned about the flood disaster occurred in the Kumano which is listed on the UNESCO World Heritage List and the reconstruction effort, also a long-term recovery process in Kobe area from the Great Hanshin-Awaji (Kobe) Earthquake in 1995.
From 2018, Ritsumeikan University will start to cooperate with the Japanese National Institutes for Cultural Heritage (NICH) whereby providing trainees an opportunity to study risk management for both immovable and movable cultural heritage affected by disasters in Japan and comprehensive countermeasures and approaches.


Site visit to Kiyomizu-dera World Heritage site

On the final day, the International Symposium “Working Internationally toward the Integrated Protection of Cultural Heritage from Disasters” was held and approximately 75 international experts and audiences participated. We discussed potential roles of disaster risk management for cultural heritage from the global perspective, based on the experience and acknowledges which have been obtained from the past disasters. Three representative trainees presented their relevant efforts to disaster risk management for cultural heritage in their countries.

The training course was organized in cooperation with the UNESCO, ICCROM, ICOM, ICOMOS/ ICORP and relevant institutions of the government of Japan. We will continue this outreach activities and dissemination of our research outcomes to the international society.

Call for applications for the ITC2018 will be announced at our website:

http://www.r-dmuch.jp/en/project/itc.html

Prof. Kazushige Obara
Director

Earthquake Research Institute (ERI)
The University of Tokyo

http://www.eri.u-tokyo.ac.jp/

In 2017, the Collaborative Research Organization for Historical Materials on Earthquakes and Volcanoes was established as a collaboration between the Earthquake Research Institute and the Historiographical Institute at the University of Tokyo. In this interdisciplinary organization, historians and seismologists work together to develop a scientific database that can provide long-term information about seismic and volcanic activities in Japan by compiling and analyzing historical materials. This historical data is essential for long-term forecasts of future seismic and volcanic hazards. Kenji Satake takes a role as the director of this organization with 10 staff from both institutes. One of the important activities is to open the database for historical earthquakes and tsunamis in Japan.

Science of slow earthquakes lead by Kazushige Obara is a 5-year project (2016-2020) funded as Japan Society for the Promotion of Science, Grant-in-Aid for Scientific Research on Innovative Areas. It will shed light on the mystery of “slow earthquakes”, which have been detected in succession in recent years. This will require an approach integrating the conventional fields of geophysics, seismology, and geodesy with materials science and non-equilibrium statistical physics, among others. By explaining the mechanisms, environmental conditions and principles of slow earthquakes, our goal is to accelerate a unified understanding of all earthquake events, from low-speed deformation to high-speed slip, and at the same time, to rebuild the way research is conducted on earthquakes.

Seismic wavefield imaging of long-period ground motion in the Tokyo metropolitan area, Japan: Long-period ground motions due to large earthquakes can cause devastating disasters, especially in urbanized areas located on sedimentary basins. To assess and mitigate such damage, it is essential to rapidly evaluate seismic hazards for infrastructures, which can be simulated by seismic response analyses that use waveforms at the base of each infrastructure as an input ground motion. Masayuki Kano et al. (2017) reconstructs the seismic wavefield in the Tokyo metropolitan area located on the Kanto sedimentary basin, Japan, from seismograms of the Metropolitan Seismic Observation network. The simulated wavefield fully explains the observed waveforms in the frequency band of 0.10–0.20 Hz. Inputting the reconstructed wavefield into seismic response analyses, rapid assessment of the overall damage to infrastructures will be made possible immediately after a large earthquake.

‘Namazu-picture’, a god with a stone trying to stop the earthquake generated by a catfish.

Earthquake Research Institute, The University of Tokyo, with permission.

Malaysia

Prof. Dr. Mohd Raihan Taha
Director

Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) at the Institute for Environment and Development (LESTARI)

Universiti Kebangsaan Malaysia

http://www.ukm.my/seadpri/

The year 2017 saw the launch of the Malaysia Window to Cambridge (MW2C@UKM), which is the culmination of a collaboration initiated in 2012 that led to the signing of a collaboration agreement between Universiti Kebangsaan Malaysia and the Cambridge Malaysian Education and Development Trust (CMEDT), in association with the Malaysian Commonwealth Studies Centre (MCSC) on 19 November 2013.The collaboration resulted in establishment of the Asian Network for Climate Science and Technology (ANCST). Following on, the MW2C@UKM was put into place where the main objective is capacity-building in areas related to atmospheric science and climate change in Malaysia and the region, to help strengthen the expertise required for future disaster prevention. The MW2C@UKM will also facilitate junior staffs and student exchanges to enhance awareness and strengthen ties between the University of Cambridge and UKM. It also serves as a gateway to Cambridge for scientists from Malaysia and Asia. The MW2C@UKM is jointly administered by SEADPRI-UKM and the Asian Network on Climate Science and Technology (ANCST) with support from the MCSC and CMEDT.

SEADPRI-UKM embarked on a research project involving teams from Malaysia and the United Kingdom, awarded under the Newton-Ungku Omar Fund, administered by Innovate UK and the Malaysian Industry-Government Group for High Technology (MIGHT). The project, Disaster Resilience Cities: Forecasting Local Level Climate Extremes and Physical Hazards for Kuala Lumpur focuses on ways to best adapt selected meteorological and hazard models to enable better forecasting of climate extremes and physical hazards in Kuala Lumpur. It will test their viability and integrate them on to a common multi-hazard platform designed for managing and communicating risks and enhancing disaster resilience, suited to local conditions and scale. From the United Kingdom, there are three research organizations (University of Cambridge; British Geological Survey; University College London) and three business partners (Cambridge Environmental Research Consultants, CERC; Cuesta Consulting, Cuesta; JBA Risk Management collaborating with Malaysian research organizations, i.e. SEADPRI-UKM; Universiti Malaya; Malaysian Meteorological Department; Mineral and Geoscience Department of Malaysia; Department of Environment Malaysia; and five business partners from Malaysia, all involved in this project seeking solutions to address the challenges of urbanization and climate change in Malaysia. Pilot studies will be conducted in Kuala Lumpur and adjacent areas to forecast flash floods, landslides, sink holes, strong winds, urban heat and air pollution at very detailed scales. The project encompasses an administrative component, which includes management, capacity building and outreach; and three technical phases focusing on areas that include meteorological forecasting, hazard modelling and multi-hazard forecasts. Each phase has specific work packages with structured project deliverables. Dissemination and outreach activities, such as capacity building and training of Malaysian partners and stakeholders in appropriate methods of risk communication and modelling results, will be carried out in parallel with and be an integral part of all aspects of the technical work.

UKM Pro-Chancellor Tun Ahmad Sarji at the MW2C@UKM launching ceremony

Prof. Irasema Alcántara-Ayala

Institute of Geography, National Autonomous University of Mexico (UNAM)

http://www.igeograf.unam.mx/geoigg/

The Institute of Geography, UNAM was quite active during the year 2017.

- Publication of the Atlas "Hillslope instability in Teziutlán, Puebla. Disaster Risk Drivers; a contribution undertaken from an interdisciplinary perspective in collaboration with communities, authorities, scientists and other relevant stakeholders; and the establishment of the University Seminar on Socio-environmental Risks (Sursa) led by the Institute of Geography, as a permanent activity of the National Autonomous University of Mexico (UNAM).
- Participation in the High-level panel discussion: Strengthening Intergovernmental Network and the International Programme on Landslides (IPL) for ISDR -ICL SENDAI PARTNERSHIPS 2015–2025 for global promotion of understanding and reducing landslide disaster risk, 4th World Landslide Forum, Ljubljana, Slovenia, 29 May to 2 June 2017. The institute was also awarded a status of World Centre of Excellence by same conference.
- In Japan, the institute participated in the Disaster Prevention and Resilient Society session of the Science and Technology in Society forum (STS forum), STS forum 14th Annual Meeting, October 1-3, 2017 in Kyoto; and co-Chaired a session on Priority 1 Understanding Risk at the Global Forum on Science and Technology for Disaster Resilience 2017, Science Council of Japan, Tokyo, 23rd - 25th November, 2017.

