



6th Global Summit of GADRI

15 - 17 March 2023

DPRI, Kyoto University,
Uji Campus, Japan



GADRI ACTIONS

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Dear Members of GADRI,

We are pleased to bring to you the current GADRI ACTIONS Volume 19 – Spring 2023 which specifically features the 6th Global Summit of GADRI. We hope this will serve as a mini-version of the Proceedings of the 6th Global Summit of GADRI. We also hope this will bring back fond memories of the 6th Global Summit of GADRI held in Kyoto, Japan after a dormant of four years.

The newsletter captures the impressive and informative ten keynote speeches, presentations at the two panel discussion sessions, Posters and Networking with Institutes sessions, the final resolution, and other events.

We have taken the liberty to include photos from all of the Poster and Networking Session with GADRI member institutes. If you, need a copy of the photo, do not hesitate to contact us.

In addition, it captures the final outcome of the Side Event - Sendai Midterm Review – MTR-SF - Viewpoints and Discussion for the Next Seven Years of the Sendai Framework which we have shared with UNDRR office.

We would like to encourage you to use GADRI ACTIONS to share your institute information on activities and reports with the GADRI community.

We hope you will enjoy going through the newsletter.

Hirokazu Tatano and
Everyone at the
GADRI Secretariat

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Participants enjoying an outing—Amagase Dam Control Office (left); and the Ujigawa Open Laboratory, DPRI, Kyoto University (right).

Photos are contributed by Ms. Kaoru Saeki, Public Affairs Office, DPRI, Kyoto University; and other members of DPRI.

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The prolonged worldwide pandemic and cascading risks have taught us that the conventional approach to disaster risk planning and management is ineffective for the development of sustainable and resilient communities. A worldwide pandemic underscores the importance of integrating the following key areas: -

- Disaster risk should not be treated in isolation but should be integrated with health risks, climate change, and environmental risks;
- DRR objectives and vision should be integrated with sustainable development goals to foster a resilient world;
- Short-term DRR objectives need to be integrated with a long-term vision and plans for a resilient society.

Towards a sustainable and resilient society, the GADRI's five-fold objectives, which include establishing global research networks, developing research roadmaps and plans, building the capacities of research institutes, sharing information and engaging in collaborative research, and advocating for organizations, need to be directed toward the above-mentioned three key areas for integration in research and development.

The 6th GADRI Global Summit aims to systematically identify the processes, techniques, evidence, challenges and opportunities for achieving the GADRI objectives for a sustainable and resilient society against hazards and working to keep them from becoming disasters. Outcomes will communicate academic science across scientific disciplines to policymakers and practitioners.

Panel Group Discussion Session I:

1. GADRI Objective - I (global research network) for Sustainable and Resilient Society Against Disasters (SRSAD)
2. GADRI Objective - II (developing research roadmaps and plans) for SRSAD
3. GADRI Objective - III (building the capacities of research institutes) for SRSAD
4. GADRI Objective - IV (mutual sharing information and engaging in collaborative research) for SRSAD
5. GADRI Objective - V (serve as an advocacy organization) for SRSAD

Panel Group Discussion Session II:

1. Big Science for DRR: Large-scale Experiment
2. Sustainable DRR: Integrating climate action, SDGs and DRR: Field DRR & Data (experience) Sharing New Challenges for Actions by GADRI
3. Gender and Inclusivity in DRR Policy and Practice
4. Putting Health into Disaster Risk Reduction and Recovery
5. Youth and DRR

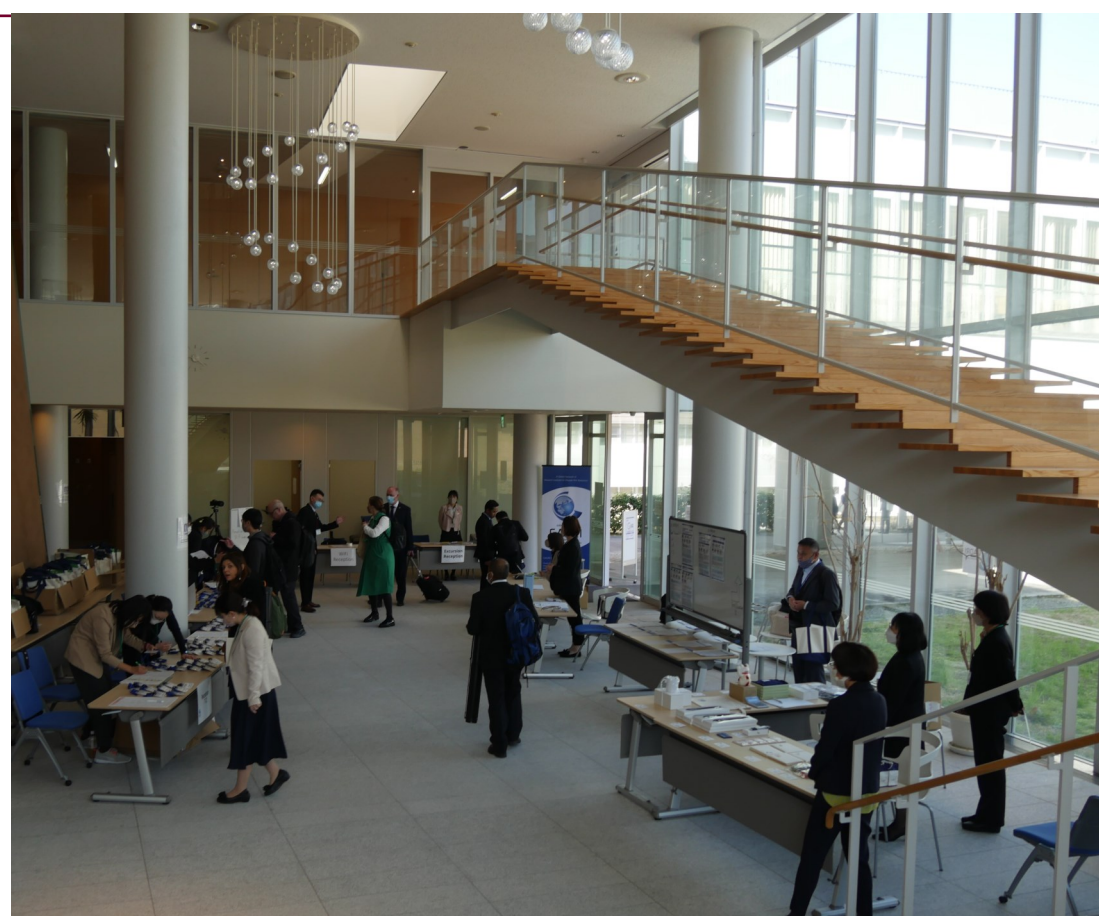
The 6th Global Summit of GADRI: Towards GADRI Objectives of Achieving a Sustainable Disaster-Resilient World was successfully convened at the DPRI, Kyoto University, Uji Campus, Kyoto, Japan from 15 to 17 March 2023. The biennially held Global Summits of GADRI brought together participants engaged in disaster risk reduction or disaster science from multidisciplinary research fields.

The Opening Ceremony was honoured by Prof. Eiichi Nakakita, Director, DPRI, Kyoto University; Prof. Nagahiro Minato, President of the Kyoto University, Ms. Mami Mizutori, Special Representative of the Secretary-General for Disaster Risk Reduction, UNDRR; and the Ms. Atsuko Matsumura, Mayor, Uji City opened the 6th Global Summit of GADRI.

On behalf of all members of the summit, the members of the Opening Ceremony took the opportunity to express condolences to the people and governments of Turkey and Syria and to state solidarity at this very challenging time.

The Secretary-General of GADRI, Prof. Hirokazu Tatano presented an overview of the Global Alliance of Disaster Research Institutes (GADRI) and of the history of the Summit. Dr. Genta Nakano, DPRI, Kyoto University shared the results of the pre-conference survey undertaken among the members of GADRI. The survey was responded by 87 institutes of GADRI. Dr. Nakano presented in detail the information of the survey.

The three plenary sessions of the summit featured keynote speeches by ten prominent speakers from around the world to address multidimensional global crises among others from climate change to the recent earthquakes in Southern Turkey, the global covid-19 pandemic, systemic risks and emerging future challenges.



Another forty-three experts in various fields shared their experiences, views and opinions during the two panel discussion sessions. Panel Session I concentrated on the five Committees of GADRI while the Panel Session II focused on New Challenges for Action by GADRI in the areas of Big Science for DRR; Sustainable DRR covering Climate Change, SDGs, and Field DRR; Gender and Inclusivity in DRR Policy and Practices; Putting Health into DRR and Recovery; and Young Scientists Session on Youth and DRR.

Poster Session

The poster session attracted over 50 abstracts. The prospective presenters were encouraged to specifically highlight their respective institutes' research activities, achievements, implementations in support of the Sendai Framework Priority Areas.

In addition to the above, the poster session provided a platform for young and upcoming scientists to share their research achievements, activities and future plans. There were 33 presenters who joined the 6th Global Summit of GADRI in-person to present their work. Six of the presenters won the best abstract award of a GADRI Scholarship to participate in the summit.

Seeds and Needs Networking Session

The Networking Session on Seed and Needs brought together 13 institutions who shared their institutions' research aspirations and challenges.

At the closing session, the conference draft final outcomes and resolution was tabled for discussion and called for inputs from the audience. Draft document of outcomes and resolutions was compiled with important points contributed by all keynote speakers and panel discussion groups. The document of outcomes and resolutions was finalized by Prof. Andrew Collins with the support of Prof. Paul Kovacs and Prof. Hirokazu Tatano. This was later shared by e-mail with all participants of the summit.

GADRI Secretariat awarded 24 full and partial scholarships to various scholars out of which 12 were awarded to female scholars.

The 6th Global Summit of GADRI was attended by 185 participants out of which there were 67 females. The participants represented 74 institutes in 30 economies.



The Opening Ceremony

The Master of Ceremony for Day 1: 15 March 2023, of the 6th Global Summit of the Global Alliance of Disaster Research Institutes (GADRI) was Dr. Masamitsu Onishi, Associate Professor, Disaster Prevention Research Institute (DPRI), Kyoto University. With the university-wide relaxed rules of COVID-19, it made it easier for Dr. Onishi to keep the logistical details to the minimum and welcome the first speaker, Prof. Eiichi Nakakita to open the 6th Global Summit of GADRI.

Prof. Eiichi Nakakita, Director, Disaster Prevention Research Institute (DPRI), Kyoto University



Prior to welcoming all distinguished guests, he took the opportunity to express his condolences to the victims and families in Turkey and Syria.

Proceeding with the welcome remarks, Prof. Nakakita offered a warm

welcome to everyone. He acknowledging and personally welcomed Ms. Mami Mizutori, Special Representative of the Secretary-General for Disaster Risk Reduction, UNDRR, Prof. Nagahiro Minato, President of Kyoto University, and Ms. Atsuko Matsumura, Mayor, Uji City.

With the high school graduations taking place across cities, and cherry blossoms waiting to bloom, echoing Spring around the corner, he said it gives a perfect backdrop to welcome everyone to the Uji Campus of the Kyoto University. Prof. Nakakita further stressed that he is delighted to see everyone in person at the 6th Global Summit of GADRI. The past few years with the global corona virus posed many challenges. He is pleased to see that the research community continued with their important research work in the area of disaster risk reduction and prevention of disasters. He stressed the importance of voicing our opinions supported by evidence-based scientific results to influence decision-making processes in various issues in today's global agendas. He voiced DPRI's mission to "save people's lives, make people happy, and make them smile", and he, as the Director of DPRI, believes that this is very much at the heart of their activities. He believes in strengthening the efforts by the young that this is something with which we should proceed to pass on to the next generation, and the generations to come.

Prof. Nagahiro Minato, President, Kyoto University, Japan

Prof. Nagahiro Minato, President, Kyoto University started his welcome remarks by expressing sincerest sympathies and condolences to the victims of the devastating earthquakes that occurred at the southern border of Turkiye and Syria last month. He expressly stated how Japan, which has experienced such devastating earthquakes in the past, is able to empathize with the pain and suffering of those affected by this terrible catastrophe.

In continuing his welcome address, he stressed how the global agendas such as the Sendai Framework, Paris Agreement on climate change, SDGs, unequivocally draw our attention to the importance of promoting sustainable development and increasing disaster resilience, and encourage us to focus and unite our efforts, with the common goal of leaving no one behind.

He stated that the presence of GADRI has become the foundation of an international research network to systematically promote disaster risk prevention and contribute to global agendas, science and technology roadmaps, and action plans. As a community of science,



we can synergistically combine our research activities, resources, and knowledge to support our communities with evidence-based outcomes and implementable real-world solutions.



Ms. Mami Mizutori, Special Representative of the Secretary-General for Disaster Risk Reduction, UNDRR, Switzerland



Ms. Mizutori warmly thanked the organizers for giving the opportunity to be present at the 6th Global Summit of GADRI. She, too, expressed condolences to people and government of Türkiye and Syria and expressed steadfast solidarity at this very challenging time.

She acknowledged Prof. Hirokazu Tatano, the Chair of the Board

of GADRI, Prof. Paul Kovacs and the Chairs of the summit. She thanked the most generous host Prof. Nagahiro Minato and Prof. Eiichi Nakakita for hosting the Summit at the Kyoto University, Uji Campus and thanked Ms. Atsuko Matsumura, Mayor, Uji City for taking the time to be present at the Summit to greet all participants.

She noted that this time, the 6th Global Summit of GADRI takes place at a time of rapid global change where the impacts of complex risks are cascading across sectors, and across borders.

Madam Mizutori welcomed the focus of GADRI summit which appropriately captured the priorities for reducing global risks. The summit's first area of focus recognized that disaster risk should not be treated in isolation but should be integrated across sectors. The second area of focus of the summit is integrating risk reduction to sustainable development. The third objective of the conference focus is around the need to integrate short term objectives with long term plans for resilience.

Ms. Mizutori expressed her excitement to be present at the 6th Global Summit of GADRI in person to greet everyone and to be among those who understand the challenges faced and dedicated to help the world to develop scalable solutions.

Ms. Atsuko Matsumura, Mayor, Uji City, Kyoto, Japan

Ms. Atsuko Matsumura expressed that she is delighted to congratulate everyone, face-to-face for organizing in grand scale, the 6th Global Summit and GADRI at the DPRI, Kyoto University, Uji Campus. As the Mayor of the Uji City, she welcomed everyone from the bottom of her heart.

She stated that in recent years, various natural disasters such as flood, draught, heatwaves, cold wave have been reported in global scale, and the ability to respond to disasters is being emphasized again.

During the earthquakes that struck Turkey and Syria on 6 February 2023, she noted that more than 52,000 people lost their lives and more than two million people are in need of help. Japan has experienced the Great Hanshin Awaji Earthquake and the Great Eastern Japan Earthquake. She empathized with the people about the hardships that will continue for some time to come. She wished for speedy restorations and revival of the situation.

She also continued to explain how about 10 years ago, the Uji City was inundated by a deluge of unexpected heavy rain which resulted in loss of lives and properties due to the overflowing of rivers; and how the Kyoto University and the Disaster Prevention Research Institute (DPRI), offered expert advice and support. She

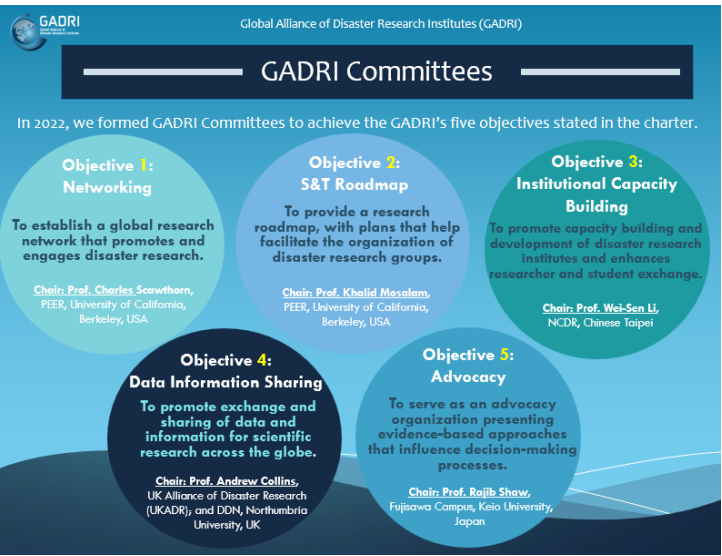


acknowledged the continuous efforts and cooperation the city and people are privileged to enjoy in many areas from the presence of DPRI, Kyoto University in the city. She also stated that the themes of the 6th Global Summit of GADRI are aptly related to the current global situations to achieve a sustainable and a disaster resilient world. She concluded by asserting her strong hope that the summit will deepen research of disaster prevention, and the results of the research will serve the communities and be an impetus to support disaster prone areas.



Prof. Hirokazu Tatano, Secretary-General, Global Alliance of Disaster Research Institutes (GADRI); and Professor and Head, Social Systems for Disaster Risk Governance, Disaster Prevention Research Institute (DPRI), Kyoto University, Japan

As the Secretary-General of the Global Alliance of Disaster Research Institutes (GADRI), Prof. Hirokazu Tatano stated that it gives him great pleasure to welcome everyone to the Uji Campus



and his joy of being able to meet and greet everyone in person.

He outlined the three-day programme of the conference and laid down the goals and objectives of the summit and expected

outcomes. He expressed the main philosophy of the summit is the importance of discussion, learning, exchange and share experiences. In particular, what are the needs and expectations from GADRI? What actions should be planned for example, visions to mitigate in global agendas such as climate change, DRR, etc. Third,



what are the new challenges and how could we tackle them? Through the plenary and discussion sessions, he stated that it is expected to fulfill the agenda and the goals of the summit. At the end, a resolution of the conference will be prepared with the help of all in attendance.

Dr. Genta Nakano, Disaster Prevention Research Institute (DPRI), Kyoto University

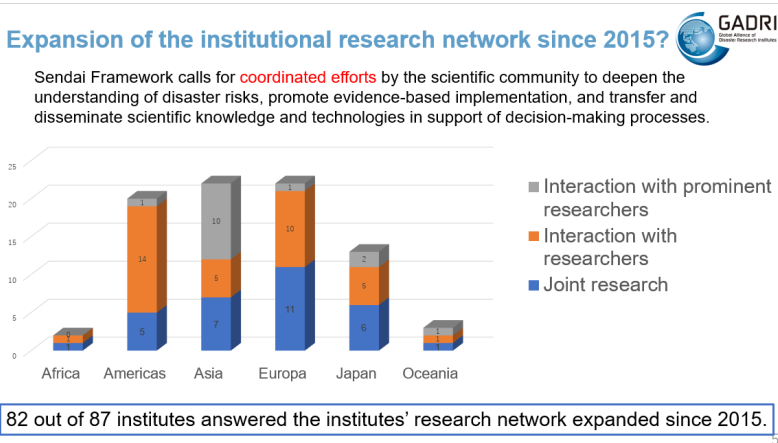
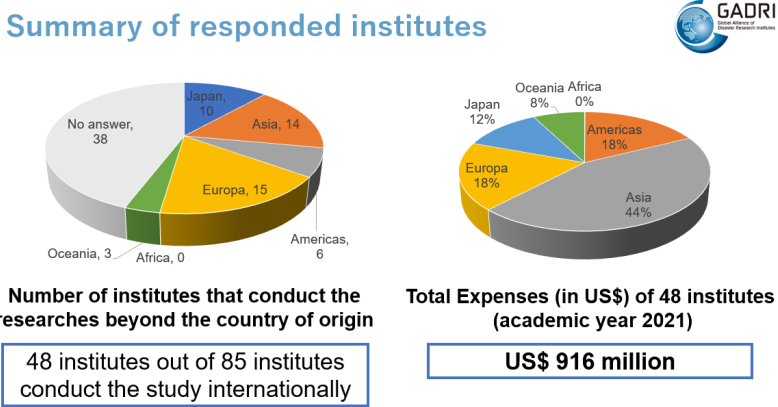
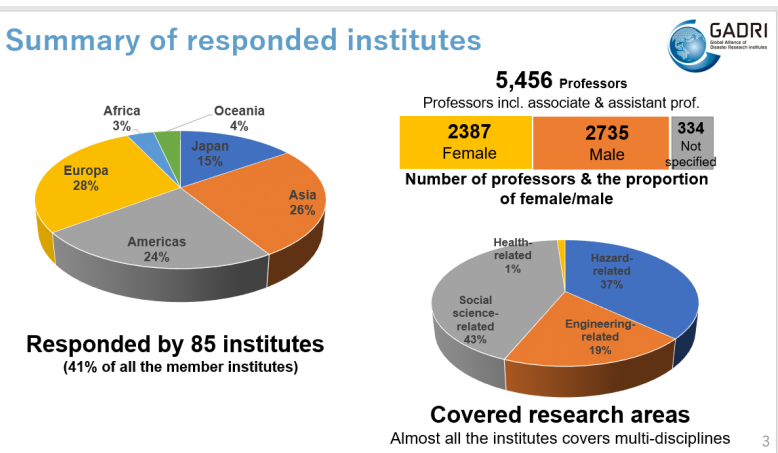


He briefly summarized the results. Out of over 200 members of GADRI, nearly 90 institutes replied to the GADRI Survey. Dr. Nakano will publish the results of this survey in the Proceedings of the 6th Global Summit of GADRI.

After thanking all members of GADRI for their input to the GADRI Survey conducted prior to the 6th Global Summit of GADRI, Dr. Genta Nakano shared the results of the survey. The survey specifically identified three main important areas:

- First, is to learn more about the activities of member institutes.
- Second, is to understand collectively the progress, and achievement of member institutes towards GADRI's objectives (<https://gadri.net/about/Aims/>).
- Third, is to make inputs as GADRI's collective contributions towards the Sendai Midterm Review.

The survey form was distributed electrically to all the GADRI's institutions with the assurance to share the results at the 6th Global Summit.



Plenary Session I: Listening to Various Stakeholders on Integration of Disaster Risks to Present and Future Disasters

Chaired by: Prof. Virginia Murray, Head, Global Disaster Risk Reduction, UK Health Security Agency, UK; and Prof. Rajib Shaw, Keio University, Japan



GADRI look back at its activities and contributions to current key concerns in disaster risk reduction since its inception in March 2015. While disaster risk reduction remains in the core of its activities, GADRI constantly share their viewpoints and contribute to many of the global agendas related to the Sendai Framework, Climate Change initiatives and other DRR related activities. During the 6th Global Summit of GADRI, it hopes to receive feedback from other key stakeholders in the field of academia, government and non-governmental institutions, the UN, private section and other entities.

With the first plenary speaker from the UNDRR, GADRI hoped to be enlightened on current disaster risk reduction in the world; to what extent the Sendai Framework has brought forth countries/states/non-state members to contribute towards achieving the goals set out therein; what could be possible contributions from GADRI be to further encourage the support of the S&T Roadmap to implement the Sendai Framework; and what expectations UNDRR has from the members of the GADRI for the remaining seven years of the Sendai Framework?

The second speaker, Prof. Mustafa Erdik with enlightened the audience with first-hand information on the devastating earthquakes that engulfed Turkey and Syria; and its causes and the damages.

The third speaker, Prof. Masahide Kimoto spoke from the perspective of the climate change related activities in the world. He reviewed the latest results of climate science which supports robust decision-making of human being. He discussed the impacts of climate change on extreme weather that causes disasters together with issues that lead to countermeasures and actions.

The fourth speaker expressed his views from the perspective of the private organizations, citizens, as well as from the academic society to touch upon the significant contributions done so far in DRR; and the expected contributions to DRR during the next decade.

Keynote 1: The state of Disaster Risk Reduction and the Transformations Needed to Take the World from Risk to Resilience, Ms. Mami Mizutori, Special Representative of the Secretary-General for Disaster Risk Reduction, United Nations Office for Disaster Risk Reduction (UNDRR), Switzerland



At the outset, she thanked GADRI for the comprehensive survey conducted prior to the 6th Global Summit of GADRI. She stated that it gave everybody a real perspective of what GADRI is and it is very positive in itself.

From the UNDRR viewpoint of a risk landscape, Ms. Mizutori stated, it is a very complex situation. Risk is systemic. It crosses borders and they are not siloed while approach to risk management is very much siloed. There are systemic risks, cascading impacts, compound disasters; and the Sendai Framework pioneers in this respect.

She stated that since the beginning of the pandemic, the uncertainty has become more and more stronger; and people are living in a world not only with systemic and complex risks, but with a lot of uncertainty. And they are constantly called to adapt the approach to situation. As a result, the conventional risk management and crisis responses system are not working as they are not able to cope up with the situation.

Many are becoming pessimistic about achieving the goals of Sendai Framework and SDGs by 2030; and to say it can be done is a waning. Therefore, it required a “course-correct” o by reviewing what SF-MTR process. It said that failure to plan, is a plan for failure. She continued to share status of the four Priority Areas and how best we could move forward in contributions to achieve them.

Ms. Mami Mizutori once again took the floor to share from the perspective of UNDRR, the current state of disaster risk management, and what can be done to strengthen long term resilience. Specifically, she shared information on findings of the Midterm Review of the Sendai Framework and highlights from GAR for DRR.

Keynote 2: What Happened on 6 February 2023 Earthquakes in Türkiye, Mustafa Erdik, Emeritus Professor, Dept. Earthquake Engineering, Kandilli Observatory and Earthquake Research Institute, Boğaziçi Üniversitesi, Türkiye



Prof. Mustafa Erdik's title of the talk was on "February 6, 2023 Kahramanmaraş- Türkiye Earthquakes – What Happened? Prof. Mustafa accepted the GADRI invitation to speak at the 6th Global Summit of GADRI, specifically to relate what happened on 6 February multiple earthquakes.

Prof. Mustafa stated, that the earthquake hit areas were triple junctions of three major fault lines. After the first earthquake, there was a second one. These two massive earthquakes occurred within 9 hours apart with 7.8 and 7.5 magnitudes respectively.

To make it more comprehensive, he compared the earthquakes to the 1906 San Francisco earthquake, where 80% of the city was destroyed; and closest from Japan would probably be the Great Hanshin earthquake in 1995 with a magnitude of 6.9 with 6,000 mortalities.

In terms of energy released by the Türkiye earthquake he stated that it was three times higher than the Kobe earthquake and he cited examples of the New Zealand and Antioch earthquakes.

The two Türkiye earthquake affected:

- 3.3 million people who were evacuated from the quake zone.
- More than 1.4 million have been resettled.
- There were 280,000 collapsed and heavily damaged buildings
- There are at least 48,000 (54,000 including Syria) deaths and 120,00 injuries.

Prof. Erdik shared before and after photos of the city of Kahramanmaraş and equaled the destruction of the city to an atomic bomb explosion.

From the photographs, a few buildings could be seen still standing and Prof. Erdik explained the reasons behind that.

- As of 12 March 2023, damage assessment investigations were conducted on about 1.8 million buildings, encompassing about 5 million housing units.
- About 280,000 buildings (about 820,000 housing units) were identified as collapsed or to be demolished (96% of these were built before 2000).
- Of the inspected building stock in the earthquake affected region:
 - About 16% were identified with heavy damage to collapse (27% in Hatay)
 - About 2% were identified with medium damage.
 - About 25 % were identified with light damage.
 - About 57 % were identified with no damage.

Prior to the 1998 code, the designer was permitted to design non-ductile reinforced concrete buildings. Driven in part by cost, the designs resulted in non-ductile reinforced concrete buildings (Sezen, 2000) . The 1998 code was similar to the US 1997 Uniform Building Code. The 2019 code has similar features to the ASCE 7-16 and EC8 Codes. Almost 98% of the heavily damaged and collapsed buildings were built before year 2000, designed following the 1968 or 1975 code with inadequate design and construction controls resulting in non-ductile (brittle) concrete frames prone to total collapse during strong earthquake shaking.

He concluded by stating that what is needed is a retrofit campaign that will:

- Improve the earthquake performance of the buildings by external retrofit methods that does not require the tenants to vacate their apartment units.
- Revise the earthquake performance objectives for retrofit (e.g. for Istanbul, collapse prevention under 84-percentile deterministic ground motion) and develop new campaign-specific earthquake retrofit guidelines.



Copy of image from Prof. Erdik's PPT.

Keynote 3: Climate Science for Action, Prof. Masahide Kimoto, President, National Institute for Environmental Studies (NIES); and Professor Emeritus, The University of Tokyo, Japan



Prof. Masahide Kimoto discussed climate science for action. In his presentation, he covered:

- Climate change - Progress
- Impacts of climate change— Changing extremes
 - Compound events, compound impacts
 - Heat wave and drought/pollution ...
- Early warning— Resolution— Processes—Climate impact drivers and impact assessments—From hours to decades

Science should contribute to people's action.

Climate change is taking place and most of the scientific knowledge is summarized in the UN IPCC report in three parts. First, climate change is occurring vastly due to our actions, he stated and it is a fact. Second, climate change triggers other disasters. Third, we are not in the track of the targets of the Paris Agreement.

Although every effort is made to combat climate change, it is not enough and it is impossible to achieve the goals. Therefore, countermeasures against climate change are really urgent. Future science predictions project various scenarios according to the level of efforts to avoid climate change. If burning of fossil fuel continues, the situation will only become even more serious..

The IPCC report summarizing all science papers says that global warming makes extreme weather more frequent and severe. In other words, global warming increases disaster risk. Not only heat, but also heavy rain and drought. In the case of precipitation and hydrology, it has two extremes; heavy rain and drought.

He shared graphs which show increase of both frequency and strength of the extreme events. He stated, therefore, the standard of protecting the previous disaster may not be sufficient in the coming decades and a change in strategy is needed.

- Climate change is projected to increase and intensify extreme weather events and associated disasters. Science can and should provide information to support policy planning.
- Early warning information for extreme weather should be scientifically designed not only for days to hours but also for longer time scales.

Keynote 4: The Potential for Recovery to Support Transformative Improvement in Disaster Risk Reduction, Prof. Paul Kovacs, Chair, Board of Directors of GADRI; and Executive Director, Institute for Catastrophic Loss Reduction (ICLR), Western University, Canada



Reflecting on the conversations he had the previous day with the participants at the Side Event of GADRI, Prof. Paul Kovacs expressed his enthusiasm to be among a group of people generating science knowledge. He stated that, in his opinion, the Four Priority areas in the Sendai Framework Agenda, there is no doubting the disaster risk reduction research community have put everything in place to challenge the increasing disasters and hazards. The Sendai Framework Agenda is the right plan to act on to reduce disasters and build resilience. Yet, again and again, one event after another continue to hamper the agenda items and push them to the bottom. Yet the science foundation is right there to get it right back on track again.

Prof. Kovacs described what is needed for the implementation of the four priority areas of the Sendai Framework - Priority one - understand risk – better hazard data, proactive communication,

improved warnings; priority two - strengthen governance – national DRR plans, perhaps local DRR plans; priority three - invest in resilience – budget for resilience investments; and priority four - build back better – introduce incentives.

He then proceeded to discuss in detail and specifically, the Priority Area Four of the Sendai Framework, Building Back Better. He shared examples of areas that Canada has worked on and seen results; and areas that may also apply to other countries and from which they may wish to draw the knowledge to apply to their individual country situations.. He shared information and how the storytelling of DRR case studies improve share successes of DRR activities in the country. The case studies shared covered the High River following 2013 flood; Calgary following 2020 hailstorm; Barrie following 2021 tornado; and Lytton following 2021 wildfire.

Prof. Kovacs reiterated that the recovery conversation is a big opportunity to be bold and be transformative. To achieve bold and transformative DRR in recovery need proven, affordable solutions to be identified for most hazards; the policy failures have resulted in alarming increase in damages; political will and financial support are needed to crease awareness, incentives and change in regulations; and recovery planning is essential. He concluded by stating that the case studies and other recovery stories gives Canadian community a global opportunity to take science and to push for things in recovery that are hard to do the rest of the time.

Plenary Session II: Visions to mitigate climate change and increase resilience through DRR objectives with SDGs
Chaired by: Prof. Yuichi Ono, Director, IRIDES, Tohoku University, Japan; and Dr. Tom De Groeve, Acting Head of Unit, European Commission, Joint Research Centre (EC-JRC), Italy

Plenary session two shared views from various experts on how best to mitigate climate change and increase resilience through DRR objectives with SDGs. Under the Sustainable Development Goals, *there are 25 targets related to disaster risk reduction in 10 of the 17 sustainable development goals, firmly establishing the role of disaster risk reduction as a core development strategy.* The following three distinguished keynote speakers with takes us through various topics.



(L): Prof. John van de Lindt, Prof. Virginia Murray and Dr. Chipo Mudavanhu



Keynote 5: The Climate Crisis is a Health Crisis - Climate Change and Public Health - links to the Sendai Framework, the Paris Agreement and the SDGs, Prof. Virginia Murray, Head, Global Disaster Risk Reduction, UK Health Security Agency, UK



Prof. Virginia Murray, through her presentation and with all available data, reiterated the fact that climate crisis is a health crisis. On the IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation where she was able to contribute as one of the authors and published in 2012, Prof. Murray showed that change in climate leads to changes in extreme weather and climate events of droughts, floods, fires and even storms. The impact of weather events by nature and severity of events, vulnerability, exposure and increasing severity and frequency of climate events contribute to growing numbers of disaster risk. She shared a diagram that brought together all of the above factors which was published in the IPCC Special Report. She continued to reiterate the importance of understanding individual events and risk factors to understand some of the risks of extreme events and how they translate into impacts and disasters and how the risks management and adaptation opportunities existed.

The opportunities were that of advocacies. Prof. Murray highlighted an example in the UK, how the health protection agency needed a new team on extreme events and health protection. With quite a lot of negotiations and advocacy internally, they were able to build the first extreme events and health protection team which was responsible for heat weather planning, cold weather planning, floods, droughts, winds, wild fires and many other events coming in together.