UNAM participation at ICL, Slovenia

Universidad Michoacana de San Nicolás de Hidalgo (University of Michoacán)

http://www.umich.mx/

Dr. Patricia de Jesús Alarcón Chaires

The Universidad Michoacana de San Nicolás de Hidalgo report on the following achievements:

Participation at the 3rd Global Summit of Research Institutes for Disaster Risk Reduction held in Kyoto, Japan and presentation of paper on “Large landslides in the past 10 years in México”; participation in the 2017 Global Platform for disasters risk reduction UN. Cancún, México and lecture on “Building resilience in Morelia, México”.

Evaluation of the structural damage behavior of masonry buildings, observed during the September 7, 2017 Chiapas earthquake, in Juchitan, Oaxaca, México. Most of these buildings (Approximately 10,000 buildings evaluated), were family dwellings, of one or two stories. Also Creating database through qgis technology for sectoral management information systems; structural damage behavior of masonry buildings, and landslides, observed during the September 19, 2017 Axochiapan, earthquake in Tetela del Volcán, Morelos, México; structural damage behavior of church masonry buildings, observed during the September 19, 2017 Axochiapan, earthquake in Puebla and Morelos (approximately 100 churches evaluated); and structural damage behavior of masonry buildings, observed during the September 8, 2017 Chiapas earthquake, in Juchitan, Oaxaca, México.

Structural damage in Juchitan, Oaxaca.

Dr. Kelvin Berryman
General Manager
Strategic Relationships

GNS Science
Te Pū Ao

https://www.gns.cri.nz/

The aftermath of the Mw7.8 Kaikoura earthquake has dominated GNS Science activity in natural hazards during 2017. Activities include advice for reconstruction and recovery, peer reviewed research publications, new funding to enhanced monitoring and warning actions especially for tsunami, and engagement with policy agencies tasked with disaster risk management and disaster risk reduction.

Some more details of these activities include:

Advice on restoration and construction standards for the reinstatement of the main transport lifelines (road and rail) in northeastern South Island considering future earthquake probabilities and erosion processes. These lifelines were re-opened in late 2016 after a year of severely disrupted transport network operations with major impacts on tourism, transfer of consumer goods, and agricultural production. Very extensive landsliding and consequential erosion and sediment transfer presented major challenges for reinstatement and recovery (Figures 1 & 2). Major new research initiatives to track and forecast landscape recovery will likely signal a decade or longer period of enhanced landsliding and sediment transport during storm events (Figure 3) that will continue to impact the transport network.

Fig. 2. Highway repairs late 2016

Fig. 1. Severed coastal highway system following Nov. 2016 Earthquake

Fig. 3. Further damage to coastal highway following Cyclone Cook in April 2017

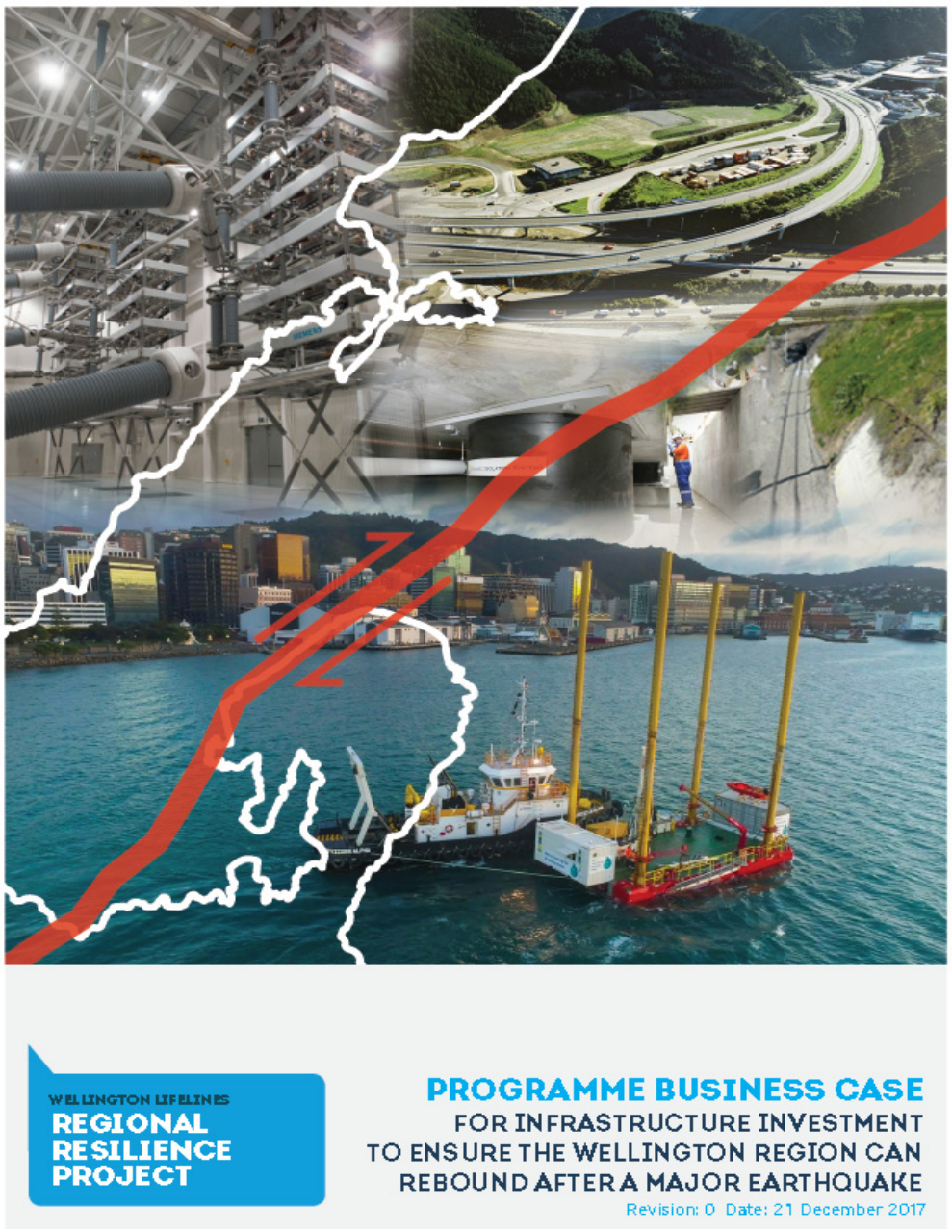


Fig. 4. Cover page of draft business case report for resilience investment for Wellington infrastructure

- A large number of peer-reviewed technical papers have been prepared and published. Publications from GNS Science cover surface fault ruptures, seismology, ground shaking, landsliding, damage assessments, economic modelling and social science.

- A Wellington city study on the vulnerability of critical lifelines and the economic benefit of resilience investment has been invigorated by the damage that occurred in the city resulting from the Nov 2016 Kaikoura earthquake. Excellent progress on economic modelling of the benefit-cost of interventions prior to high probability future events has been identified. These results will be socialised with New Zealand central and local government agencies in 2018, seeking commitment to improved resilience for the capital city (Figure 4).

- In budget 2017 GNS Science was awarded additional funding for the GeoNet project (https://www.geonet.org.nz/) to transition to a 24/7 operation to enhance more rapid advice to response agencies in the event of a major geological event, and to provide more timely warning of tsunami and volcanic eruption. These developments are a direct consequence of the Kaikoura earthquake which occurred at 12:04 am local time on 14th November 2016 when duty seismologists were on call but not operational and the tsunami threat advice from this local source earthquake did not meet public or government expectations. See https://www.stuff.co.nz/national/nz-earthquake/86742260/review-of-tsunami-alerts-likely-after-kaikoura-earthquake, and findings in a recently released review of current civil defence arrangements (https://www.dpmc.govt.nz/our-business-units/ministry-civil-defence-emergency-management/ministerial-review-better-responses).

Prof. Srikantha Herath
Director

Center for Urban Water (CUrW)

http://www.curwsl.org/

The transition office for Center for flood control and water management is set up now at the Sethsiripaya Stage II, Battaramulla, until the completion of the new building that will house a state-of-the art real time forecasting and control center to manage floods in Metro Colombo. The center also has agreements with the University of Peradeniya and the University of Moratuwa, Sri Lanka, so that center staff can be enrolled in the M.Sc. Eng. programmes of the universities in one year research degrees based on the research work carried out at the center. The center also can host visiting postgraduate students who can conduct research on various aspects of urban water management where the Megapolis Development Programme will serve as a "living laboratory".

Workshop with the Department of Irrigation, Sri Lanka

International Network for Advancing Transdisciplinary Education (INATE) organized a workshop at the Irrigation Department, Sri Lanka on 30th of January 2017 to share the results of joint study carried out by the Irrigation Department and INATE under INATE-Sri Lanka project. The main objective of the workshop was to share two outcomes of the project with relevant stakeholders and to plan a way forward. The first was the study and proposal to construct an Aqua Park that will collect the excess water from proposed Malwatu Oya reservoir to serve functions of flood control (extending the flooding from 1:5 year at current levels to 1:8 years), recreational and ground water recharge. The park will also address a social need of inadequacy of open space in the area. Around 30 senior engineers and water management specialists from different stakeholder agencies joined the meeting and expressed appreciation for the proposal. A figure of the proposed Aqua Park is shown in Figure 2.

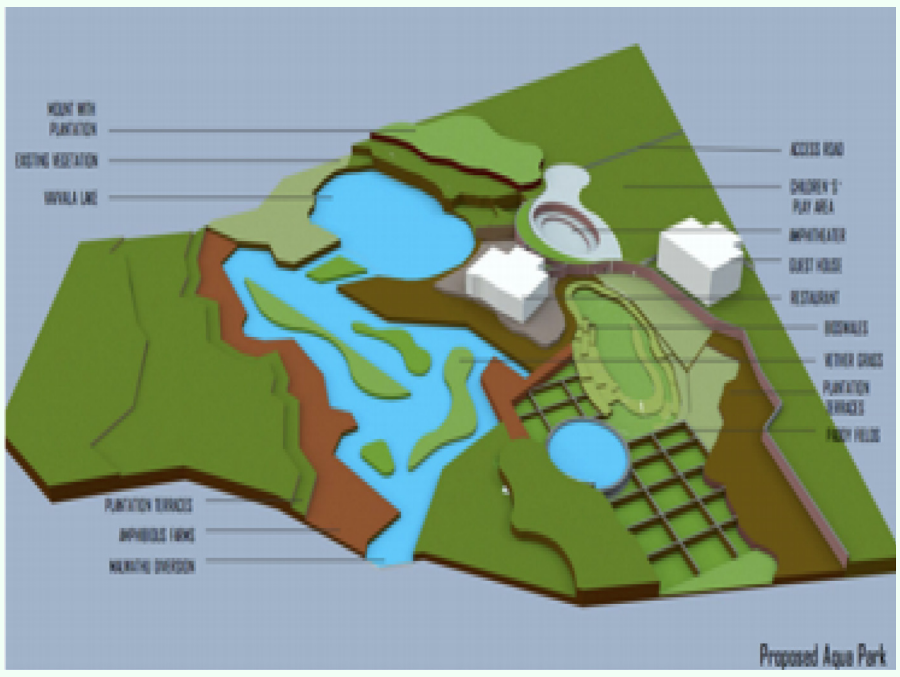


Figure 2. Proposed Aqua Park


Figure 1: A prototype of a floating agriculture field
(L-R—Aditi Kodke, Srikantha Heath and a staff member)

The second proposal was based on a feasibility study carried out to see the feasibility of using amphibious structures as agriculture fields in the lower Malwatu Oya basin, in the Giant Tank area where recurrent flooding has prevented farmers from engaging in long term agriculture practices, especially cash crop cultivation. A Figure of prototype is shown in Figure 1.

Dr. Karlee Johnson
Research Associate

Stockholm Environment Institute (SEI)

https://www.sei.org/

The Integrated Research on Disaster Risk (IRDR) unanimously approved SEI-Asia Centre's proposal to host an IRDR International Centre of Excellence on Transforming Development and Disaster Risk (ICoE-TDDR). The ICoE is supported by SEI's global TDDR Initiative which seeks to understand how disaster risks are created inside development processes, and to transform this current relationship towards equitable, resilient and sustainable development policy and practice. The ICoE-TDDR is one of 13 ICoEs globally, and the third center to be established in Asia. While the ICoE is hosted by SEI-Asia, it brings together a consortium of well-established regional and national institutions in Asia, including the Asian Disaster Preparedness Centre (ADPC), Rockefeller Foundation Asia, and Chulalongkorn University. The ICoE will serve as a long-term platform to undertake multi-disciplinary research that informs DRR and development policy processes, in line with the Sendai Framework and SDGs.

SEI now sits on both the global Science and Technology Advisory Group (STAG) of UNISDR and the Asian Science, Technology and Academia Advisory Group (ASTAAG). The STAG provides substantive technical advice and support in the formulation and implementation of activities carried out by the UNISDR community. The ASTAAG is UNISDR's main advisory body for the implementation of the Sendai Framework in Asia and is composed of disaster experts from Asia. Its focus is: (i) strengthening the science, technology and academic community; (ii) support governments in science-based decision making; and (iii) enhance networking among academic community and other stakeholders.

In January 2017, SEI was ranked as the world's most influential environment policy think tank in the University of Pennsylvania's 2016 Global Go To Thinks Tanks Index. The index is based on a survey of thousands of journalists, policy-makers, donors and topic and regional specialists around the globe, using a detailed list of criteria including quality and reputation of the research produced, policy impact and recognition, convening power, innovation, and inclusiveness.

SEI researchers have been invited to guest edit a special issue of the journal *Sustainability* on 'Transforming Development and Disaster Risk' which will focus on the complex relationships between development and disaster risk, and how transformation can help us move away from current development patterns that increase, create or unfairly distribute disaster risk. GADRI members are encouraged to submit research papers to be featured in the special issue by 31 March 2018: http://www.mdpi.com/journal/sustainability/special_issues/disaster_risk.

Switzerland

Prof. Michel Jaboyedoff
Vice-Dean

Faculty of Geosciences and Environment
University of Lausanne

http://www.unil.ch/gse/home.html

Prof. M. Jaboyedoff had the privilege and was much honored to receive the DPRI award on February 21st 2017. Dr. Derron and M. Jaboyedoff participated to the outstanding 4th Slope tectonics conference, which held in DPRI October 2017, which was an event underlining the collaboration we developed with Prof. Chigira (DPRI).

In September 2017, we worked with the Yosemite National Park (Dr. G. Stock) to analyze during an emergency the rockfalls that occurred in the southeast face of El Capitan, which caused one fatality and several injuries. Thanks to the acquisition of oblique helicopter photos taken a few hours after these events, the Risk Analysis Group has provided the first volume estimations (450 m^3 and 10'250 m^3) by comparing the terrestrial LiDAR scans acquired over several years with the post-event Structure-from-Motion models (Figure).

We are developing a relatively easy-to-use analysis tool to better assess the risk associated with rockfalls. This work was initiated during collaborative projects in Quebec, (Canada) with Dr. Jacques Locat. The tool consists of a fast 3D rockfall simulation numerical model that works on highly detailed terrain models (such as LiDAR point clouds), which is unique at present.

We developed a methodology to use the *SfM-on-motion* technique to generate 3D spatial data from images taken from a moving vehicle with action cameras that have a GPS chip. The geroreferencing without ground control points and based only on approximate coordinates from the low cost GPS chips gives an absolute accuracy less than 10 m and a relative accuracy of few centimeters. Benefits of this low-cost SfM on-motion method are: 1) a simple setup to use in the field (easy to switch between vehicle types as car, train, bike, etc.), 2) a low cost and 3) an automatic georeferencing of 3D points clouds. This can support very simply and at low costs post-disaster assessments.