Moving to 2015 UN agreements, the Sendai Framework, SDGs, Paris Agreement, she stated that all three of them have climate change in them. SDGs very clearly covers climate, Paris Agreement is all about climate; and the Sendai framework is also about climate.

Prof. Murray stated that disasters, many of which are exacerbated by climate change. To foster collaboration, there was a need to implement coherence for climate change disaster risk reduction such as impact of climate change and incorporate DRR measures including adaptations for climate change which are all mentioned in the Sendai Framework and shared the linkages between the SDGs and the Paris Agreement.

Referring to the IPCC Assessment Report 6 and particularly the technical report working group 2 – which is on impacts, adaptation and vulnerability, Prof. Murray stated that the science clearly mentions that any delay in concerted global climate action means missing a brief and rapidly closing window to secure a livable future. Advocacy needs to be clearer, stronger and more personalized. Most specific, to try and change. Multiple climate hazards can present multiple risks to ecosystems and humans.

...climate is not a hazard but climate is a driver of hazards.

Referring to various UN technical reports by IPCC, WMO, and UNFCCC, she stated that climate change is not a hazard but climate is a driver of hazards. It is necessary to be aware of all the different types of hazards that can occur. From the heat wave, to severe weather, to the air pollution, to the increased in vectors, to the increasing allergens, to the increasing water quality impacts, including cholera which causes something even happening now – to the malnutrition, and diarrheal diseases, to the water and food supplies, to the environmental degradation, forced migration, and civil conflicts and also mental health.

She stated that possibly none of these vulnerable things matters. It is to know that these will have significant effect on increased illness and deaths and also increased health inequalities.

What are we doing about it? What have been done this time?

Using an example from the UK, Prof. Murray stated that the UK Health Security Agency has brought in a new Centre for Climate and Health Security in October 2022. It is trying to use the links locally, nationally, and internationally, to increase awareness of the impacts of climate change on public health by building the evidence-based and then mobilise it to the inform policy development.

Prof. Murray concluded by stating that she shared the fact that climate crisis is a health crisis. And this time, unlike covid, there is no vaccination. She referred to the IPCC work that has been done and some of the steps taken at the COP27; as well as WHO's achievements on how they brought together the hazards to try and understand what could be done and steps taken for early warning. She shared how they are going to look at all these different kinds of risks that are going to be impacted and how in the UK, they are trying to deal with it and how the partnership with GADRI is critical in delivering it.

The Climate Crisis is a Health Crisis
Climate Change and Public Health - links to the Sendai Framework, the Paris Agreement and the SDGs



Copy of image from Prof. Murray's PPT

Keynote 6: Digital Twinning of Communities for Disaster Risk Reduction: Climate Adaptive Solutions, Prof. John van de Lindt, Harold H. Short Endowed Chair Professor, Co-Director, Center for Risk-Based Community Resilience Planning, Colorado State University, USA



Spring boarding off from the previous presentation, Prof. John van de Lindt said that one of the recommendations was to improve resilience. His keynote talk was on an illustration of how it is possible to measure the resilience of an

entire city of community so that improvements can be made on it. Although, one of the challenges believed in are that measuring can be done but do not know how much is improving.

At this point of uncertainty, the challenge is climate change, sea level rise (SLR), among others – but the magnitude is highly uncertain.

Socially equitable solutions are possible but require extensive interdisciplinary modeling which have to include:

- Physical infrastructure and buildings
- Social institutions
- Households, the people themselves
- As well as the economy and its interaction of all of those all the way through the process not just risk.

He mentioned how they have wondered of the possibility of having a model to predict the damage probability at the individual building level using physics, so that it could be transferred anywhere to predict not only how many but also which households will dislocate based on their race/ethnicity, income, and other factors. It could be done through the modeling by taking census and synthetically allocating, aggregating and reproducing the census. While protecting the individuals information, this will allow to predict changes in community level incomes by household demographics, changes in gross product at the community level, and changes in tax base by sector as a result of hazard; and ultimately making resilience-formed socially equitable decisions.

Prof. van de Lindt continued to address questions that they ask themselves: what exactly should we be measuring? Who decides what metric levels represent resilience? How does human decisions enter into a resilience calculation? and what do we do with these measured values in the end?

He brought the attention to one of the US Presidential policy directive, “the resilience is the ability to prepare for and adapt to changing conditions and to withstand and recover rapidly from disruptions...”

Particularly drew the attention to several words - it's just prepare for to adapt to those changing conditions or climate to withstand so that's the mitigation effects hardening, stiffening and then recover rapidly. He said the hardest part for modeling is how to model recovery? Ultimately, the desire to improve community resilience and city resilience requires measuring what can, and cannot be seen, touch or feel. The easy part is modeling the things that can be seen. However, modelling the things that cannot be seen, such as the economy and its interaction with the people, with the physical infrastructure, these are thing that brings twin model to the picture.

Prof. van de Lindt continued to explain that by integrating the physics and process-based models with empirically data-driven models and combining components from across disciplines, and IF it represents something close to reality, how they propagate as much uncertainty as possible to look at alternative actions and ideas to explore and enhance community resilience. He also mentioned that in modeling the entire resilience process involves five areas of community stability – populations; economic; social services; physical services; and governance. Without taking these five areas in to modeling, it is not possible to study and model resilience.

He stated that his center, Center for Risk-Based Community Resilience Planning, they are funded by NIST, the National Institute for Standards and Technology which is tasked by Congress in the US with measurement science in support of US Commerce. Prof. van de Lindt continued to explain how the complex INCORE model operates, and what kind of data that can be generated from it; and by using various computational environmental models, how they work to improve the area of community level mitigation.

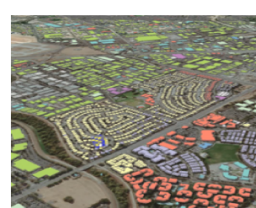
With the help of all the complex models that they use, they are able to calculate the real cost of a hazard. For example, the cost to the people, to the long-term economy, and do a long-term benefit. Those are the decisions to be made with regard to resilience and climate as it is a long-term process.

Prof. van de Lindt concluded by stating that:

- resilience analysis requires “modeling” before, during, and after the hazard whether it's an earthquake or a flood
- modeling physical building and network damage to an event - no matter how comprehensive that's just a portion of the story, and so the real digital twin can't be seen. there's no way to see it all. because it's the people, it's the economy, it's things like that.
- Being able to comprehensively “measure” resilience in terms of stability areas is critical to provide these near optimal solutions. We can mathematically optimize anything. It is just a bunch of equations. But bringing in the community goals and what the community truly wants, that's key.
- “Improving” resilience through communication, decision, and these actionable strategies is the goal.

NIST Center of Excellence for Risk-Based Community Resilience Planning

Digital Twinning of Communities for Disaster Risk Reduction: Climate Adaptive Solutions



John W. van de Lindt

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March 2023; GADRI Global Summit, Kyoto

Keynote 7: Addressing Climate Change and Disaster Risks in the Context of Sustainable Development in Southern Africa, Dr. Chipso Mudavanhu, Vice-President, AADRI; and Senior Lecturer, Bindura University of Science Education, Zimbabwe



Dr. Chipso Mudavanhu's keynote speech was on climate change and disaster in the context of sustainable development in Southern Africa. She shared challenges in implementing the goals set in Sustainable Development Goals and the Sendai Framework, and how hazards impact the human development. Natural hazards, floods, zero poverty, equality, access to quality education, health and outbreak of diseases, these are clearly mentioned in the above-mentioned agendas.

Looking at disaster issues, Dr. Mudavanhu stated that there is no doubt that they are increasing in frequency and intensity. It is very true in the case of Southern Africa which has seen an increase of cyclones and cyclone-induced disasters, and droughts during the past 10 years. These disasters are affecting human development.

The Sustainable Development Goals, especially goal 17 talk about no hunger, zero poverty, equality, access to quality education, and so forth. With an onset of hazards impacting Africa, all one can see are setbacks to human development. For example: when talking about educating children and participating in disaster risk management, especially in rural and vulnerable communities, the children do not have access to these as some of them need to cross the rivers to access schools. When the rivers are flooded, they have no way of getting to schools.

On health and livelihoods, Dr. Mudavanhu stated that there are outbreaks and emergence of new diseases that are becoming complex. Recently, the outbreak of the Newcastle disease is affecting the livelihoods of a larger population as most of the African countries are agrarian and rural. These populations are the most hampered by changing climates, floods and droughts to mention a few. The climate change is affecting the human development and, in the end, it affects even the achievement or the attainment of the Sustainable Development Goals.

Referring to the Paris Agreement, Sustainable Development Goals and the Sendai Framework, she stated that the goal is to reduce vulnerability and also to enhance resilience. However, in observing what is happening in communities back home, and in the region, despite all efforts to domesticate the frameworks at national, local levels and communities, the vulnerabilities are increasing. It seems that there is a lack in building resilience in communities. What is the problem? What are the challenges?

She highlighted a few of the difficulties faced with communities. The number one challenge could be lack of community participation. Citing an example, Dr. Mudavanhu stated when talking about community involvement or representation, it is important to note how they are represented. For example, the vulnerable rural communities, they were represented by the traditional leaders like

the Chiefs, sometimes, living within urban community. The chief may not even visit the rural community where the vulnerable communities are supposed to be represented and end up with misrepresentation at the local level. Another challenge is institutional capacity. It needs to capacitate the local institutions. Also, inadequate legal Frameworks some of which are outdated and not in sync with the new frameworks.

There is also the challenge of documentation and proper record of collection of data at national and regional levels. Sometimes, although the data is available, to package it in a manner that the communities understand is a challenge due to various dialects, community knowledge and accessibilities. It is very important to make sure that the information is packaged in a way that the end user can understand and also take appropriate action.

In the limited technical capacity sector, there is a serious brain drain especially in Zimbabwe - people are leaving the country and there is a limited number of technical personnel to run the various sections of the national disaster offices.

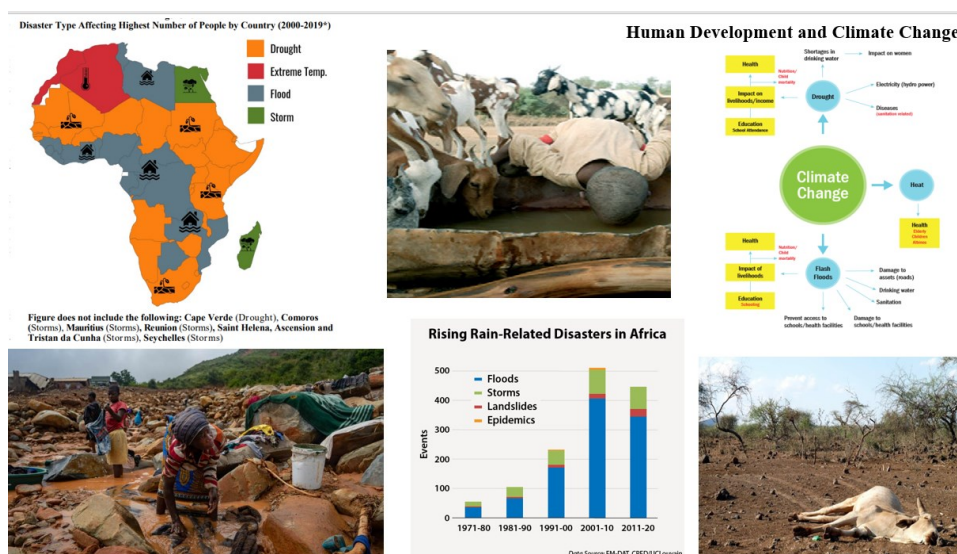
The major challenge of all are budgetary issues. There is inadequate budgetary allocation, and sometimes and in most cases, there is a reactive approach where more resources are put towards disaster response and not to mitigation and not preparedness.

Going back to the UN agreements, Sendai Framework, Paris Agreement, and Sustainable Development Goals, she stated that at local levels, they do not have the strategies nor the policies that support the implementation of these frameworks.

And, there is a poor understanding of disaster risk reduction among the stakeholders. Because, within most communities, there are activities that are contributing to disaster risk reduction on a daily basis. Yet, it is not perceived as DRR activities. When people talk about DRR within communities, they portray it as something completely new. Although, there is a common goal, there is a siloed approach in all sectors. The key reason behind the slow implementation of DRR strategies and policies, is the limited research and development.

In conclusion, Dr. Mudavanhu stated the following recommendations:

- o Community involvement
- o strengthen research and innovation and technology transfer
- o Evidence-based decision-making
- o Data management and sharing
- o Multi-sectoral approach



Plenary Session III: Systemic Risks and Emerging Future Challenges

Chaired by:

Part 1: Prof. Charles Scawthorn, Professor Emeritus, University of California, Berkeley, USA; and Ms. Ritsuko Yamazaki-Honda, Deputy Director, NIED, Japan

Part 2: Prof. Wei-Sen Li, Secretary-General, NCDR, Chinese Taipei; and Prof. Gretchen Kalonji, Dean, IDMR, Sichuan University, China

The final plenary session on Systemic Risks and Emerging Future challenges featured three speakers from diverse backgrounds.

It is always fascinating and interesting to listen to **Prof. Ortwin Renn** and the way he lays down the structures within which we operate and live-by on a daily basis. Discussing Risk Communication and Governance in a Post-Truth Environment, Prof. Ortwin Renn enlightened the audience by touching specifically upon “New challenge of polycrises” and by giving a detailed and comprehensive overview of the entire polycrises situation.

This session was held during the afternoon of Day 2 of the conference, and was Chaired by Prof. Charles Scawthorn and Ms. Ritsuko Yamazaki-Honda.



Keynote 8: Online - Risk Communication and Governance in a Post-Truth Environment, Prof. Ortwin Renn, Retired Scientific Director, International Advanced Science Studies (IASS), Germany

Chaired by: Prof. Charles Scawthorn, Professor Emeritus, University of California, Berkeley, USA; and Ms. Ritsuko Yamazaki-Honda, Deputy Director, NIED, Japan



Discussing Risk Communication and Governance in a Post-Truth Environment, Prof. Ortwin Renn enlightened the audience by touching specifically upon “New challenge of polycrises”, something that is being experienced right now when looking for resilient and inclusive strategies.

He continued to state from a systemic risk perspective, that it is specifically crucial as there is multiple crises that have happened at the same time. For example, the climate crisis is coming up, and at the same time, there is the war in Europe which brings a crisis in energy supply, crisis in supply of goods which affects the whole value chain in the entire world, and also, there is an increase in natural hazards.

Hence the potential loss of a breakdown of system functionality with the likelihood that it affects other systems – one crisis in one system that transports negative impacts into other systems leaving the likelihood of risk cascade in between systems.

Although it is very sophisticated and complex, it is normally fairly good that there is a very simple model to deal with such situations. The model supposed and written about by Prof. Renn is to always look into risk from two components, risk agents and risk absorbing systems. Risk agents are those that carry negative impact for disaster. It could be physical. There are three physical substances – one energy substance and biota; energy can be

any form, it can be explosion, it can be terms of kinetic energy or it can be terms of chemical energy. Substance that of course, toxic substances specifically, and biota the major element, covid was mentioned in the previous session which is of course is a major element. There are also social risk agents. Power can be one, violence, information, including money can be another, and risk of these are different agents. They can have impacts on the so-called risk absorbing system. That is a system that is being exposed to one of these five risk agents.

The new signatures of systemic risk are that these five agents are intertwined. That energy can lead to the release of substance; release of substance can release to biota coming up that can make power shifts, or power may exacerbate the problem and with wrong information, people do the wrong thing and the impacts are even worse. All of those are interrelated and that makes it quite interesting. The emphasis is to look at risk agents as normally as looking into risk analysis.

What do these agents do? Who is exposed? What are the consequences? What are the impacts?

Looking specifically at the risk absorbing system, it is looking at the vulnerability in resilience of the system. For example, the city or even a human body – how vulnerable that person is? How resilient is that person to withstand whatever risk agent is approaching to him or to her. That is kind of a framework within which it operates.

Then crisis itself leads to the polycrises itself which can be basically characterized with high complexity interconnectivity. Tipping points makes it extremely difficult. There are cross-sectoral, transboundary cascading effects though the effects that go beyond a geography, beyond different sectors, beyond political constituencies and all of that means that there is a need to have a more integrated approach. Very often there are major ambiguities when trying to interpret and manage these risks often they are attenuated because all these sides are not seen. Sometimes they are also amplified.

The challenges for managing our governing this multiple risk or this systemic risk were already mentioned. The quantification is difficulty of very complex cause affect assessment which is very often difficult to be well prepared.

There is an endless list of black swans. Everything is connected with everything. Small things can have very major impacts in terms of outcomes. That means that at least in one million events, there is a probability that one over million that something bad happens. That makes it very difficult to do good risk assessment because it is not possible to know all the black swans.

There is always a polarity of knowledge claims and assessments. It is not just one. There are conflicts even between scientists or between scientists and policy makers.

What examples of these kinds of big systemic risks?

- Firstly, there is the intensity of human intervention to the natural environment, climate biodiversity pollution which are main aspects here;
- there is the interconnectivity of technology, cybersecurity, energy blackout and others
- The one that most familiar with is action between natural habitat and human habitats, the earthquake, floods, etc.
- Social side effects of modernization, globalization, pandemics, social activity, populism, war, distress in government, could also be systemic risks. Those are more related to power information but they very often have manifestations in terms of energy, in terms of substance, and in terms of biota.

These are some of the main examples when we talk about systemic risk that leads to polycrises.

What are the requirements for risk and crisis governance?

There are some principal strategies that are quite important.

- First one is that if there are billions of Black Swans, very often, there is no good probability assessments about the risk agents and their impact. It is better to focus on resilience. That means overcoming vulnerabilities of the risk absorbing system. That is true for natural hazards as very often we do not know when they are happening. For example, it is necessary to make sure that the structures are basically capable of withholding or withstanding better natural hazards. Just recently, in Turkey that has not been the case and power and information were one of the big risk agents that made these cities much more vulnerable than they needed to be.
- It is possible to do reverse stress test. Starting with vulnerabilities and assess potential stressors to see how it fit for this.
- A third component is a Black Swan scenario. What is needed to be done is to construct a set of diverse Black Swan scenarios - very unlikely scenarios or tests of robustness of risk absorbing systems. This will not probably forecast or predict the Black Swan that will happen. But if the system works well with three or four Black Swan scenarios, we can be pretty confident there is a possibility that it will also work for us.
- The last thing which Prof. Renn thought important was that it is not possible to know whether it is only systemic risks or systematic risks from science. The

stakeholders with experiential knowledge are needed and also stakeholders should be included to get regional knowledge and to be aware of local concerns.

- There are also new societal conditions in which all of that happens which makes it difficult in terms of governance and communication.

Prof. Renn concluded by describing several properties of polycrises:

- first is high complexity. There are cross-sectoral and cross boundary cascading effect which made it very difficult to manage risk because different agencies are responsible and need to cooperate with each other and very often they do not do it.
- There is stochastic relationship between cause and effects. Again, that makes it something difficult to be effective in a risk reduction.
- There are a lot of nonlinear functional relationships often with tipping points so that trial and error is not a good method to learn; it is necessary to learn from anticipation and;
- There is a lack of attendance to systemic risk very often by risk managers and regulators.

What is required:

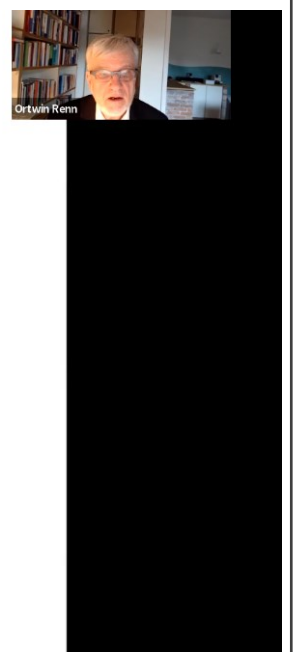
- Need to focus on resilience and risk absorbing systems and make sure that they are as resilient as possible, independent of the stress that they will experience in the future. They will experience some stress in a polycrises. It is very unlikely that it will not face a stress situation.
- Need to focus on a variety of unlikely stress scenarios to make sure that even in a stress scenario that was not expected to come, that it will still be able to deal with that stress and that risk of solving system can recover in a very short period of time.
- Need to focus on integration on multiple stakeholders in public participation. Because it is necessary to have ownership over the process because that guarantee that people will - first play it along the rules; and secondly will be accepting the various strategies that are necessary to make us less vulnerable in a polycrises world.

Prof. Renn ended with a quote "what man desires is not knowledge but certainty". from Bertrand Russell. Policy makers cannot produce certainty. They can help people to develop coping mechanisms to deal prudently with a necessary uncertainty that is required for societies to progress.

QUOTE

■ "What man desires is not knowledge but certainty."
Bertrand Russell

■ Policy makers cannot produce certainty but can help people to develop coping mechanisms to deal prudently with the necessary uncertainty that is required for societies to progress



Chaired by: Prof. Wei-Sen Li, Secretary-General, NCDR, Chinese Taipei; and Prof. Gretchen Kalonji, Dean, IDMR, Sichuan University, China



The Part two of the Plenary Session III was Chaired by Prof. Wei-Sen Li, Secretary-General, NCDR, Chinese Taipei; and Prof. Gretchen Kalonji, Dean, IDMR, Sichuan University, China.

One of the points continuously mentioned from the Plenary Session I up to the GADRI Committee on Networking was, how to relate disaster science news to the community. The suggestion was storytelling of disaster science practices, results and success stories. **Dr. Tom De Groeve** showed us how this could be done and set the stage by starting with the story of the European Union efforts on disaster risk reduction and mitigation to disaster. There is also a wealth of resources and knowledge for everyone who is willing to use them to apply to their local situations.

Prof. David Alexander started his keynote speech with the following: “An eminent French expert on risk, once told me, he was going to found a rapid reflection force. Not a rapid reaction force. They will go to disaster and reflect.” Great! I thought. I would go one step further. And I will want to found a rapid skepticism force. What I do is, I doubt and therefore I am. We will go to disaster and be skeptic. There is a surmountable raw material out there. So I thought, what am I going to do to distract the audience from reading their emails? I thought to myself, maybe I will simply say what I think.”

Keynote 9: Anticipation, Integration and Impact – Three Elements for Tackling Future Risks, Dr. Tom De Groeve, European Commission, Joint Research Centre (EC-JRC), Italy



The keynote presentation by Dr. Tom De Groeve focused on the DRR and DRM challenges, systemic risks and future risks from the perspective of the European Union and the European Commission Joint Research Centre (EC JRC). Through the PPT presentation, he illustrated different aspects and scenarios of the ongoing work within the European Union.

Dr. De Groeve thanked the opportunity to talk about how they see things in the EU, and in the JRC. Because it is interesting to know how different parts of the world deal with the new challenges, challenges of systemic risks and more and more future risks; and to see how they try to move forward in the EU.

He discussed the concept of VUCA-world – a world that is characterized by - Volatility – Uncertainty – Complexity and Ambiguity -. This is actually a way of looking at the world in terms of decision making. What does crises manager have to do? It is not a simple problem anymore. If it is floods, it is more and more complex. There are more things interlinked, and that is what links to systemic risks.

Different impacts may have cascading effects through different systems. The are volatile because it is changing too quickly – sometimes there is talk about permacrisis – meaning one thing after the other.

Dr. De Groeve continued to state that an organization such as the EU, with every government being in crisis mode all the time, EC JRC try to deal with this situation. In a way, risk is dealt within this context of uncertainty. The beginning of COVID is unknown. Nobody knew what the virus could do and what it did. Within that context, decisions were made. It is complex and ambiguous and does not always have an answer. Perhaps, there is no answer, it is about trade-offs and making the right decision.

EC JRC deals with such situations as they are actually part of the that government - EU. There is the EC and the government part of the EU. Within that lies the research center, JRC which does science for policy, to help the policies of the European level, policies that are translated to the member states of the EU. In there, there is one unit, the Disaster Risk Unit which is lead by Dr. Tom De Groeve. There is also a center, Disaster Risk Management Knowledge Centre, working together on interdisciplinary research.

The policies that they work for is what the 27 member states can do together under the civil protection. The solidarity principle is important. If something happens to one country, another can help. They need to be member states and requested and encouraged to be more and more resilient. At the European level there is also a lot of thinking what that means in a collaborative context. Because for EU, the EC rarely dictates what happens. It is more about collaborations and about doing things together.

Collaboration is in the DNA of the EU and Dr. De Groeve stated that it is also within themselves. They also work externally in the context of the Sendai Framework, etc. in the humanitarian world and towards the Sustainable Development Goals.

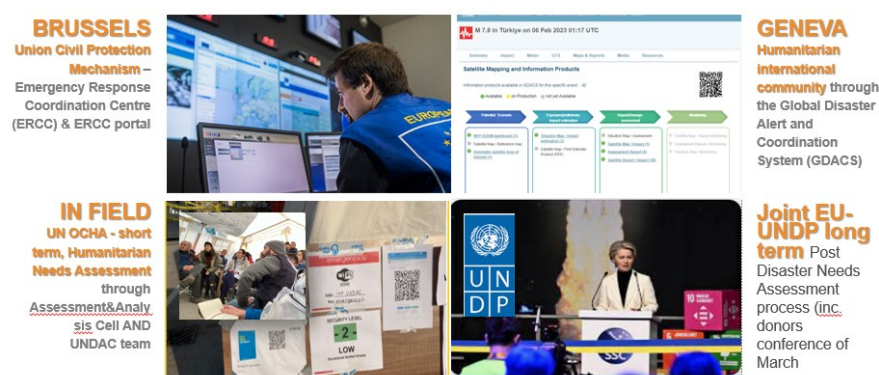
A few of the priorities:

- Understanding risks and the risks of the future – and acting on them. The work we do is actionable, again similar to objectives of GADRI. Using a cartoon by Graeme MacKay, he said that we have a short-term vision. When it was COVID, our thoughts were about COVID, and did not think about other potential risks that could come in the future.
- Having a mindset, where one can try to think of the risks, further into the future, and the broader picture is very important. It is to try through things like foresight, looking further ahead, working with others nationally, and trying to have things on the radar. It is important for them, but also for the EU and other organizations that need to manage risks.
- 2nd part is the satellite world – where their big data is – modelling of all these things. It is an enhanced situational awareness for crisis management. For example: In case of crisis happens, to be there, to give the right information at the right time to the disaster managers.

Those are the two area where we can improve a lot and where our research really focuses. Another important aspect of the Centre is its publications. The knowledge is summarized through books.

3. Situational awareness and crisis management

Main users of JRC scientific analyses



14



On the policy side, he stated that it is not easy. The policy side, is also very complex. Perhaps more complex. Definitely for them as they do not necessarily understand how things work, who has which responsibility and how the whole system works. Yet, it is important to try to understand so that they can be the bridge.

The principles are a very important part - try to anticipate and work in an environment discussed previously, and think of the impact of everything that is done by the Centre.

The three principles of the Joint Research Centre.

- Anticipation – to anticipate all the time. As scientists, it is possible to look a bit further ahead than policy makers. It is possible to bring a bit more vision, and this should be made the task of scientists.
- Integration – both sides need to be integrated
- Impact – is having a business approach to the work that is done. Not just doing science for the fun of science. It has to achieve clear objectives and try to measure.

He stated that it is also necessary for them to think ahead with a broadest view on future risks; and foresight are important such as to be on top of current and ongoing events and disasters.

He shared examples for anticipation - Climate change anticipation - A result of a whole series of study on climate change in Europe.

Another point Dr. De Groeve touched upon was the humanitarian crisis, a very important part of work for EC JRC. What happens in the future at humanitarian crisis level and shared the risks in the future using IPCC predictions cascade in to humanitarian risks. Figures showed that there will be an increase in 36 countries in the higher risk category to 52 countries in 2030 in the worse-case scenario. Increase in the number of countries in humanitarian crisis does not look good. Even in a best-case scenario, there is also an increase. Even in a more optimistic scenario, it will be definitely be worse even if it goes to a net zero situation.

On risk data, Dr. Groeve said that there is always a dream of putting data together. It may not work as data is going to be everywhere—to have the process for where things come together, where the standards are, and where the discussions about it are, and comparing data, and throwing it from one discipline to another—all these facts are important and come in to play. He shared an example of the European Central Bank using the data that comes from fires and floods to do their report for the financial world.

..... it takes skills to develop the foresight and knowledge management as a profession

In conclusion, Dr. Groeve stated that to anticipate, integrate and deliver impact is very useful as a concept for every action they do. But it takes skills to develop the foresight and knowledge management as a profession. Be strategic about things. We really think strategically but our data, communication, strategy, and stakeholder engagement play a bigger part in putting things together. He said he will be happy work with anyone who would want to connect and benefit from the European story.

Keynote 10: Disaster Science: Updating Theory to Guide Disaster Risk Reduction in the Future, Prof. David Alexander, Institute for Risk and Disaster Reduction (IRDR), University College London, UK



Prof. David Alexander stated that theory is necessary because it shines a light on what we are doing. The trouble with it is much of the theory used in it dates from the 1960s if not earlier. Meanwhile the world has moved on. It is moving on faster, and faster and faster. At least, it discovered systemic risks. Actually, if one reads about the origins of these in the business economics field, they would call it systematic risk. Because systemic risk is actually caused by a single entity. Nevertheless, we are talking about the possible proliferation towards the breakdown of the entire system.

What does it take for the world to change its attitude to disaster, he asked. The threshold of political and public tolerance is passed. What would it take for the world economy to reorientate itself towards the problem of disaster? It actually needs to without necessarily being existentialist.

Complexity - clearly it has a variety of important ingredients that needs looking at- perhaps one at a time or at least some of them. The trouble with the complexity of disaster risk is that it goes in a variety of different directions.

Perhaps, to take at least five of them. And they are composed of a whole pot full of different ingredients that we somehow got to deal with. Prof. Alexander stated that thinking about that for a while, he thought, perhaps he can steal a word. And the word he stole was intersectionality. It, of course, comes from studies of race and gender but actually have somehow to deal with intersectionality on a variety of different levels. There is the intersection of several things; different causes; different kinds of disaster. For example: there were three earthquakes during the bulk of covid. They required a very different response to that given to the pandemic disease. Intersection of disaster within its context and many aspects of the context are connected social to social circumstances.

We live in an age which really is rather threatening in some ways said Prof. Alexander. Human rights are in retreat. Covid itself led to the diminution of human rights. Democracy threatened by authoritarianism and in some of the cases, the scope of democracy is narrowing right now. Identity perhaps needs a rethink. Sovereignty - what does that actually mean? It is the source of so much conflict but do we need to redefine it in a globalized world. Globalization has arrived. Mobility - the cat is out of the bag. It cannot be contained. It will not be contained. Welfare - easy to define but nobody does it. Nobody wants to define welfare. They might have to live up to their own definition but it is fundamental to disaster management reduction, etc. Legality – it is under threat by anomie (nihilism).

Showing the pyramid of Abraham Maslow dating to 1942, Prof. Alexander said that he thinks it is time to update it a little bit. A layer should be written related to connectivity to connection as we depend upon it so much in this day and age. Not only, but what that means is that we are increasingly and heavily dependent on critical infrastructure. What if that goes wrong? The essence is according to Prof. Alexander is of cascading consequences as it is the interaction between different kinds of vulnerability. He stated that if you like intersectionality again which can multiply to give us an escalation in the cascading path that could well mean that the secondary impact is worse than the primary ones.

Secondary events, cascading paths, complexity and the transfer, by what is called panarchy of effects to different scales from the global to the local simultaneously. That really is complexity. At the heart of its critical infrastructure which of course is multifaceted, multi-dimensional, not merely a question of technology in some kind of geographical space but it also has a social component. Of course, a cyber component which is also increasingly important and is also dynamically changing. For example, we are moving somewhat away from direct sabotage towards subversion towards digital influence.

What does that mean for the nature of knowledge? Here is a problem that needs dealing with and not merely with the objective reality that is produced as scientists and consumed as scientists. Or the perceived reality of those we study but the fact that they are perceptions coalescing to something which we can call manufactured reality. In other words, it might not be true. For example, conspiracy theories about vaccination- but we still have to deal with it and in a big way. If it is ignored and think it does not mean anything, then we are missing out on something absolutely fundamental in society. The risk of that is, if it is not under control somehow, and hopefully democratically, we will end up with the word resurrected by the French sociologist Emil Durkheim 1893 book on Labour, which is “anomie” which is a form of nihilism. And abandonment of standards and principles that could be very profound for disaster governance.

Prof. Alexander shared a thought that occurred to him which is that you cannot make people resilient against disasters if they are not resilient generally. A very important point, he thought but often a neglected one. On that basis, he put together the “egg hypothesis”.

He stated - we have learned rather painfully and rather slowly and exactly 40 years, that we need to look not merely at the superficial causes of disasters but at the root causes of them – that is the yoke. He continued to state that he thinks if we cannot understand disaster, if we do not understand the context in which it occurs, which he would define as things that are not in any way directly related, they might not even be related to the disaster at all. In other words, specific vulnerability to floods or whatever occurs within the context of general vulnerability, if people are generally vulnerable, then one cannot stop them from being specifically vulnerable properly.

Referring to the 1950s Nobel Prize winning economist Herbert Simon's idea which divided into the satisficer of the optimizer - either you didn't exercise all his options or did but always did the best. What it does actually mean is as we grapple with a profound impact of information technology, we should change not really the way people think about things but the way they do things.