Among other research activities, the group also carried out projects in the development of webGIS-based decision support platforms for the risk analysis and management of natural hazards. These platforms are also used by students to learn environmental risk assessment. They are developed entirely with open-source components, and can be easily adapted to specific requirements.

Location of the scars of the 27-28 September 2017 rockfall events with their associated estimated volumes. Data sources: 2006 and 2010 aerial LiDAR by the U.S. National Center for Airborne Laser Mapping; 2015 terrestrial LiDAR and 2017 Structure-from-Motion (SfM) models by the Risk Analysis Group; SfM pictures taken by Dr. Greg M. Stock (credit: U.S. National Park Service).

Chinese Taipei

Prof. Wei-Sen Li
Secretary-General

National Science and Technology Center for Disaster Reduction (NCDR)

https://www.ncdr.nat.gov.tw/

In 2017, NCDR has offered information intelligence for emergency operations of four typhoons and three major torrential rains that clearly showed the values of science-based disaster risk management. Through conducting impact assessments, the results did improve efficiency to make effective decisions for emergency preparedness and response. For example, to decide timing to conduct early evacuations or to identify locations for deploying utilities that highly depended on scientific evidence. Furthermore, a mechanism of information sharing and exchange to fill gaps between central and local government at times of emergency response. All 22 local governments have received direct benefits from information sharing through a common-operating-picture platform.

To engage regional participation into activities of disaster reduction, NCDR hosted the 13th International Training Workshop (ITW) on Disaster Reduction in July and invited GADRI to recommend participants. The centerpiece of the event focused on post-disaster recovery at community-based level. Participants had a chance to visit recovery sites and know their stories about how to “Build back better” from Typhoon Morakot in 2009. With the field excursion, all participants had full discussions on key issues related to reconstruction, recovery and rehabilitation. With case studies, the workshop provided an occasion to exchange regional experiences and the best practices of post-disaster recovery, especially focusing on highly vulnerable groups such like indigenous communities. NCDR will continue hosting the series of ITW in 2018 and welcome GADRI members to join. The proposed topics for the 2018 ITW will be applications of big dada and social media for disaster risk reduction and emergency preparedness.

Thailand

Dr. Indrajit Pal
Assistant Professor and Chair

Disaster Preparedness, Mitigation and Management (DPMM) Asian Institute of Technology (AIT)

https://www.ait.ac.th/

In 2017 Dr. Indrajit Pal has been recognised as "IRDR Young Scientists" by Integrated Research on Disaster Risk, Beijing, China. His recent book publications in 2017 includes ***"Disaster Risk Governance in*** *India and Cross Cutting Issues"* (2017), Edited by Dr. Indrajit Pal and Prof. Rajib Shaw, *Springer, Singapore* and ***"Natural Hazards Management in*** *Asia"* (2017), Authored by: Dr. Indrajit Pal and Dr. Tuhin Ghosh, *SAGE Publications*.

Disaster Preparedness, Mitigation and Management (DPMM), Asian Institute of Technology, Thailand along with University of Newcastle, Australia under the Australia-ASEAN Council (AAC) supported grant for the project "Disaster Resilience Education Capacity Building in South-East Asia" organized an **International Expert Forum on "Mainstreaming Resilience and Disaster Risk Reduction in Education"** at AIT from 1 - 2 December 2017. Dr. Indrajit Pal was the Coordinator and Organizing Committee Chair of this Mega event. This International Forum was a holistic approach to integrate Sustainable Development Goals, Sendai Framework for Disaster Risk Reduction (2015-2030) and UNFCCC Paris Agreement to address the regional challenges on Mainstreaming resilience and Disaster Risk Reduction (DRR). Over 140 participants from more than 20 countries took part in this International Expert Forum, which includes academicians, scientists, engineers, practitioners, research scholars, policy-makers and high-level representatives from international development agencies, UN organizations and International non-government organizations.

The Expert Forum provided an opportunity to develop a Higher Educational Institution Platform on DRR to address the cross-cutting issues on Disaster Risk Governance and understanding regional challenges that result from complex problems generated by natural hazards and human -induced threats. It also provided a platform to create regional synergies between leading higher education institutions engaged in education and research on DRR and Sustainable Development, development agencies, government and non-government stakeholders to proactively address disaster risk and build resilience through education.

Book release: **"Natural Hazards Management in Asia"** at the Mainstreaming Resilience and Disaster Risk Reduction in Education" held at AIT from 1-2 December 2017. (From left: Dr. Indrajit Pal, Mr. Surendra Shrestha, Mr. Bernard Philip and Dr. Tuhin Ghosh)

Prof. Richard Gordon
Director

Bournemouth University Disaster Management Centre (BUDMC)

http://budmc.uk/

During the year 2017, colleagues of BUDMC published and contributed to articles and book chapters, participated in conferences and in addition to continuing with many other activities.

Published Articles

- Bang, H., Miles, L. and Gordon, R. (2017) The Irony of Flood Risks in African Dryland Environments: Human Security in North Cameroon, *World Journal of Engineering and Technology,* 5.
- Walters, G, Shipway, R., Miles, L. and Aldrigui, M. (2017) Fandom and Risk Perception of Olympic Tourists, *Annals of Tourism Research*, 66.
- Holdo, G-M., Miles, L. and Hartwell, H. (2017) Disaster Nursing: Looking to the Future in Norway. *International Journal of Safety and Security Engineering,* 7(3).

Book Chapter and Reader

- Miles, L., Gordon, R. and Bang, H. (2017) Blaming Active Volcanoes or Active Volcanic Blame? Volcanic Crisis Communication and Blame Management in the Cameroon. In: Fearnley C., et al., eds. *Observing the Volcano World, Volcanic Crisis Communication*. Springer
- Gordon, R., Bang, H. and Miles, L. Dedicated Reader in Disaster Management for the Middle East

International Conference Presentations - Lee Miles, Henry Bang and Richard Gordon participated in many conferences and symposia within the UK and abroad. At the International Studies Association 58th Annual Convention in Baltimore, Maryland, USA in April 2017, Prof Lee miles and Dr. Henry Bang delivered a presentation on “A glass of crisis management with a foreign policy twist? Entrepreneurial resilience in the Cameroon” .

Successfully concluded the research of AFRIGATE (West/Central Africa), PINPOINT (Caribbean) and CRIS-ELITE research and knowledge exchange projects.

Completed the Executive Briefings to Ghana’s National Disaster Management Organisation, Nigeria’s National Emergency Management Agency, Cameroon’s Directorate of Civil Protection and British Virgin Island’s Department of Disaster Management, all hosted by the BUDMC.

Through external funding, delivered the National Research informed Multi-Scenario National Exercise Training and Simulations, Oman; Medical Emergency Training for Global Centre for Mass Gathering Medicine, Saudi Arabia; and two other International Disaster Management Courses (IDMC).

Impact and Public Engagement - Prof Lee Miles disseminated the PINPOINT research project in relation to Hurricanes Irma and Maria. Twenty-four radio and TV interviews were conducted on premier media outlets with an estimated media audience coverage/impact calculated at 12.5 million.

Research-informed Career and Professional Development Delivery: Richard Gordon: 4 courses in Oman and FCO course delivery; and Prof. Lee Miles: Launch of Masters (MSc) in Disaster Management (CPD route).

Prof Lee miles (left) and Dr. Henry Bang (right)

Prof. Dilanthi Amaratunga

Global Disaster Resilience Centre University of Huddersfield

https://www.hud.ac.uk/gdr

In 2017, academics at the Global Disaster Resilience Centre, University of Huddersfield, UK have been successful with several international research grants:

'Mainstreaming Integrated Disaster Risk Reduction and Climate Change Adaption Strategies into Coastal Urban Agglomeration Policy'. Value of the grant is £ 120,000 for 18-24 months and it is funded by the Newton Fund Institutional Links Programme. Professor Haigh is the GDRC lead where as Dr. Harkunti P. Rahayu at Bandung Institute of Technology, Indonesia is leading the project from Indonesia. Associate partners include: National Disaster Management Agency (BNPB); Meteorology, Climatology and Geophysical Agency (BMKG); Ministry of Agrarian and Spatial Planning; and University of Andalas, all from Indonesia and UNESCO ICG/IOTWMS based in Perth, Australia. This collaboration and research project will develop researcher capacity and novel, integrated DDR and CCA strategies that can protect centres of economic growth and development outcomes in coastal urban agglomerations.