In conclusion, Prof. Alexander stated that:

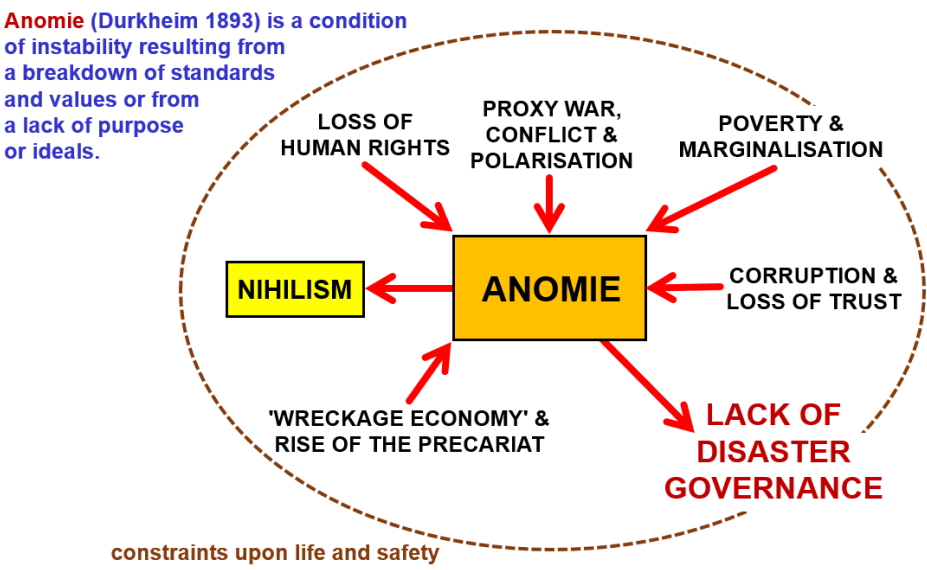
Participatory democracy may be in the retreat but it is actually the answer. It is the magic ingredient. It gives access to information and the ability to act.

Inequality and inequity often result from poor human rights and may be diagnostic of inability to act. For example: some actions might be terribly negative but with guidance and encouragement, it can be build-back-better etc.

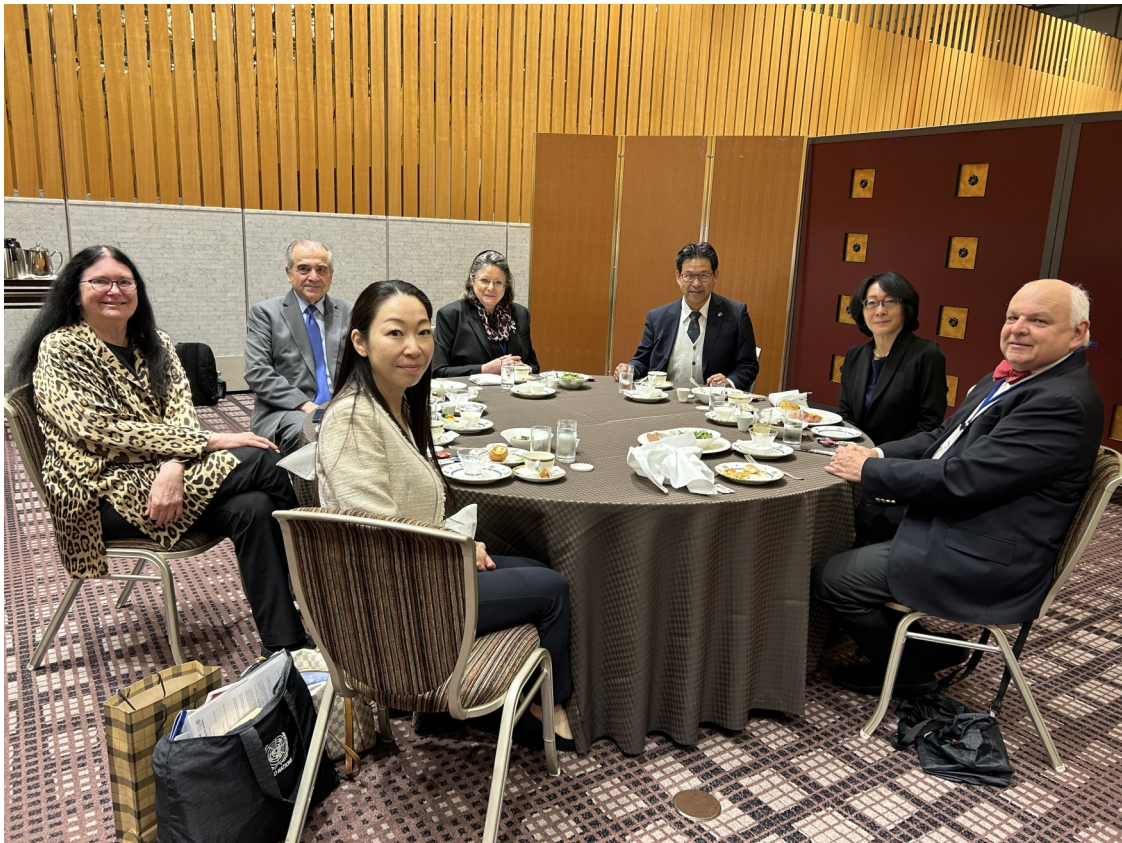
The foundation of rights is shifting as the world goes rapidly through momentous change. For example: Since 1970 to 1973, there has been increasing divergence of wealth. The world's billionaires for example, increased their wealth by 24% in one year as a result of covid at the expense of the poor. Momentous changing.

Foresight – it is absolutely necessary to know what the future outcomes are likely to be. Prof. Alexander's argument here was that we need civil protections that are not slightly bigger than the ones we have got now but in an order of magnitude bigger. For example: in Southern France last summer, 2,000 Fire Fighters were needed to fight the wildfires in the ground. Next time, they may need 20,000 not 2,000. It is necessary to get used to that idea because such are the hazards we are facing. Foresight is the only way we will get them under control. Of course, we should also move from response to emphasis on mitigation preparation and disaster reduction.

Referring to Dr. Tom De Groeve's earlier presentation, Prof. Alexander said he is glad that the European Union existed. He is glad to be a citizen of it too. He is equally glad that it has a mechanism that helps to coordinate. He said that many more resources should be invested in that as the people and the expertise are there. The needs are going to show up very, very quickly. One could also say that response is also mitigation because one of the future key tasks is going to be damaged limitation.



GADRI Member Breakfast Meeting with Ms. Mami Mizutori, Special Representative of the Secretary-General for Disaster Risk Reduction, UNDRR, Switzerland at the Hotel Granvia, Kyoto, Japan



GADRI Regional Alliances: Showcasing Collaboration, Research Workflow and Opportunities

Chaired by: Prof. Peter Sammonds and Prof. Kaoru Takara, Emeritus Professor, Kyoto University

Activities of Natural Disaster Research Council in Japan, Prof. Makoto Okumura, Natural Disaster Science Council (NDRC), Japan



• The Japan Academic Society for Disaster Science and Engineering (JASDE) was established in January 2016. It promotes the promotion of research on natural disasters.

Prof. Makoto Okumura, Director of the Natural Disaster Science Council (NDRC) of Japan outlined the structure and purpose of the organization. A nationwide Japanese organization which aims to facilitate cooperations among institutes as well as researchers by

encouraging discussion of research plans and academic information on natural disasters and mitigation. Although it is not a local branch of GADRI, its functions and objectives are similar to GADRI. NDRC also gathers evidence-based findings from ongoing studies and use the information to plan and propose future research on natural disasters.

In the event of a natural disaster occurrence in Japan or abroad, NDRC goes into action to put forward a nationwide interdisciplinary research proposal. With NDRC's academic significance in the society, together with the cooperation from other natural disaster research networks and local branches, research teams are dispatched to such disasters. Such research activities are aimed to better understand disaster mechanisms, and to contribute to reduce the risk by proposing strategies that

can minimize damage in the event of a similar case. Research results are usually disseminated through published reports and symposia. NDRC strives to improve its management by carrying out self-inspections

including organizational reform for a better research and check-and-review of the study. As of 2009, the Government of Japan established the Joint Use Research Center Program at the Disaster Prevention Research Institute (DPRI), Kyoto University. Since then, all activities fall within this umbrella.

Further, NDRC strives to contribute to the prevention and reduction of natural disasters around the world and help establish resilient societies. Along these lines, NDRC is expected to develop natural disaster research in collaboration with research institutes of natural disasters in other countries. Prof. Okumura concluded his presentation by stating that as a representative body of the community, NDRC is ready to cooperate with GADRI, and to conduct international collaboration in the world, by appointment of new division within NDRC to take charge of these international activities. NDRC is eager to find opportunities to share their findings with a wider audience around the globe.



North American Alliance of Hazards and Disaster Research Institutes (NAAHDRI) Activities: Fostering Interdisciplinary Research and Community Engagement to Better Confront Increasing Disasters under the Changing Climate - Dr. Guirong (Grace) Yan, Director, CHM&CR, Missouri University of Science and Technology, USA



Dr. Grace Yan, the current Chair of NAAHDRI, introduced the regional alliance and its activities on behalf of Prof. Lori Peek.

What NAAHDRI has been doing to foster interdisciplinary

research and community engagement to better confront increasing disasters. Currently, NAAHDRI has a membership of 100 research centers affiliated and located in the US, Canada and the Caribbean. When it comes to NAAHDRI, one important person Dr. Yan mentioned was Prof. Lori Peek who sent her regrets for not attending the summit and sends her best wishes for the conference. She is one of the important persons for creation of NAAHDRI.

Along with Dr. Peek, there are two other NAAHDRI founders, they are Prof. Paul Kovacs and Prof. John van de Lindt. Dr. van de Lindt is also a former member of the Board of Directors.

With a seven-member Board, NAAHDRI move forward aggressively within the North American region creating opportunities for its members to contribute to hazards and disaster research; and finding ways to innovatively, disseminate the research findings to help communities. To accomplish these tasks, the following five committees were set-up:

- Justice, Equity, and Future Leadership Committee, Prof. Lori Peek, University of Colorado Boulder
- Membership Relations Committee. Prof. Melanie Gall, Arizona State University
- Policy Advocacy Committee, Dr. Rachel Orsen, Florida Intl
- Research Committee, Prof. John van de Lindt, and Dr. Jamie Kruse, Colorado State University
- Strategic Planning Committee, Dr. Karl Cane, University of Hawaii

There are awards for members, NAAHDRI Engagement Award.

NAAHDRI innovatively disseminate its research findings to the communities. One of the most recognized and ongoing initiative is to ask members to contribute 100 resilience stories within 1000 words.

- The science—what is being delivered
- The trigger—what is the societal problem, what is the hazard
- The approach – what is the approach
- The outcome – what is the outcome.
- Remarks from the community

NAAHDRI look forward to working with all other alliances to achieve disaster risk reduction and to better living of whole world.

African Alliance for Disaster Research Institutes (AADRI) - Prof. Desmond Manatsa, President, AADRI; and Executive Dean, Faculty of Science and Engineering, Bindura University of Science, Zimbabwe



Prof. Desmond Manatsa shared information on the African Alliance for Disaster Research Institutes (AADRI) - What they are for and what they have achieved so far. Rational for AADRI :

- Africa’s disaster research community is fragmented and diverse.
- No clear collaboration and partnership to inform decision-making in African
- Africa’s disaster research output is less than 1% of global disaster research
- No hub of Africa’s disaster research

The forum is for 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 organizations comprise of 10 universities from 5 countries – Botswana, Malawi, Mozambique, Ghana and South Africa. Also, include governmental, NGOs, private sector and disaster research PhD students.

AADRI is an independent alliance that is managed by with voluntary contributions from the Africa’s research community. Secretariat is hosted by the School of Climate Change and Disaster Research; Bindura University, Zimbabwe. The committees within the alliance will be rotating.

AADRI’s main theme are for disaster risk reduction; climate change adaptation; and sustainable development.

There are various Collaboration & Research projects.

- The way forward is the plan to hold the first AADRI conference in October 2023.
- The first AADRI substantive committee to be elected from different African countries and institutes
- Consultations are ongoing to have the conference to be held at new SHOC centre in Mozambique
- Shifting focus from Zimbabwe is a strategy for AADRI to have a continental outlook
- Secretariate to remain at BUSE according to the current AADRI constitution.

South Asia Alliance of Disaster Research Institutes (SAADRI) - Prof. Mahua Mukherjee, Secretary-General, SAADRI; and Professor, IIT Roorkee, India



Prof. Mahua Mukherjee, Secretary-General, SAADRI; and Professor, IIT Roorkee, India said that the South Asia Alliance of Disaster Research Institutes (SAADRI), is new and started in 2021. South Asian regions is the most disaster-prone area of the globe. Whenever looking at a risk report, it is possible to see how the South Asia Region is being identified as the most risk prone area.

What we have done – we started with understanding the challenges with our strengths.

The working groups work on bringing the synergy between SDGs, Sendai Framework and the Climate Change Agenda.

- The first working group focuses on earthquake and landslide early- warning systems.
- Second group works on Flood, cyclone and tsunami early warning systems.
- Third group on critical infrastructure resilience.
- Fourth group concentrates on participatory community resilience;
- While the fifth group is working on nature-based resilience.
- Recently an additional sixth group is formed to tackle climate change impact on environment and health.
- In addition, there is a young professionals platform; and a SAADRI newsletter.

One of the features of the newsletter is, it is available in the vernacular language of the country to reach people easily.

Our initiatives include:

- SAADRI lectures
- Knowledge platform –
- Disaster management action frontiers
- Planet bring prosperity – focus on nature-based resilience
- DRR Awareness and Education for young SAADRI members
- Investment related research activities.
- Partnerships are the starting point and mainstay of SAADRI.
- Continue efforts towards SFDRR Global Targets

UK Alliance for Disaster Research (UKADR) - Prof. Andrew Collins, Advisor, UKADR; and Disaster and Development Network, Northumbria University Newcastle, UK



Prof. Andrew Collins presented the UK Alliance for Disaster Research (UKADR) – which is set up with a Steering Committee, Advisory Board – there are a total of 15 steering committee members, and a few members of the Steering Committee are also attending the 6th Global Summit of GADRI..

UKADR is quite widespread in the UK. There are about 24 institutional members and 300 individual members while maintaining links with other alliances.

Why we need UKADR?

- Support UK government commitments to the Sendai Framework for Disaster Risk Reduction 2015 - 2030
- Enable smart, rapid response to international emergencies
- Inform the wider international development and disaster risk reduction policy process

Respond to the needs of UK research community

- DRR lacked a coherent advocacy voice to UK government compared to other specialisms
- To avoid institutional competition that can undermine collective weight – collaborate rather than competing.
- Make new partnerships easier
- *Maintain global links in a more coordinated way*

What UKADR has achieved so far

- Strategic Working through an elected UKADR Committee and Advisory Board
- A solid Constitution that has undergone consultation and update during 2022.
- Called upon by national research representations to steer content of funding calls, particularly those of the Natural Environment Research Council (NERC)
 - e.g. advising on rapid and agile research.
 - Joint UKADR–DRG Resilience Workshop that steered £20 million Global Challenges Research Fund (GCRF) 'Equitable Resilience' and 'Systemic Risk' themes.
- Serves as academic point of liaison for UK Disasters Research Group (DRG) – this comprises Government and others policy

gatekeepers including the Cabinet Office, Foreign Commonwealth and Development Office (FCDO), Go-Science, Royal Society, UKCDR and ELRHA.

- Partner for COP26 Adaptation and Resilience Series
- Reference group for UNDRR STAGs including through reviewing of UK Risk Management
- Regional link for GADRI and International Science Council Co-sponsored Programmes such as IRDR
- Open elections for new life as it progresses
- Early Career Research Network

There are UKADR events

- Annual UKADR conferences
- UKADR Research priorities as expressed by its membership
 - Understanding Risk
 - Disaster science methodologies
 - Mechanisms of investment and research governance

UKADR ECR Network

To bring young scientists together.

The overarching objectives of the network are to allow networking with other colleagues; to bring out professionals who are isolated in their own institutions; allows cross-institutional engagement for next generation of researchers.

It allows also to develop joint grant initiatives and it is with the UKADR steering group. There are about 30 members. We work with networks of researchers.

Work of UKADR ECR Network was presented by Dr. Mark Ashley Parry.



Outcomes of the 3rd World Bosai Forum, Sendai, Japan from 10 to 13 March 2023 - Prof. Yuichi Ono, Director, IRIDES, Tohoku University, Japan



Prof. Yuichi Ono, Founder and Representative Director, World BOSAI Forum, delivered the report of the 3rd World Bosai Forum at Sendai International Center, Tohoku University, Sendai, Japan from 10 to 13 March 2023. It was held back to back with the GADRI conference. At the bosai forum, we talked about scientists interacting with governmental representatives, NGOs., private sector and many others. There were 32 countries representing more than 5,000 participants gathered in Sendai. There were 30- sessions of 90-minute durations.

Outcomes of the Bosai forum were:

- December last year, Bosai forum and the risk forum were related. We support the world risk forum in Davos, Switzerland. Global Risk forum organized a small meeting of 30 people in Santis, Switzerland.

Recommendation and the Sendai Bosai Forum inputs:

- There were 20 points of recommendations which covered Sendai Priorities

Overarching recommendations.

1. Strengthening of the national platforms and the secretariat.
2. Priority 1 – need sound and reliable evidence on data collection and analysis.
3. To enhance credibility, utilizing historical disaster loss and damage data and statistics
4. need consistent and understandable metrics regarding disaster risk reduction and building resilience.
5. The Sendai monitoring should be done not only by national governments but also local governments, including municipalities, to understand disaster risks at the local level. In this regard, the Sendai City prepared a report on the Sendai Midterm Review.
6. need more robust education programs for securing skilled human resources dedicated to disaster risk reduction.
7. must strengthen the National Platform for Disaster Risk Reduction and coordination with national organizations. Sendai Framework the contact point is the national disaster management authority or the office. They are not necessarily building DRR infrastructure and funds are from the Ministry of finance. It is necessary to convince the ministry of finance about DRR infrastructure to receive the necessary funding required to build DRR infrastructure.
8. stress the importance of balance between structural and non-structural measures to reduce disaster risk.

9. encourage further involvement of the private sector in investments in disaster risk reduction.
10. Specific actions (tangible, measurable, visible, 'mapable,' GIS-based actions) are needed at the local level. – Global level agendas should be able to be implementable at local levels. Since all disasters are affected at the local levels, activities must be action oriented.
11. Continued investment in disaster risk reduction, including cooperation and guidance with private investors is necessary for substantial risk reduction.
12. need to link disaster risk reduction with urban and rural land use planning.
13. need to develop better financial mechanisms for resilient infrastructure, including insurance of public assets.
14. Pre-disaster investment and DRR actions should be optimized based on the economic and social development level of the countries and regions.
15. Pre-disaster recovery planning derived from the Build Back Better principles learned from the Great East Japan Earthquake and Tsunami can reduce the recovery time and serve as effective pre-disaster DRR investment.
16. Scientific global collaboration networks should be strengthened with more involvement of academia to share successful cases and to improve the accuracy of disaster risk assessment.
17. The forum identified a need for an intergovernmental venue to discuss key disaster risk reduction issues from the NDMO's perspective.
18. The forum concerned that disaster risk reduction issues related to climate change are currently discussed and decided without sufficient involvement of NDMOs in the global process of climate change adaptation under the UNFCCC, especially in the COP series.
19. There is a need to bridge the gap and share knowledge between countries that have long dealt with climate change and those facing climate change as a new risk. Conventional disaster risk reduction strategies are also effective for climate change-induced disasters.
20. There is a need for science-based discussions and evidence on the linkages between climate change adaptation measures and disaster risk reduction, based on solid data on disaster losses and damages at all levels.

Prof. Ono stressed the importance of the early warning systems. With his experience, he has seen how the early warning systems have been effective in saving lives but not the infrastructure or livelihoods. The UN Secretary-General has called for the early warning systems to be established in the entire world.

A possible approach in the future might need to categorize the countries, depending on the development of the country status, developed countries, middle-income countries, LDCs., etc. Early warning systems can be effective for certain countries. DRR recipe is different for each country and it should be tailored to each country depending on the available resources.

Closing Ceremony and the Banquet of the 6th Global Summit of GADRI Rihga Royal Hotel, Kyoto MC: Dr. Yuki Matsushi, DPRI, Kyoto University



Panel Discussion Session I-A : Towards GADRI Objectives of Achieving a Sustainable and Resilient Society Against Disasters

Chairs: Prof. Hirokazu Tatano, Secretary-General, GADRI; DPRI, Kyoto University, Japan; and Dr. Chipu Mudavanhu, Vice-President, AADRI; and Senior Lecturer, Bindura University of Science Education, Zimbabwe

The global corona virus pandemic and cascading risks have taught that the conventional approach to disaster risk planning and management is ineffective for the development of sustainable and resilient communities. A worldwide pandemic underscores the importance of integrating the following key areas: - and

- i. Disaster risk should not be treated in isolation but should be integrated with health risks, climate change, and environmental risks;
- ii. DRR objectives and vision should be integrated with sustainable development goals to foster a resilient world;
- iii. Short-term DRR objectives need to be integrated with a long-term vision and plans for a resilient society.

Towards a sustainable and resilient society, the GADRI's five-

fold objectives, which include establishing global research networks, developing research roadmaps and plans, building the capacities of research institutes, sharing information and engaging in collaborative research, and advocating for organizations, need to be directed toward the above-mentioned three key areas for integration in research and development.

The 6th GADRI Global Summit panel discussion sessions aimed to systematically identify the processes, techniques, evidence, challenges and opportunities for achieving the GADRI objectives for a sustainable and resilient society against hazards and working to keep them from becoming disasters. Program participants were able to communicate academic science across scientific disciplines to policymakers and practitioners.

On Day 2, the outcomes and recommendations of the Panel Group Discussion Session I were shared by a rapporteur nominated by each Committee.

Panel Session was chaired by Prof. Hirokazu Tatano and Dr. Chipu Mudavanhu.

I-A: Committee on Networking—Ms. Ritsuko Yamazaki-Honda

I-B: Committee on Science and Technology roadmap—Prof. Hirokazu Tatano

I-C: Committee on Institutional Capacity Building—Dr. Subhajyoti Samaddar

I-D: Committee on Data and Information Sharing—Dr. Tom De Groeve

I-E: Committee on Advocacy—Prof. Irasema Alcantara-Ayala



I-A: Committee on Networking - Fostering Networking to Enhance Global DRR

The session was chaired by Prof. Charles Scawthorn, Chair and Ms. Ritsuko Yamazaki-Honda, Co-Chair

The session committed to explore how networking can be fostered by GADRI and ways to improve disseminating GADRI's message for improving global DRR extensively among GADRR community by encouraging networking among individual researcher and their interaction. It also explored ways to extend it to the media, governments, MDBs, NGOs and local groups .

Four speakers from diverse backgrounds were invited to the panel discussion session which was held in a “world café” style – which involved an *ad hoc* organizing of participants into small groups and moving around in musical-chairs fashion to deepen discussions on the presentations by the speakers:

The speakers were:

- Rajib Shaw, Professor, Keio University, Tokyo
- Ronan Sato, Associate, Energy & Environment Investment, Tokyo
- Jean-Paul Pinelli, Professor, Florida Institute of Technology
- Hiroyuki Goto, Disaster Prevention Research Institute (DPRI), Kyoto University

The Committee Chair and Co-Chair submitted the following report of achievements and recommendations at the end of the Session.

Key questions addressed during the session:

1. **How can we foster exchange between individual GADRI researchers?**
 - Would a directory of GADRI institution researchers contribute to this goal?
 - Would monthly on-line discussion/seminars on specific topics be of interest?
2. **Which stakeholders should GADRI be networking with?** (e.g. international agencies, MDBs, NGOs, etc.)
 - What would be specific goals in doing so?
3. **How would GADRI approach networking with multitude of DRR consumers? How can GADRI support/assist its members in need?**



Results from the discussions:

1. How can we foster exchange between individual GADRI researchers?

- Young professionals/researchers to collaborate and exchange in and across region. Online sessions or even better would face-to-face interactions
- Use social media or database *as a platform to connect internally and engage (FB, Instagram).
- Feed all information outcomes of events, research meetings, etc. into “GADRI YouTube Channel”
- Storytelling as researchers - a “People-centered GADRI” activity particularly aimed at vulnerable people for disaster mitigation measures. GADRI, as an umbrella, to facilitate storytelling.
- Internal association or regional association

* External networking with institutions on DRR

2. Which stakeholders should GADRI be networking with?

Education ... students of any school level

- To reach out for instance;
- At global level: UNESCO a good focal point and possible to connect through online training
- At National level – there are examples from Japan and Thailand
 - Education department at university level which should have connections
 - Disaster preparedness training for teachers
- At Decentralized, local level
e.g. (Thai) School safety program

3. How would GADRI approach networking with multitude of DRR consumers? How can GADRI support/assist its members in need?

- Creation of a GADRI Fellow Program:
accomplished disaster researchers will be nominated as GADRI Fellows. E.g. GADRI will extend invitation for Fellows to visit/lecture DRIs on a case-by-case basis (at no financial burden to GADRI, to be explained). GADRI members support GADRI fellows in their area (e.g. hosting, sabbatical)
- Young professional program in GADRI members – inviting young professionals to be hosted in GADRI institutions to study and research for three – twelve month period.
- Creation of a Google Scholar-like of GADRI, Global Disaster Researcher Directory: *voluntary compilation of individuals engaged in disaster research, channeled through GADRI member institutes*
- Existing common programs to involve different network/stakeholders

The Chair emphasized several points. He stated that the consensus of the meeting was that GADRI's presence is not sufficient. It is not present enough in various people's ongoing activities. Networking is essential to increasing the presence of GADRI in various member research institutes and having an impact. One suggestion was the use of social media and creating of a YouTube channel will have a tremendous impact.

Secondly the face-to-face contact such as the GADRI Fellows with GADRI institutes; and lastly a simple Global Directory of Researchers using the ORCHID database.



I-B: Committee on S&T Roadmap

The session was chaired by Prof. Hirokazu Tatano and Dr. Selim Günay—

Notes were taken by Dr. Maria Camila Suarez Paba



The Science and Technology (S&T) Roadmap is an important component of GADRI for achieving disaster resilience. With this important direction and goal in mind, this session focused on the potential contributions of the S&T Roadmap in advancing the science of hazards, along

with technologies that can minimize their harmful effects.

The session invited the following experts to the panel discussion:

1. Prof. Toshio Koike, International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM), Japan
2. Prof. Qunli Han, Integrated Research on Disaster Risk (IRDR), China
3. Prof. Yuicho Ono, International Research Institute of Disaster

Science (IRIDeS), Tohoku University, Japan

4. Prof. Mahua Mukherjee, Indian Institute of Technology (IIT) Roorkee, India
5. Dr. Guirong Grace Yan, Missouri University of Science and Technology, USA
6. Dr. Selim Günay, Pacific Earthquake Engineering Research Center (PEER), University of California, Berkeley, USA

The session was chaired by Prof. Hirokazu Tatano, Disaster Prevention Research Institute, Kyoto University on behalf of Prof. Khalid Mosalam, Taisei Professor of Civil Engineering and Director of the Pacific Earthquake Engineering Research (PEER) Center; and Dr. Selim Günay, Pacific Earthquake Engineering Research (PEER) Center, University of California, Berkeley, USA.

Questions addressed during the session:

- How to enhance S&T Roadmap?
- How should we proceed with the S and T roadmap?

The outcomes of the discussion session were presented by Prof. Hirokazu Tatano.

The purpose of session was to create a GADRI S&T Roadmap to maximize its impact for minimizing the harmful effects of different hazards.

Although initially it was divided into four hazards, recently there were multihazards and systemic risk aspects that have come into the forefront. That made the group to re-think about the categorization.

Specific topics discussed during the session:

1. Advancing the science and understanding of various natural hazard phenomena, including earthquakes, wildfires, volcanic eruptions, droughts, hurricanes, tornadoes, sea-level rise, floods, and their relationships to climate change, using theoretical, numerical, and data-driven approaches.
2. Developing or adopting technologies to use vast amounts of hazard-related data available in recent years due to reconnaissance activities.
3. Developing tools, technologies, and methods that explore all hazards from a holistic perspective that considers commonalities and interactions between them. In addition, reducing the consequences of each hazard individually and preventing them turning into disasters.
4. Using the experiences from the COVID-19 pandemic, formulating, and preparing for the world-wide consequences of large-scale disasters from social science perspective (e.g., potential changes on the social fabric of communities), economic (e.g., worldwide supply-chain issues), and humanitarian (e.g., physical, and mental health) perspectives.
5. Using the same experiences of COVID-19 (e.g., developing vaccines in unprecedentedly short-time frames), formulating methods to bring available science and advanced engineering methods together for finding timely solutions for disaster risk reduction.
6. Promoting and advocating for the development and use of latest technologies for disaster monitoring, reconnaissance activities (view from the ground), short-term and long-term recovery, and related city- and regional-scale simulations, e.g., deep learning, satellite imagery (view from the sky), drone technologies, computer vision, natural language processing, high performance

computing, and low cost and accurate sensors.

7. Developing methods to merge advanced engineering technologies with low-cost solutions that can facilitate the world-wide usage of modern technologies of the fourth (digital) industrial revolution, both in the developed world and underdeveloped and developing countries, with a special emphasis on the most vulnerable populations, for disaster risk reduction.
8. Working across-board with other committees (Institutional Capacity Building, Networking, Data Information Sharing, and Advocacy) for effective implementation and adoption of the S&T Roadmap.

Key questions raised during the session:

1. How can we structure the S&T Roadmap to enhance the broader impacts of GADRI activities?
2. How can we maximize the effects of GADRI in shaping disaster-related policy changes in the world through the S&T Roadmap?
3. What are the tools and methodologies needed for developing holistic and consistent solutions to multiple hazards (e.g., earthquakes and climate change related hazards)?
4. What is the most effective way of establishing supportive communications between engineering, earth science, social sciences, and economic disciplines for disaster mitigation?
5. How can the GADRI S&T Roadmap realistically prevent hazards from becoming disasters?
6. How can the various advanced engineering technologies be merged with low-cost solutions to serve the most vulnerable populations to hazards around the world.



Final conclusions of the session:

- GADRI S&T roadmap will provide:
- future vision of directions of S&T activities to be shared among members of GADRI and hopefully influence policy and systems transformation towards disaster resilient and sustainable society.
- Importance of collaborations among different academic

discipline to provide effective, affordable and sense-making solutions and implementation strategies for DRR policies and sustainable development. There is a need to re-allocate and reshape the S&T Roadmap. This will be the starting point for the S&T Roadmap.

- Data collection, analysis and prescription based on the field activities should be organized to share knowledge reflected in policy improvement in the real world.

Following provide a summary report submitted by Dr. Selim Günay and Dr. Maria Camila Suarez Paba.

Opinions shared by the Panelists:

Panelist Prof. Toshio Koike

- Relationship between disaster resilience and DRR (Disaster Risk Reduction)
- Evacuation, rescue, build back better are factors that can add to resilience, and can also facilitate a faster rehabilitation and recovery.
- How to support stakeholders (national and local governments, companies, organizations, residents, communities). We need a system for better information sharing with these stakeholders, however confidentiality can be an issue in this process.
- It is needed to develop an integrated knowledge-open science, from which a quality-oriented society could benefit.
- Capacity building for stakeholders needs a facilitator to implement the proposed framework.
 - A facilitator should have the skills to translate, interpret, and be a mobilizer of data and scientific information to stakeholders.
 - The target audience for the facilitator to give the message should be defined.
 - A mechanism for data sharing is also needed to use it effectively for capacity building and decision-making.
- Accumulated information can be used for planning and training, land use planning and management, infrastructure investment, and disaster prevention.
- As a consequence, sustainable development and resilience can be enhanced or strengthened.

Panelist Prof. Qunli Han

- Key points of 2018 to analyze the Sendai Framework (SF) roadmap:
 - Problem: we don't know how the roadmap has been added to the SF implementation, is it really helping countries?
 - We need to think about how to measure the progress of the SF.
 - It is needed to discuss how the GADRI Science and Technology Roamap can help to accelerate SF implementation or progress.
 - Systematic and cascading risks were not understood well even in 2019, but they became evident after Covid-19.
 - Urban areas under different risks are not necessarily highlighted in the SF agenda.
- We need to include systematic, cascading, and compound risk in GADRI's network.
- Facilitator's role in DRR, mentioned by Prof. Koike, is crucial for interaction among stakeholders and understanding of risks.

- We need to consider DRR as a development issue, otherwise, sustainable development will not be achieved.
- The involvement of communities and behavioral change are essential for strengthening DRR.
- Science knowledge/understanding needs to be simplified for this purpose.
- GADRI science-policy interface can be organized for enhanced society engagement.
- Open science, open data, data sharing and accessibility are needed, and GADRI needs to support these.



Panelist Prof. Mahua Mukherjee

- Ecosystem-based resilience potentially incorporated to the Science and Technology Roadmap.
- Ecosystem restoration, related to Sustainable Development Goals (SDGs) and initiatives by the global community.
- Urban risks are constantly changing, because of anthropogenic actions, and climate change issues.
- Urban risk: benefit/cost analysis for nature-based solutions. Should consider a time frame in the mid or long-term.
- The effectiveness of nature-based solutions is not clearly understood. So, an evaluation or validation approach is needed (e.g., analysis through scenarios can be a good approach).
- Data for ecosystem-based urban risk resilience is a resource that should be carefully analyzed, and determine its appropriate use.
- Collecting data is not the end of the task, but it is the starting point for researchers to develop nature-based solutions.
- In countries with mega populations, e.g., India, policies have a gap because they are not properly addressing the current environmental issues.
- Science and Technology roadmap should consider research innovation, policy, and planning, pilot projects, capacity building, and collaboration. Therefore, it is essential to understand the mitigation, resilience, and their interaction.