Professor Richard Haigh is the Principle Investigator of **CABARET (Capacity Building in Asia for Resilience EducaTion)** with 15 partners from Indonesia, Malaysia, Maldives, Myanmar, Philippines, Sri Lanka, UK, Spain, Bulgaria, Latvia and Malta. Its associate partners include IOC/ UNESCO, ADPC and Federation of Sri Lankan Local Government Authorities. CABARET is co-funded by an EU Erasmus+ programme grant of €993,340, will run for three years commencing February 2017. CABARET aims to promote international cooperation between Higher Education Institutes (HEIs) in Asia and Europe, and among Asian HEIs themselves, to improve multi-hazard early warning and increase resilience among coastal communities. through its focus on coastal communities, many of which are under severe pressure resulting from planned and unplanned development, population growth and human induced vulnerability, coastal hazards with increasing frequency and magnitude, and the impacts of global climate change.

"Tsunami Interface: A study of the upstream-downstream interface in end-to-end tsunami early warning and mitigation systems" is another initiative that was commenced in 2017, led by Professor Dilanthi Amaratunga. This study aims to understand the technical, legal and socio-cultural complexities that occur at the interface between upstream and downstream mechanisms of the tsunami early warning system. Project investigators include: University of Colombo, Sri Lanka; Bandung Institute of Technology, Indonesia; Asian Disaster Preparedness Centre, Thailand; and Several other associate partners.

7th International Conference on Building Resilience was very successful held in Bangkok, Thailand from 27-29 November 2017 and was chaired by Professor Dilanthi Amaratunga and Professor Richard Haigh. It was attended by more than 300 academics, practitioners, professionals and policymakers from around the world. The conference sought to bridge the gap between the research community in disaster risk reduction, and policy and practice. Experts from all regions shared the latest research being conducted by universities and research institutes, much of it undertaken in response to the Sendai Framework for Disaster Risk Reduction, which maps out the course of global action over the next 15 years.

Further details about GDRC activities in 2017 can be read by visiting: http://www.hud.ac.uk/gdrc

CABARET project launch

Prof. Andrew Collins
Leader

Disaster and Development Network (DDN) Northumbria University

https://www.northumbria.ac.uk/ddn

The Disaster and Development Network (DDN) is hosted by the Department of Geography and Environmental Sciences of Northumbria University at Newcastle-upon-Tyne in Northeast England. During 2017 the DDN continued to engage with research, policy, practice and civil society in combined disaster reduction and sustainable development issues both locally and with partners in other parts of the world. For example, the 2017 annual Dealing with Disasters Conference was hosted as a local Durham and Northumbria University collaboration. Both institutions are members of the UK Alliance for Disaster Research (UKADR) that provided extensive sessions. Northumbria DDN is a founding member and current co-lead of UKADR (ukadr.org). The UKADR is an achievement for all those institutions involved in this field in the UK demonstrating commitments to alliance building now more apparent in the disaster research sector.

The DDN steered and lead inputs to major policy development work; for example through leading ongoing regional evaluations in Southern Africa that included 'strengthening national capacities and frameworks for disaster risk reduction and climate change adaptation' with United Nations Development Programme (UNDP) and furthering the World Health Organization 'Thematic Platform for Emergency and Disaster Risk Management for Health'. The DDN is an accredited partner of UNISDR for the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, and input to the Global Platform in Cancun being also a partner institution in the Science and Technology roadmap. In 2017, the DDN concluded its Steering (since 2011) of the highly successful Enhanced Learning and Research for Humanitarian Assistance (ELRHA) (elrha.org), now spinning off from its host Save the Children and taking forward an extensive portfolio of forward looking projects that includes bringing DRR into Humanitarian Assistance.

The DDN hosted Visiting Research Fellowships in 2017 focusing variously on 'Disaster Law' lead by Michael Eburn (ANU, Australia), 'Disaster Ethnography' (Miyamae, JSPS/Osaka University) and on outcome 'Analyses of the Global Assessment Report (GAR)' (Maskrey, Geneva). A new research project on 'Infectious Disease Disaster Risk Communication' was launched with partners in Kenya (No Strings and Catholic Relief Services) funded by Department for International Development and the Welcome Trust. The DDN Research Fellow working on this project (Becky Richardson) is also to be a presented with an Award from the Queen for their services with the British Red Cross in relationship to the Grenfell Tower, London fire disaster of 14th June 2017. A further DDN research input on 'domestic sprinkler safety', was launched with Tyne and Wear Fire and Rescue Service (TWFRS) (Kotter). DDN also input to the UK-India Joint Network on Sustainable Cities and Urbanization in India lead by Nottingham University amongst others initiatives.

PhDs awarded in 2017 included:

- Sara Walsh – 'Mainstreaming Disaster Risk Reduction in Nepal: The rhetoric and the reality'
- Onaopepo Adeniyi – 'Disaster Resilience Framework for Encouraging Private Sector Investment in the Built Environment'
- Nnamdi Iloka – 'Indigenous knowledge for Disaster Risk Reduction'
- Turki Alshadadi – 'Assessment of weather-related natural disaster vulnerabilities in the Kingdom of Saudi Arabia'
- Ibrahim Almarzouqi – 'An Analysis of Disaster Vulnerability in the United Arab Emirates'
- Seema Ahmed – 'Psychosocial wellbeing of adolescent girls and young women after the 2005 Pakistan Earthquake'

The accompanying MSc in Disaster Management and Sustainable Development concluded 19 awards during 2017. These comprised seven Distinctions, five Commendations and seven at the Pass level.

UK

Dr. Emma Lovell
Research Fellow

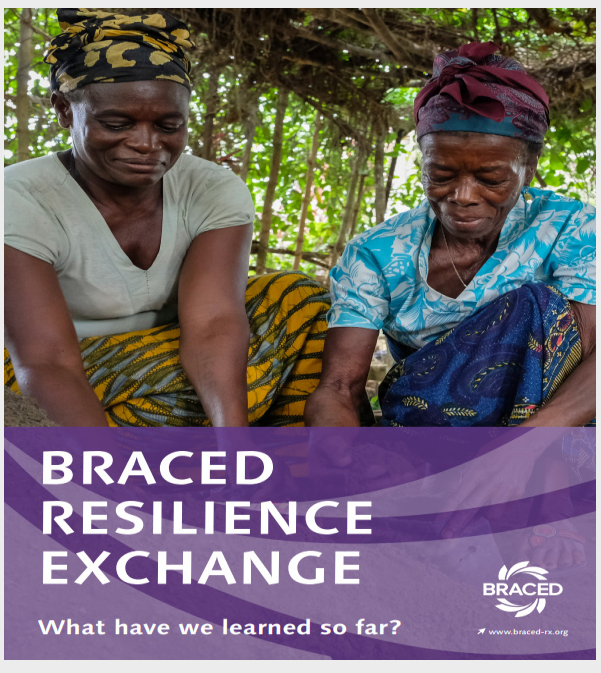
Overseas Development Institute (ODI)

https://www.odi.org/

ODI's Risk and Resilience Programme published a range of reports and working papers in 2017, notably Delivering disaster risk reduction by 2030: pathways to progress, which examined countries' individual progress and reporting under the Hyogo Framework for Action, and how lessons can be drawn to help achieve the Sendai Framework for Disaster Risk Reduction 2015–2030. Case studies covered a range of examples from low- and middle-income countries, each with varied risk levels, starting points and trajectories of progress.

In 2017, we undertook a project to understand people's choices and efforts to rebuild following disasters in Nepal and the Philippines, and produced a working paper looking at how households recover from disasters in situations where little or no support is available from humanitarian agencies. We also produced a report with UNDP examining the links between climate change, migration and displacement, breaking down the often sensational claims made by the media and examining the complex links between the effects of climate change and human mobility. Other research explored The next frontier for disaster risk reduction: tackling disasters in fragile and conflict-affected contexts.

Our Resilience Scan initiative (supported by the Rockefeller Foundation) has continued to deliver a series of quarterly publications reviewing and summarising the latest trends in resilience from grey and academic literature, debates and social media, alongside expert views on i) Self-recovery for resilience; ii) transboundary adaptation; and iii) coastal resilience. We have also produced several 'deep-dives' on key emerging resilience-related topics in 2017, including how i) universal health coverage; ii) risk insurance; and iii) solar household systems can support overall resilience.



Highlights from two other long-term programmes, Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) and Pathways to Resilience in Semi-arid Economies (PRISE), both of which began in 2014, are provided below:

BRACED aims to build people's resilience across the Sahel, East Africa and Asia. ODI leads the BRACED Knowledge Manager, which generates evidence and learning on resilience and adaptation in partnership with BRACED projects and the wider resilience community. In 2017, BRACED launched The Resilience Exchange, which looks at what has been learned across the diverse projects, presenting stories, research, evidence and learning. BRACED has recently been awarded a 21-month extension, taking the programme to the end of 2019.

PRISE works with decision-makers in local and national governments, businesses, business support agencies and trade bodies in semi-arid regions of Senegal, Burkina Faso, Kenya, Tanzania, Ethiopia, Pakistan, Tajikistan and Kyrgyzstan to build climate-resilient economic development. In 2017, PRISE published a range of publications, including Value Chain Analysis for Resilience in Drylands (VC-ARID): Identification of adaptation options in key sectors, which identifies opportunities for economic transformation and diversification in semi-arid areas of PRISE countries by integrating sectors rooted in semi-arid lands, including cotton and livestock, into national economies.

Finally, ODI researchers have taken part in several high-level meetings in 2017, including the Global Platform for Disaster Risk Reduction and the United Nations Climate Change Conference (COP23). For more information about our publications, research and events, please visit odi.org.uk

Prof. Lori Peek
Director

Natural Hazards Center (NHC)
University of Colorado, Boulder

https://hazards.colorado.edu/

The Natural Hazards Center is the one academic center in the United States dedicated to linking researchers, practitioners, and policy makers to reduce the harm from disasters. We share and advance social science and interdisciplinary knowledge, with a special emphasis on the most vulnerable populations and places. Every day, we work to empower a culture where all people are educated and inspired to take positive action to mitigate hazards losses and to build stronger communities.

In 2017, the Center team hosted the 42nd Annual Natural Hazards Workshop, which brought together over 500 leading researchers and practitioners. In addition, at the 2017 Workshop, the Center helped convene a meeting of North American directors of academic hazards and disaster centers. At the meeting, the group decided to move forward with forming an alliance of institutes for the region, to be discussed and voted on in 2018.

The Center currently has numerous active research projects in the areas of hazards, disasters, and social vulnerability. In addition, Center Director Lori Peek is the Principal Investigator on a new National Science Foundation EAGER grant, that is intended to form a Social Science Extreme Events Research (SSEER) and Interdisciplinary Science and Engineering Extreme Events Research (ISEEER) network and platform for the hazards and disaster community. In addition, Peek is PI on a new evaluation research grant for Save the Children and co-PI on a National Science Foundation research grant on interdisciplinary methods and approaches for hazards and disaster research.

Natural Hazards Center Wildfire and Flood Tour, July 9, 2017. ©Sonya Doctorian, 2017

Prof. John van de Lindt
Co-Director

Center of Excellence for Risk-Based Community Resilience Planning Colorado State University

http://resilience.colostate.edu/

The Center is about to embark on its fourth year of operation. Year 1 was devoted to knowledge consolidation and interdisciplinary team-building. Year 2 focused on community modeling and inter-dependencies. Year 3's emphasis was on recovery modeling. In Year 4, we will turn our attention to decision support. Practically all research activities in progress are performed on a community scale. Major accomplishments during the first three years include:

- Completed community resilience assessment of the Centerville Virtual Community, demonstrating how interfaces between models of the built environment can be developed by teams of engineers, social scientists and information scientists to study social and economic impact of a severe earthquake;
- Performed a hindcast of the Joplin, Missouri Tornado of May, 2011, utilizing data gathered from NIST's post-disaster investigation as well as tornado demand and fragilities developed in earlier Center research, completing the damage assessment phase and entering the recovery modeling phase;
- Initiated a multi-year longitudinal investigation of the impact of Hurricane Matthew, Sept-Oct 2016, on Lumberton, North Carolina, a vulnerable, low-income community, conducting an initial field investigation of flood-related damage and social impact approximately 6 weeks after the hurricane and returning just over a year later to assess progress in community recovery.
- Initiated a hurricane hindcast for Galveston, Texas to develop models for hurricane damage, loss and recovery modeling through integration of hazard, infrastructure and socio economic systems and interdependency modeling; developed hurricane-induced coastal flood fragilities for roadways using empirical damage data from past hurricane Ike and physical hydrodynamic experiments, one focusing on wave loads on submerged bridges, and the other on failure mechanisms of coastal highway pavements and embankments. Surrogate models are being developed for storm surge using a combination of a logistic regression and random field models.
- Initiated the Memphis Metropolitan Statistical Area (MMSA) testbed (Tennessee, USA), the first testbed for a large urban community with a population of approximately 1.4 million in 9 counties distributed in three states, to examine issues related to scaling physical, social and economic resilience models developed in prior research for small communities to a larger urban area, to determine the dependence of recovery on the influence and support from surrounding communities, and to model interfaces and information flow between physical, social and economic systems during the recovery process with the ultimate goal of informing the development of efficient decision support algorithms.

Visit our webpage for further details on our projects and accomplishments.

Lumberton Field Study Team

Prof. James M. Kendra
Director

Disaster Research Center (DRC)
University of Delaware

https://www.drc.udel.edu/

The Disaster Research Center (DRC) is committed to advancing the state of the art in disaster research and its scientifically guided practice; educating the next generation of disaster science scholars and informed practitioners in the fields of disaster mitigation, preparedness, response and recovery; and creating, gathering, and disseminating disaster knowledge in a dynamic and responsive way.

In 2017, faculty, staff, and students at DRC published 20 books, articles and dissertations, including the release of an updated edition of the *Handbook of Disaster Research*, and participated in numerous conferences and panels around the world. DRC hosted seven visiting scholars this year, and faculty, staff, and students participated in quick response field studies for three significant disaster events: the Charlottesville, Virginia civil disturbance, Hurricane Harvey, and the Mexico City earthquake. Additionally, students at DRC deployed to disaster sites around the world in various response capacities.

Community engagement is a key focus at DRC, and this year several unique opportunities arose to collaborate with stakeholders. In early Spring, Resource Collection Manager Pat Young facilitated a gathering of library personnel and emergency managers in the state of Delaware as part of a series of Library Summits. In the Fall, a number of DRC faculty and staff had the opportunity to meet with Facebook founder Mark Zuckerberg to discuss community experiences in crisis response and resilience building.

The DRC is pleased to announce that the Bill Anderson Fund (BAF) will be housed at the University of Delaware. The BAF was founded in memory of disaster scholar William A. Anderson with the goal of increasing diversity among disaster researchers and practitioners through advocacy, fellowships, and support for scholars from historically underrepresented communities.

Finally, this year marked the passing of DRC co-founder Dr. Enrico L. Quarantelli. Dr. Quarantelli was remembered in the *New York Times Magazine*'s special "The Lives They Lived" feature section.

In September, 2017, DRC faculty and students and local community leaders in the arts, disaster relief, and social advocacy met with Facebook founder Mark Zuckerberg to talk about hazards, environmental justice, and the importance of social networks in disaster response.