Panelist Dr. Grace Yan

- Pathways to transfer science and engineering into climate actions
- Focus on collaboration with research (research integration-advance science and engineering), industry, government, education (bottom-up approach)
- Interdisciplinary research, downscaling climate change modeling (resolution is too low)
- Mechanisms for researchers to collaborate to do high-impact research (higher grants/funding)
- Multi-hazard risk assessment approaches for the characterization of hazards
- Impacts of hazards on people (social science), solutions to reduce the impacts of hazards (engineering and social science)
- Collaboration among stakeholders is needed among countries, and governments, and no country should be left behind. What kind of approach is needed for collaborating with governments? Top-down or bottom-up?
- Resilience related points
 - Education gap: resilience science and engineering
 - The facilitator should take a resilience science and engineering class (proposed) and a broader perspective of DRR-related courses.
 - ◇ Natural hazards
 - ◇ Hazard impacts on built environment and society
 - ◇ Hazard mitigation and adaptation
 - ◇ Overcoming barriers to resilience implementing
- Innovative resilience projects are needed (where to invest the money)
- Improvement of resilience should be a target of the investment (insurance companies are a profitable business).
- Insurance companies are changing their focus to look more at a community level (resilience bond)
- FEMA is likely to change their cost-benefit analyses
- We need to encourage people to have a wider scope to choose a place to live different from that of a cheaper place even if they are located in a risky area

Panelist Dr. Selim Günay

- Learning from natural disasters through reconnaissance provides opportunities for rebuilding and building back better
- Extreme events research and reconnaissance are crucial for DRR and need an interdisciplinary approach for hazard (e.g., Pacific Earthquake Engineering Research Center, PEER), geotechnical (e.g., Geotechnical Earthquake Engineering Reconnaissance Network, GEER), building and lifelines (e.g., Structural Extreme Events Reconnaissance Network, StEER), and socioeconomic (e.g., Social Science Extreme Events Research, SSEER)
- This approach is completed by enable agencies in the US, e.g., RAPID NHERI-Natural Hazards Reconnaissance Facility (open access), and DesignSafe-CI (open access)- Web interface of the NHERI that provides the data and software tools
- Under the NHERI umbrella---StEER: Structural extreme events reconnaissance (www.steer.network). Builds societal resilience by generating new knowledge on the performance of the built environment through impactful post-disaster reconnaissance disseminated to affected communities. This is a network that

aims at collaboration among research, practice, and policy

- StEER aims at finding solutions for our challenges as a society in mitigating natural hazards by focusing on 1) affected communities, 2) field observations, 3) research and development, 4) regulatory mechanisms
- StEER facilitates learning from earthquakes and enhance resilience through reconnaissance apps
- In a recent application, a joint report is prepared for the Türkiye earthquake together with EERI
 - Several buildings with well-known structural weaknesses collapsed
 - Immediate action plans are needed for retrofitting this kind of building not only in Türkiye but worldwide
 - Earthquake severity of 2475 years return period (Maximum Considered Earthquake, MCE) was exceeded
 - The instrumentation of structures should be promoted and increased
 - The seismic response of code-designed structures should be explored when subjected to such extreme shaking with realistic shaking table tests or other testing methods that are closer to reality
 - Increased usage of protective systems should be promoted all around the world. The feasibility of using cost-effective protective systems should be explored for the reconstruction of the largely impacted cities

Discussion

- Ideas on creating context networks for natural hazards analyses
- Tools, techniques, and items for research. Which solutions can we achieve with these?
- If focused on hazard, the roadmap will be different for each of the hazards
- If not focused on the hazards, but on the SDGs, it can be a more holistic approach
- Resilience is independent of the natural hazard and one approach is to focus directly on resilience
- Question: What is needed for achieving this solutions to provide strategies focused on DRR? Answer: GADRI can be a facilitator to integrate knowledge and data in terms of DRR efforts (strategy)
- A global perspective is needed to share experiences and enhance disaster prevention and mitigation policies
- We need international collaboration to address hazards that have impacts worldwide (a global approach). Global aspects make an impact at the local level as well.
- Local context and knowledge are also very important and should be included in the global perspective of GADRI. Therefore, the global-local interrelation is helpful.



Closing Ceremony and the Banquet of the 6th Global Summit of GADRI
Rihga Royal Hotel, Kyoto



I-C: Committee on Institutional Capacity Building

The session was chaired by Prof. Wei-Sen Li Wei-Sen Li, National Science and Technology Center for Disaster Reduction (NCDR), Chinese Taipei with the Co-chairs Prof. Gretchen Kalonji, IRDR, Sichuan University, China; and Prof. Desmond Manatsa, Chair; African Alliance of Disaster Research Institutes (AADRI), Bindura University of Science Education, Zimbabwe



The Committee on Institutional Capacity Building of the Global Alliance of Disaster Research Institutes (“the Committee”) is aimed at leveraging networking, capabilities and resources among all partners under GADRI for capacity building. The committee focuses its functions and operations on sharing knowledge, management, opportunities, good practices, and training on enhancing disaster research, resilience and risk reduction.

The session invited the following panelists:

- Keynote address by Prof. Reini Wirahadikusumah, the Rector of the Bandung Institute of Technology (ITB), Indonesia
- Mr. Bill Ho, the Director of the Asia Disaster Preparedness Center (ADPC) in Bangkok, Thailand
- Prof. Geoffrey Mukwada, from the University of the Free State in South Africa
- Prof. Dimeter Velez, from the University of National and World Economy of Bulgaria
- Prof. Ailsa Holloway, of the Auckland University of Technology, New Zealand; and
- Prof. Krishna Pribadi, from the Bandung Institute of Technology (ITB), Indonesia

Key questions addressed during the session:

1. How to engage GADRI Member Institutes to share their expertise and demands of disaster risk management and resilience by surveys under GADRI to depict the opportunities and direction for regional or global efforts on topics addressed by GADRI.
2. To define scope of “Institutional Capacity Building”, which could include both intra-GADRI and with entities external to GADRI ranging from international agencies, organizations (including

non-governmental organizations) to sovereign national governments and agencies, press and media, leading thinkers and policymakers and the general population.

3. To make a roadmap for GADRI “Institutional Capacity Building” activities that could encourage both physical or virtual exchange on inter- and trans-disciplinary, that is, inclusive of involvement from research disciplines, practical implementations, educations for under-graduate students, graduate students, NGO practitioners and all-levels governmental officers to better facilitate how to better built social capital and capacity for disaster risk management.
4. To identify possible and diverse channels to fulfill GADRI “Institutional Capacity Building” for creating “opportunities for exchange and learning”.
 - A. At the GADRI Member Institution level – “Institutional Capacity Building” at the GADRI Member Institution level may take many forms, for example cooperative research programs, joint research, exchange of individual researchers, webinars or other training involving GADRI Member Institutes, and so on.
 - B. At the society level – this involves facilitating dialogues, exchanging ideas and identifying gaps related to disaster resilience of the whole society.
 - C. Via outreach to international public/private sectors, development, humanitarian, and similar organizations, to strengthen rapid implementation of knowledge into applicable know-how.

Summary of the discussion session prepared by Prof. Gretchen Kalonji.

The Institutional Capacity Building session gathered participants from a wide variety of experiences and perspectives. The central goal of our session was to address the broad question of how we can **strengthen the capacity of our research institutes** to more effectively contribute to research, education and service to society on disaster risk reduction and response. We learned from institutions with a wide geographic distribution, and with diverse institutional perspectives.

The speakers included:

The Rector of the Bandung Institute of Technology (ITB), Prof. Reini Wirahadikusumah, who gave a keynote speech about her efforts to build the capacity of a premiere research university in Indonesia to focus yet more strategically on research and education on disaster science.

Her speech was followed by short contributions from five panelists, including:

- 1) Mr. Bill Ho, the Director of the Asia Disaster Preparedness Center (ADPC) in Bangkok who spoke about the challenges and successful strategies for ADPC's training programs, primarily in SE Asia;
- 2) Prof. Geoffrey Mukwada, from the University of the Free State in South Africa, who spoke about the data infrastructure needs for DRR in Africa;
- 3) Prof. Dimeter Velez, from the University of National and World Economy of Bulgaria, who spoke on the needs and strategies for developing capacity in artificial intelligence for DRR;
- 4) Prof. Ailsa Holloway, of the Auckland University of Technology, who spoke about her many years of involvement with the Peri-Peri University, a network of 12 universities in Africa focusing on institutional capacity development for DRR, and;
- 5) Prof. Krishna Pribadi, from the Bandung Institute of Technology (ITB), Indonesia, who described their efforts to bring together 100 universities in Indonesia in a nationwide forum to address DRR challenges, and to connect to local communities and policy makers.

Some key points:

- The need to develop clear plans which connect the local and national DRR-related human resources needs to the programs at our research universities and other training institutes.
- The value of creating new interdisciplinary programs in our universities which break down silos between disciplines
- The need make stronger connections with local communities – linking our research directly to local communities
- The vital importance of including the social perspective in whatever we do; our solutions can never only be engineering solutions
- The strategic importance of building alliance, and the national and international levels.



I-D: Committee on Data and Information Sharing

The session was chaired by Prof. Andrew Collins, DDN, Northumbria University, UK; and Co-chair Dr. Tom De Groeve, European Commission Joint Research Centre, Italy

Based on the concept note of the Committee, the session aimed to advance a significant part of the agenda on data and information sharing on the understanding that greater emphasis on data for action orientated knowledge impact requires varied data providers, managers and users at all levels. The principles for greater usability of data are well reflected in FAIR principles, and much will be required moving forward to apply these to disaster prevention and response research more effectively and equitably – especially considering that disasters continue to be most prevalent and severe for marginalized communities.

The session invited the following members to the panel discussion:

- Prof. Andrew Collins, Chair
- Dr. Tom de Groeve, Co-chair
- Prof. Norio Maki, DPRI, Kyoto University, Japan
- Dr. Hiroyuki Goto, DPRI, Kyoto University, Japan
- Prof. Jean-Paul Pinelli, University of Florida, USA

The following highlights are from 7え summary report presentation by Dr. Tom De Groeve:

The objective of the session: promote exchange and sharing of data and information for scientific research across the globe.

Over the years, GADRI promoted "action data", "bridging gaps to knowledge sharing", developing an "active database" and, in the MTR, comprehensive array of gaps in progress on data under priority one (understanding risk). The GADRI Committee continues in many ways the work of the Global STAG.

Dr. De Groeve stated by referring to the **go-fair.org**: a strategic view on data is that it should be findable, accessible, interoperable and reusable. It is not sufficient to have data put it on a website and hope that it will be used. But it takes effort to make it work. All four presenters of the session emphasized on this vision as well.

- FAIR principles - common taxonomy and ontology - hazard definitions
- Data governance: what policies are recommended for GADRI research organisations? Some public organisations do not have an open data policy to protect their interests, to sell their data, or for security reasons. Therefore, the data is not open. From the research point of view, it would be good to have a policy to publish data so that it can be used.

- Data policy and ethics of GADRI members – there is a lack for open data policy due to commercial/security/other constraints. It would be better to establish data principles in time of crises and especially data principles during the crisis. As during a crisis things change; and it is difficult to access data. One good recent example was the Turkish government opening up an archive of aerial imagery right after the recent earthquakes. And it was very useful, as the science community had minimum access to the area and the data released were useful and was able to use the data in time too. When the data is released, at later points after the event, it is too late to be used. In this sense, perhaps GADRI could play a role to think about fair principles and policies and help the UN to take this further.
- Technology is important and there is plenty and evolving fast. Sustainable systems need to buy in from ICT scientists.
- Accessibility: Members from developing countries can have serious hurdles to access data if it is commercial. Some data is sold at cheaper prices. Sometimes even that can be too expensive for researchers in developing countries due scarce research funds. Would GADRI be able to help in this respect?



The following summary was prepared by the Chair and the Co-chair of the Committee:

A session of the Data and Information Sharing Committee reiterated its orientation to its earlier concept note that identifies the need for “data informed and action orientated knowledge partnerships that steer progress in disaster reduction worldwide”.

This includes the ambition to:

- i. Promote exchange and sharing of data and information for scientific research globally
- ii. Promote the flow and application of active data for disaster reduction impact

(Committee Concept Note, 2022)

Influential discussions on the orientation of the Committee notably included via the former UNDRR STAG Data Working Group (2020) that concluded the need for more active data, the previous GADRI Summit 2021 on bridging gaps to knowledge sharing, the DPRI active database approach, and most recently the Mid Term Review of the Sendai Framework (Jan 2023). The Mid Term Review has highlighted an array of gaps in progress on disaster risk data under the Sendai Framework Priority One: Understanding Risk.

A focus of the Committee for the coming years would therefore include working to bring about “GADRI Data Sharing, Action Data and Active Data Base” together with further items from the outcomes of the session at the GADRI 6th Summit as summarised also for GADRI Outcomes and Resolutions and including in relation to GADRI suggested revisions to the UNDRR Mid Term Review.

The GADRI session on 15th March included an introduction to the Committee rationale, a series of presentations as follows below and an open discussion amongst all participants in attendance, some of whom expressed an interest in joining it:

- Andrew Collins (Chair)(University of Northumbria, UK) – *Why have a Data and Information Sharing Committee?*
- Tom de Groeve (Co-Chair) Acting Head of Unit at European Commission Joint Research Centre, EC) – *EC leadership and contributions in data and information sharing.*
- Hiroyuki Goto (DPRI, Kyoto University) – *GADRI Database Project – Disaster Collection Database and Case Study Database.*
- Norio Maki (DPRI, Kyoto University) – *Good practices in DRR database development.*
- Jean-Paul Pinelli (University of Florida, USA) – [*Enabling Data Analytics and High-Performance Computing in Natural Hazard Engineering.*](#)
- Becky Richardson (Northumbria University, UK) - *Listening to children’s perspectives on risk to understand the narrative of those living in extreme environments.*

The GADRI session helped in elaborating the following conclusions, that were formulated for the GADRI Outcomes and Resolutions (2023):

- GADRI is committed to promoting "action data", "bridging gaps to knowledge sharing", developing an "active database".
- The GADRI Committee is acutely aware of data issues flagged in the Sendai Framework MTR under priority one (understanding risk). The GADRI Committee is committed to continuing in many ways the work of the Global STAG working group.

- The Committee emphasised the importance of the various elements of FAIR data: Findable, Accessible, Interoperable and Reusable.
- Inputs at the Summit brought influential examples of; databases and their sustainability and the use of big data and high performance computing (DesignSafe) supporting engineering research and publishing workflows; the GADRI database project that intends to regularly scrape URLs from members and analyse the pages with keywords, so the data becomes searchable; local level data from narratives on risk from local, marginalized communities in particular children, which responds to the Sendai objective to understand the risk for the most vulnerable people. New action-oriented collection methods for data through drawings, art, stories, which works well for health-related risks and impact of wellbeing.

Priorities the GADRI committee include:

- Good implementation of the FAIR principles by all its members, thinking of the sustainability of databases.
- Identification of platforms or databases that can help make GADRI data FAIR. However, existing initiatives should be considered for their fitness for purpose. In particular, the UNDRR's own initiative on Risk Information Exchange. The design of the GADRI database must be flexible, able to collect quantitative and qualitative data, and developed by data scientists in collaboration with domain experts.
- Collecting microdata from its members is an opportunity to develop a database of narratives about the most vulnerable people. There are issues of accessibility and a need for curation of a data policy and governance of its members, and recommendations to all DRR actors, including on data principles in times of crises.
- Reusable data means that Members are encouraged to monitor the ongoing use of data that supports the purpose of DRR.

The following statement was provided to UNDRR for its consideration in the context of its Mid Term Review of the Sendai Framework:

“Sound and reliable evidence based on data collection and analysis, including risk assessment, must be used to further enhance the connection between risk information and DRR decisions and actions and this should be supported by scientific and academic partnerships. Whilst good data is a basis for improved decision making towards achieving Global Targets for Disaster Risk Reduction and Sustainability, there is a need to analyse how it is contributing at all levels. Understanding what data works requires guidance for data providers and users regards its authenticity and impact in diverse contexts so that it is active as a voice and enabler of disaster risk reduction, particularly in marginalised at-risk locations.” (GADRI Summary Comments on the Sendai Framework Midterm Review, 2023)

Further opportunities to develop work contributing to the focal interest areas of the committee are being explored by committee members and will be presented as soon as these are more fully elaborated.

I-E: Committee on Advocacy

Science Technology and Innovation linked to Advocacy

The session was chaired by Prof. Rajib Shaw, Keio University, Japan; and Co-chair Prof. Irasema Alcántara-Ayala, UNAM, Mexico

The Science and Technology Roadmap to support the Implementation of Sendai Framework for Disaster Risk Reduction 2015-2030 aims to “foster collaboration among science communities and other stakeholders across global and regional mechanisms and institutions for the implementation and coherence of instruments and tools relevant to disaster risk reduction” (UNDRR, 2019). It focuses on four expected outcomes and 58 actions structured around the four Priorities for Action of the Sendai Framework. The recent regional reports of Asia Pacific and the Americas, and the Caribbean strongly suggest the need for science-based advocacy, where science and technology communities need to be engaged in sustained work with different stakeholders from policymakers to grassroots communities.