Meeting with Facebook Founder Mark Zuckerberg

Prof. Desmond Manatsa
Chairman

Africa Alliance for Disaster Research Institutions (AADRI)
Geography Department
Bindura University of Science

https://www.buse.ac.zw/

The Geography Department, Bindura University of Science joined GADRI this year 2017, marking with it the emergence of the Africa Alliance for Disaster Research Institutions (AADRI). This will pave a new phase of prominence for its members within the African continent. Prof. Desmond Manatsa was appointed as the interim Chairman of the AADRI. He will disseminate AADRI information as a key strategy for its awareness campaign and engage on a membership drive to formally initiate its activities which would include a possible first conference in the near future.

In November, within GADRI session held at the World Bosai Forum in Sendai, Japan from 25 to 28 November 2017, AADRI and the Geography Department of Bindura University was represented by Prof. Manatsa. He delivered a presentation on Vision and Future for AADRI.

To sum-up the rationale for establishing AADRI within the School of Climate Change and Disaster Research (SCCDR), Bindura University, Zimbabwe, Africa's disaster research community is fragmented and diverse. It is quite conspicuous that the continent, despite having the greatest share of global disaster victims, Africa has neither a clear and coherent disaster research collaboration nor partnership to inform decision-making. Africa's disaster research output is less than 1% of global disaster research with no hub for Africa's disaster research. In this regard, AADRI will be involved in advancing disaster risk reduction knowledge through producing and sharing knowledge; promoting collaboration and partnerships and provide a unified message for policy makers across Africa. Membership will be open to universities, government and non-governmental organizations, private sector and PhD students engaged in disaster research. Disaster risk reduction, climate change adaptation and sustainable development will be among the key issues addressed by AADRI.

AADRI will function as an independent alliance that will be managed by voluntary contributions from the Africa's research community. The Secretariat will be hosted by SCCDR, Bindura University of Science with a rotating committee including chair of AADRI.

Further details can be found at our website http://www.aadri.org.zw.

GADRI Session at the World Bosai Forum 2017, Sendai Japan

GADRI Member Institutes

Africa

1	Algeria	University of Science & Technology Houari Boumediene (USTHB), Built Environment Research Laboratory (LBE)
2	Egypt	German University in Cairo （GUC)
3	Egypt	Faculty of Engineering, Alexandria University
4	Egypt	Geology Department, Faculty of Science, Assiut University
5	Egypt	Water Resources Research Institutes (WRRI), National Water Research Center (NWRC), Ministry of Water Resources and Irrigation
6	Ghana	Department of Agricultural Engineering, UDS International, University for Development Studies (UDS)
7	Ghana	Department of Geography & Resources Development, University of Ghana
8	Ghana	Hydrology and Water Resource Engineering, Water Research Institute, Council for Scientific and Industrial Research (CSIR)
9	South Africa	Disaster Management Training and Education Centre for Africa (DiMTEC), University of the Free State
10	Sudan	UNESCO Chair in Water Resources
11	Sudan	Disaster Management and Refugees Studies Institute (DIMARSI), International University of Africa
12	Zimbabwe	Bindura University of Science Education

Americas

13	Brazil	Centre for Technology and Natural Resources, University of Campina Grande
14	Canada	The Institute for Catastrophic Loss Reduction, Western University
15	Chile	Centro Nacional de Investigacion par la Gestion de Desastres Naturales (CIGIDEN)
16	Colombia	National Unit for Disaster Risk Management in Colombia (UNGRD)
17	Colombia	Department of Chemical Engineering, Universidad de los Andes
18	Colombia	Seismological and Geophysical Observatory of the Southwest (OSSO), Valle University
19	Ecuador	Pacific International Center for Disaster Risk Reduction, Escuela Superior Politechnica del Litoral
20	Mexico	Institute of Geography, National Autonomous University of Mexico
21	Mexico	Structures Laboratory, University of Michoacan
22	Mexico	Research Institute of Risk Management, University of Michoacan
23	USA	Advanced Radar Research Center, University of Oklahoma
24	USA	Wind and Hurricane Impact Research Laboratory, Florida Institute of Technology
25	USA	Resilient Communities Research Institute, California Polytechnic State University
26	USA	Pacific Earthquake Engineering Research Center (PEER), University of California, Berkeley
27	USA	Center for Risk-Based Community Resilience Planning, Colorado State University
28	USA	Disaster Research Center, University of Delaware
29	USA	Consortium for Capacity Building, University of Colorado-Boulder
30	USA	Natural Hazards Center, University of Colorado-Boulder
31	USA	Geologic Hazards Science Center, US Geological Survey
32	USA	Southern California Earthquake Center (SCEC)

Asia (excluding Japan)

33	Bangladesh	Institute of Water and Flood Management (IWFM) Bangladesh University of Engineering and Technology (BUET)
34	Bangladesh	Department of Disaster Science and Management, Faculty of Earth and Environmental Sciences, University of Dhaka
35	China	Beijing National Earth Observatory, Institute of Geophysics, China Earthquake Administration
36	China	Institute of Tibetan Plateau Research, Chinese Academy of Sciences
37	China	College of Engineering, Ocean University of China
38	China	State Key Laboratory of Geo-hazards Prevention and Geo-environment Protection (SKLGP), Chengdu University of Technology
39	China	Key Laboratory of Coastal Disaster and Defense (KLCDD), Hohai University
40	China	Institute for Disaster Management and Reconstruction Sichuan University - The Hong Kong Polytechnic University
41	China	College of Architecture and Environment, Sichuan University
42	China	State Key Laboratory of Hydraulics and Mountain River Engineering, Sichuan University
43	China	Center for Energy and Environmental Policy Research, Beijing Institute of Technology
44	China	Integrated Risk Governance Project (IRG-Project), State Key Lab of Earth Surface Processes and Resource Ecology, Beijing Normal University
45	China	China Research Center for Emergency Management (CCEM), Wuhan University of Technology
46	China	Natural Disaster Research Institute, Northeast Normal University
47	China	Shanghai Institute of Disaster Prevention and Relief, Tongji University
48	China	Chang'an University
49	China	Institute of Mountain Hazards and Environment, Chinese Academy of Science, Ministry of Water Conservancy
50	India	Humanities and Social Sciences Department, Indian Institute of Technology
51	India	Research & Development, Indian Institute of Technology Gandhinagar
52	India	Center of Excellence in Disaster Mitigation & Management, Indian Institute of Technology Roorkee
53	India	Jindal School of Liberal Arts and Humanities, O.P. Jindal Global University
54	India	Department of Geography, Delhi School of Economics, University of Delhi
55	India	School of Planning and Architecture, Delhi
56	Indonesia	School of Ecology and Environment Studies, Nalanda University
57	Indonesia	JASA TIRTA I Public Corporation
58	Indonesia	Research Center for Disaster Mitigation, Institut Teknologi Bandung
59	Indonesia	Faculty of Engineering, Gadjah Mada University
60	Indonesia	Geological Agency, Ministry of Energy and Mineral Resources of the Republic of Indonesia
61	Indonesia	Brawijaya University

Asia (excluding Japan)

62	Iran	International Institute of Earthquake Engineering and Seismology (IIEES)
63	Korea	International Water Resources Research Institute, Chungnam National University
64	Korea	Research Center for Disaster-hazard Resilience, Seoul National University
65	Korea	Graduate School of Disaster Prevention, Kangwon National University
66	Korea	School of Urban & Environmental Engineering, Ulsan National Institute of Science and Technology
67	Laos	Asia Research Center, National University of Laos
68	Malaysia	Universiti Sains Malaysia (USM)
69	Malaysia	Universiti Tenaga National (UNITEN)
70	Malaysia	Malaysia Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM)
71	Malaysia	Centre for Coastal and Ocean Engineering (COEI), Universiti Teknologi Malaysia (UTM)
72	Malaysia	Centre for Environmental Sustainability and Water Security (IPASA), Universiti Teknologi Malaysia (UTM)
73	Malaysia	Dept. Structure & Materials, Faculty of Civil Engineering, Universiti Teknologi Malaysia (UTM)
74	Malaysia	Universiti Kebangsaan Malaysia (UKM)
75	Malaysia	Center for Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM), Institute for Environment and Development (LESTARI), UKM
76	Malaysia	Disaster Management Institute (DNI), Universiti Utara Malaysia
77	Nepal	International Centre for Integrated Mountain Development (ICIMOD)
78	Nepal	Institute of Engineering, Tribhuvan University
79	Philippines	University of the Philippines, Diliman Campus
80	Philippines	Resource Facility, Partnerships in Environmental Management for Seas of East Asia (PEMSEA)
81	Philippines	Philippine Society of Emergency Medical Technicians
82	Sri Lanka	National Building Research Organisation (NBRO)
83	Sri Lanka	Natural Resource Management & Laboratory Services, Central Engineering Consultancy Bureau (CECB)
84	Sri Lanka	Center for Urban Water (CUrW), International Network for Advancing Transdisciplinary Education (INATE)
85	Sri Lanka	Sri Lanka Institute of Information Technology (SLIIT)
86	Chinese Taipei	Taiwan Typhoon and Flood Research Institute, National Applied Research Laboratories
87	Chinese Taipei	Tainan Hydraulics Laboratory, National Cheng Kung University
88	Chinese Taipei	National Science and Technology Center for Disaster Reduction (NCDR)
89	Chinese Taipei	Center for Weather Climate and Disaster Research, National Taiwan University
90	Chinese Taipei	National Center for Research on Earthquake Engineering, National Applied Research Laboratories
91	Chinese Taipei	Disaster Prevention Research Center, National Cheng-Kung University
92	Thailand	Disaster Preparedness, Mitigation and Management (DPMM), Asian Institute of Technology (AIT)
93	Turkey	Kandilli Observatory and Earthquake Research Institute, Bogazici University
94	Vietnam	VNU Key Laboratory for Geo-environment and Climate Change Response, Department of Geo-environment, Vietnam National University

Europe

95	Austria	International Institute for Applied Systems Analysis (IIASA)
96	Bulgaria	Department of Information Technologies and Communications, University of National and World Economy
97	Bulgaria	ISER-Bulgarian Academy of Sciences
98	France	Bureau de Recherches Geologiques et Minieres (BRGM)
99	France	Council of Europe
100	Germany	Center for Disaster Management and Risk Reduction Technology (CEDIM)
101	Germany	United Nations University, Institute for Environment and Human Security
102	Germany	Institute for Advanced Sustainability Studies (IASS)
103	Germany	Disaster Research Unit, Department of Social and Political Sciences, Freie Universiät Berlin
104	Italy	Department of Earth Sciences, University of Florence
105	Italy	European Commission Joint Research Centre (EC-JRC)
106	Slovakia	Faculty of Security Engineering, University of Zilina
107	Sweden	Stockholm Environment Institute (SEI)
108	Switzerland	Faculty of Geosciences and the Environment, University of Lausanne
109	Switzerland	Global Risk Forum (GRF Davos)
110	UK	Cabot Institute, University of Bristol
111	UK	Global Disaster Resilience Centre, School of Art Design and Architecture, University of Huddersfield
112	UK	Disaster and Development Network (DDN), Department of Geography, Northumbria University
113	UK	Swansea University
114	UK	British Geological Survey
115	UK	Bournemouth University Disaster Management Centre (BUDMC)
116	UK	Evidence Aid
117	UK	Public Health Consultant in Global Disaster Risk Reduction, Global Public Health, Public Health England (PHE)
118	UK	Overseas Development Institute (ODI)

Oceania

119	Australia	Fenner School of Environment & Society, Australian National University
120	Australia	Centre for Disaster Studies, College of Science and Engineering, James Cook University
121	Australia	Centre for Infrastructure Performance and Reliability, School of Engineering, The University of Newcastle
122	Australia	Science and Engineering Faculty, Queensland University of Technology
123	Australia	University of Sunshine Coast
124	Australia	School of Earth and Environmental Sciences/ SMAH, University of Wollongong
125	New Zealand	GNS Science

Japan

126	Japan	Research Center for Potential Development of Disaster Prevention, Akita University
127	Japan	International Consortium on Landslides (ICL)
128	Japan	International Centre for Water Hazard and Risk Management (ICHARM) under the auspices of UNESCO
129	Japan	Research and Education Center for Natural Hazards, Kagoshima University
130	Japan	Faculty of Safety Science, Kansai University
131	Japan	Institute of Nature and Environmental Technology, Kanazawa University
132	Japan	Research and Development Center of Fire and Environmental Safety, University of Kitakyushu
133	Japan	Research Center for Urban Safety and Security, Kobe University
134	Japan	Disaster Prevention Research Institute (DPRI), Kyoto University
135	Japan	Graduate School of Global Environmental Studies, Kyoto University
136	Japan	Institute of Disaster Area Revitalization, Regrowth and Governance (IDiARRG), Kwansei Gakuin University
137	Japan	Research Institute for Applied Mechanics, Kyushu University
138	Japan	Disaster Risk Reduction Research Center, Faculty of Engineering, Kyushu University
139	Japan	Center of Environmental Science and Disaster Mitigation for Advanced Research, Muroran Institute of Technology
140	Japan	Advanced Disaster Prevention Engineering Center, Nagoya Institute of Technology
141	Japan	National Research Institute for Earth Science and Disaster Resilience (NIED)
142	Japan	Research Institute for Natural Hazards & Disaster Recovery, Niigata University
143	Japan	Research Initiative for Natural Disaster Prevention of Oil and Gas Spill in Industrial Parks, Graduate School of Engineering, Osaka University
144	Japan	Graduate School of Human Sciences, Faculty of Human Sciences, Osaka University
145	Japan	Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH)
146	Japan	Frontier Research Center for Natural Disaster Mitigation, Ritsumeikan University
147	Japan	Disaster Prevention Research Center for Island Regions, University of the Ryukyus
148	Japan	International Research Institute of Disaster Science, Tohoku University
149	Japan	Center for Urban Earthquake Engineering, Tokyo Institute of Technology
150	Japan	Earthquake Research Institute, The University of Tokyo



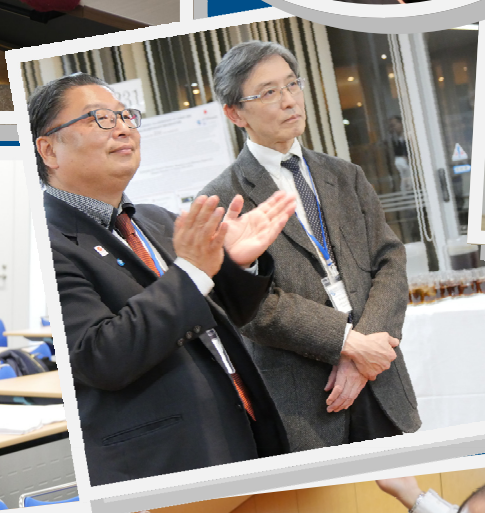


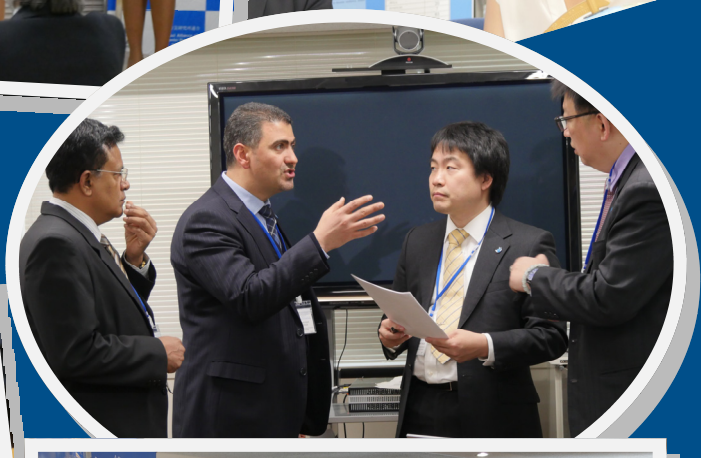

GADRI
Global Alliance of
Disaster Research
Institutes













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