The session invited four speakers from both the government and grass-roots perspectives:

- Need of critical advocacy and identification of obstacles: National government perspectives: **Dr. Antonia Loyzaga**, Secretary, DENR, Philippines
- Science advocacy: lessons from IPCC: **Prof. Joy Pereira**, UKM, Malaysia
- Need of critical advocacy and identification of obstacles: Grass-roots perspectives: Mr. **Takeshi Komino**, ADRRN, and CWS Japan; and
- Science advocacy: role of Media and identification of challenges for science communication: **Prof. Sayaka Irie**, Matsumoto University (ex NHK)
- Specific comments were provided by Prof. Paul Kovacs and Prof. Irasema Alcántara-Ayala

The discussion session aimed to:

- Identify the key needs of “critical advocacy” from stakeholder perspectives
- Learn from science-based advocacy in the climate change sector
- Identify good practices of national and /or local science-based advocacy in disaster risk reduction

Topics discussed covered:

Keeping the above in mind, the session aimed to identify key challenges and potentials of science-based advocacy processes and identify the roles of different stakeholders. The session was divided into two parts.

Soon after the opening remarks, the first part focused on key needs of critical advocacy from national, local governments and grassroots perspectives; and the second session was followed by key lessons from IPCC science-based advocacy and how those lessons can be incorporated into disaster risk reduction perspectives (through a 15-minute discussion session). The role of media in science-based advocacy was also discussed.

Key questions addressed included:

- What are the key barriers to science-based advocacy?
- What is the need for “critical advocacy” at different levels, from national to local governments to grassroots?
- What lessons can be drawn from climate sectors?
- How can media play a critical role in science-based advocacy?

Discussion summary was presented by the Co-Chair, Prof. Irasema Alcántara-Ayala.

Through the PPT, Prof. Irasema Alcántara-Ayala gave a detailed description of the session and shared the following key points highlighted by each panelist:

Need of critical advocacy and identification of obstacles: National government perspectives: Dr. Antonia Loyzaga, Secretary, DENR, Philippines

A national government perspective:

- The government needs specific science-based advice at the national and local levels with practical application.
- Some critical areas include climate change, biodiversity, and oil spills (new risks).
- Diverse disciplines need to come together for customized information and advice at the local level.

As a scientist, she was able to bring a community perspective into the policy domain. There was also the establishment of the Secretariat which integrated science for policy making. It was very important to have such a platform of integrated science right within the structure of the government.

Science advocacy: lessons from IPCC: Prof. Joy Pereira, UKM, Malaysia

IPCC: Science policy advocacy

- Policy advocacy needs a clear purpose and constructive partnership.
- Institutionalization is very critical.
- The standard interface is essential.
- Advocacy messages need to be peer-reviewed to bring legitimacy.
- High-level dialogue, outreach events, and media communication are essential.
- Grooming and recognizing young scientists are essential.

This is the case of IPCC which has recently included the participation of young scientists in the chapters.

**Need of critical advocacy and identification of obstacles:
Grass-roots perspectives: Mr. Takeshi Komino, ADRRN, and
CWS Japan**

Civil society perspective:

- Disaster management with localization perspectives needs strong advocacy and a science–grassroots interface.
- An ecosystem for community-centered innovation helps science-based advocacy.

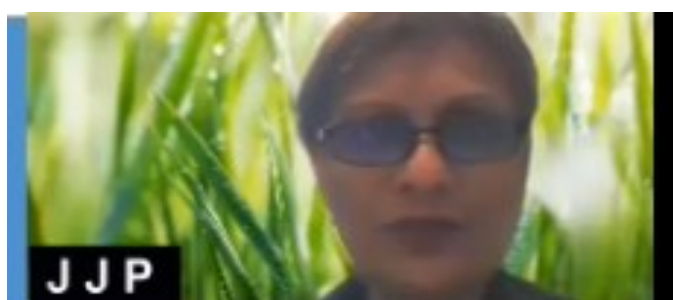
He conveyed a different perspective about how the actions and the understanding of the community and why disasters take place, why disaster risk is constructed – and moving into transformation by acting on local demands.

Science advocacy: role of Media and identification of challenges for science communication: Prof. Sayaka Irie, Matsumoto University (ex NHK)

Media Perspective:

- Communicating scientific knowledge in an easy-to-understand manner is vital for disaster prevention.
- Needs both ways of communication and co-creation:

- Media literacy is essential, and scientists need to work closely with media. – a very interesting point. Prof. Irie explained how there is a network of the media people in Japan, that build the interaction between scientists, the government, the community and the media. This is not only during a disaster. But before a disaster takes place. Also, there are some programs and journals which are devoted to disaster prevention. This group of network go to the field during and after a disaster. They work with the government. After a disaster, they visit the actual disaster site. Prof. Irasema Alcántara-Ayala stated that it is a very good practice that the media people are well aware of what disaster risk reduction and disaster prevention involves from a very early stages, and not only after a disaster has taken place.
- Learning from established / successful cases the importance, implication, and value of science-based media advocacy for communities and learning from them. Prof. Irasema Alcántara-Ayala stated that it is a continuous process of not only information exchange but also learning, and information sharing which is very significant if we are to have a good communication in disaster risk reduction.



The following synthesis report was submitted by the Chair and the Co-chair of the Committee:

- Media plays an essential role in science advocacy, where risk communication can be done effectively to the people, communities, and decision-makers.
- Customized science advocacy can be effective using diverse media (from conventional broadcasting to social media to community radio) and key change agents (who can plan the interface of researchers and communities).
- Science advocacy needs to be cross-cutting, from grass-roots to policy formulation. To do that, researchers need to co-design solutions along with civil society, other stakeholders, and top policymakers. The process of co-design, co-develop, and co-delivery of advocacy messages is essential.
- Commitment to produce GADRI Policy briefs in collaboration with other initiatives and programmes such as IDRD.
- Discuss in the future the possibility to support the creation of a Periodic Disaster Risk Assessment to make science policy relevant.
- Learning to do more advocacy to do more for society.

Closing Ceremony and the Banquet of the 6th Global Summit of GADRI Rihga Royal Hotel, Kyoto



Presentations on Panel Discussion Session II : New Challenges for Action by GADRI

Chairs: Prof. John van de Lindt, Harold H. Short Endowed Chair Professor, Co-Director, Center for Risk-Based Community Resilience Planning, Colorado State University, USA; and Dr. Kaushal Keraminiyage, Centre for Disaster Resilience, School of Science, Engineering and Environment, University of Salford, Manchester, United Kingdom

The following brief wrap-up report on the session was shared by Dr. Kaushal Keraminiyage and Prof. John van de Lindt:



During the 2nd day of the 6th GADRI summit, the evening session was dedicated for the panel discussion 2 – “New Challenges for Action” by GADRI. The summaries of this discussion were presented before the wrap-up session of the summit on the 3rd day.

Track A of the panel discussion II was on “Big Science for DRR – Large scale experiments”. Challenges related to large scale experimental facilities to facilitate DRR research were discussed by the panel members. As the outcomes, issues related to sharing facilities and data, development of new instruments, digital twins, and disaster education were noted.

The theme of the Track B was sustainable DRR, with special emphasis on SDGs and data sharing. The panel members discussed the about the importance of long-term observations for data accumulation, and impact-based forecasting. One of the key outcomes of this Track was the agreement on importance of Alignments of targets of different Frameworks (SDG, SFDRR, CC).

Track C was focusing on gender and inclusivity in DRR. 6 presenters presented their ideas within this track, and after a rich and insightful discussion, panellists and the members of audience

agree fundamentally on the issue of the tackling inequalities at the root should be a priority for implementing the Sendai Framework for Action.

Panel at Track D discussed the timely issue of putting health in to DRR and recovery. The UNDRR publications “Hazard Classification and Definition review” and “Hazard information profiles” have been brought to the attention during the discussions, and it has been agreed that information in such publications can be used to engage policymakers and scientists in evidence-based national risk assessment processes, disaster risk reduction and risk-informed sustainable development. One of the key highlights of this outcomes of this track was the agreement on the need of address cascading and complex hazards and risks.

The role of youth in DRR was the theme of Track E. Panel discussed in detail, the issue of insufficient recognition of DRR as career, specially from the point of view of youth. This led to the discussion on lack of attractive platforms to attract YYPs to join DRR society and lack of independent access to resources, including funding, data, technical information, etc.

Overall, the panel discussion II provided a valuable platform for the participants of the 6th GADRI summit to discuss the way forward for GADRI, in particular, the direction that the GADRI can take to address the new challenges in DRR.

Rapporteurs for each of the panel discussion session were:

II-A: Prof. Nobuhito Mori, DPRI, Kyoto University

II-B: Prof. Tetsuya Takemi, DPRI, Kyoto University

II-C: Dr. Punam Yadav, Institute for Risk & Disaster Reduction, University College London

II-D: Prof. Virginia Murray, UK Health Security Agency

II-E: Dr. Mizan Bisri, Kobe University, and U-INSPIRE



II-A: Big Science for DRR Large-Scale Experiments

The session was Chaired by Prof. Nobuhito Mori, and Prof. Shinichi Matsushima, DPRI, Kyoto University, Japan

The session discussed on large scale experimental apparatuses, instruments, observational facilities, and computational environment to promote research and development on disaster prevention. Discussion also focused on what kind of experimental instruments and facilities are necessary for future disaster prevention research and science, and how to utilize them.

The session in particular discussed the next steps of large-scale research facilities supported by research communities.

- Review of current status of large-scale research facilities in different hazards
- Recommendations arising from the discussion session should be considered by the GADRI board.

Topics discussed:

1. Current status and aims of large-scale research facilities for natural hazards
- Earthquakes
 - Tsunamis
 - Hydraulics
 - Strong winds; and others

2. Vision and demands for future developments
3. The utilization of these large-scale facilities, such as joint use, was discussed from the perspective of the disaster research community.

The following speakers were invited as panelists:

- i. Dr. Nelson PULIDO, National Research Institute for Earth Science and Disaster Resilience, (NIED) - Observation Network for Earthquake, Tsunami and Volcano
- ii. Dr. Kentaro TABATA, (National Research Institute for Earth Science and Disaster Resilience, (NIED) - Achievement and future perspective of research on earthquake-disaster risk reduction with E-Defense shake table
- iii. Dr. Kojiro SUZUKI, Port and Airport Research Institute - Super Large Experiments on Coastal Structures using Large Hydro GEO FLUME
- iv. Prof. Nobuhito MORI, DPRI, Kyoto University - Large coastal wave flumes
- v. Prof. Shinichi MATSUSHIMA, DPRI, Kyoto University - Large-scale experimental facilities of DPRI and collaborative use



Session discussion observations and outcomes were presented by the Chair of the Session Prof. Nobuhito Mori.

Presentations by the Panelists:

- Nelson Pulido - introduced a very comprehensive observation network, including seismic signals, strong motion, volcanic activities and tsunamis in Japan. It is kind of a state-of-the-art network in Japan.
- Kojiro Suzuki - introduced the super-tank for tsunamis- a very high-tech, high-cost equipment.
- Kentaro Tabata - he talked about large scale strong shaking table and e-defense.
- Nobuhito Mori – introduced the large coastal wave flumes in the world.
- Shinichi Matsushima – presented an introduction to DPRI collaborative research facilities.

Challenges of large-scale experimental facilities for DRR:

1. Sharing facilities is important – large-scale experimental facilities are very expensive. Sharing of facilities to conduct experiments were widely discussed and recommended. The US based, NEES founded by National Science Foundation supports such facilities. DPRI also support sharing of experimental facilities.

2. Sharing dataset with systematical format— each facility has historical experimental datasets. It is not easy to use this outside of the facilities. / Digital foundation to experimental dataset is also important to share.
3. Development of new instruments and sensors – use different types of sensors from economical to sophisticated /Digital twins using large-scale experiments.
4. Benchmark test for numerical models including structure modelling or tsunami modelling – there are many different numerical models but lack knowledge of the performance of the individual numerical models. Through large facilities, it is possible to test the performance of numerical models using benchmark-test type of research.
5. Hybrid physical-numerical modeling – this part has been developed in structural engineering. It would be good to expand to hybrid, physical and numerical experiment to other fields such as structure, soil or tsunami soil interaction.
6. There was recommendations about disaster education as well.

Observations and recommendations submitted by the Chairs to the Board of Directors of GADRI:

- Seismic and Tsunami monitoring to improve accuracy and speed for Early Warning System.
- Detection of earthquakes in ocean regions by sea floor observation.
- Use of new technologies such as Distributed Acoustic Sensing (DAS) to lower the cost of observation.
- Utilize ocean optic fiber lines to observe seismic motion in the sea.
- Extend from experiments using full scale single structure to experiments of a system with multiple structures including structure-structure or soil-structure interaction.
- Provide existing experimental data together with meta data so that the users can fully understand the conditions of the data.
- Large-scale experiments are expensive and the number of experiments conducted will be limited. Therefore, establishing a method to combine numerical simulation and large-scale experiments will be essential.
- Collaboration between institutes with large-scale experimental facilities such as PARI and institutes capable of numerical simulations is necessary.
- Data obtained by experiments at DPRI is not collected, but if it can be available to the community, it would be beneficial to the community, although an environment to share the data needs to be fostered.
- It would be ideal if the observed data of buildings and infrastructure are shared among the community to understand the safety of existing structures.
- A new facility to consider the coupling effect for compound hazards (multi-hazard) needs to be developed, but it would be very expensive and it is will be difficult to consider many combinations of hazards. Hence the proposal that environments such as Digital Twin should be utilized to consider multi-hazard effects.
- A protective system such as base-isolation systems with less cost should be developed to be utilized in earthquake prone countries all over the world.
- The effect to soil-structure interaction should be considered more to understand the response at sites where soil-structure interaction can have a large impact.
- Cost-effective instruments can be used for system monitoring.
- Blind prediction exercise of large-scale experiments will be beneficial to the community to understand the capability of numerical simulation codes and updating them.
- The use of large-scale experiments should not be limited to researchers but it would also be effective to educate students and general public. Because the real sound, pressure, smell that can be felt by the senses has much impact compared to those of virtual reality.



Dr. Selim Gunay as a participant at the session.

II-B: Sustainable DRR: Integrating climate action, SDGs and Field DRR & Data (experience) Sharing

New Challenges for Actions by GADRI

The session was Chaired by Prof. Tetsuya Takemi, DPRI, Kyoto University, Japan; and Co-chaired by Prof. John van de Lindt, Colorado State University, USA



The discussion group focused on action against climate change, and to understand the state-of-the-art concepts, methodologies, and approaches from scientific, engineering, and implementation viewpoints from the past research and practical experiences. The session continued to discuss SDGs, and climate change and adaptation. Under the IPCC framework, a number of GADRI institutes are conducting studies on climate change and their impact assessments from various points of view. During the session,

current status of activities on studies related to climate change and their impact assessments from the GADRI institutes were discussed. Some experiences on linkages among the research community, policy makers, and practitioners were also shared.

The following speakers were invited as panellists:

- Prof. Weiqiang Ma, ITP, Chinese Academy of Science, China,
- Dr. Fatima Akter, Department of Meteorology, University of Dhaka, Bangladesh
- Prof. Mahua Mukherjee, Professor, Department of Architecture and Planning, and Joint Faculty and Ex-Head of Centre of Excellence in Disaster Mitigation and Management (CoEDMM), IIT Roorkee, India
- Mr. Novvria Sagita, PhD Program, DPRI, Kyoto University, Japan

Key questions addressed:

- How the GADRI community influence policy makers for achieving SDGs and climate change adaption?
- How can we make best use of existing data from field measurements and monitoring for climate change assessment?

Outcomes of the session were presented by the Chair, Prof. Tetsuya Takemi.

The session shared current activities on studies related to climate change and their impact assessments from the GADRI member institutes.

- Highlight experiences on the linkages among the research community, policy makers, and practitioners.
- Try to understand of the importance of data and/or experiences from field measurements for a sustained period of time in order to monitor environmental and long-term climate change effects.

Discussions continued along the lines with the objective to share current understanding on climate change assessment from scientific and engineering viewpoints. Further, promoted discussion on adaptation strategy for climate change as well as experiences on field measurements among the participating institutes.

The session also discussed the significance of data sharing.

Some specific points shared by the panelists:

• **Prof. Weiqiang Ma, Chinese Academy of Sciences**

- Experiences of field observations in the Tibetan Plateau region for long periods of time.
- Emphasized on the importance of observations especially, in data-sparse regions in order to monitor long-term climate change and the impacts of extreme weather.
- Emphasized that generating long-term datasets requires continuous effort.

• **Prof. Fatima Akter, University of Dhaka**

- Shared the research progress on cyclone disasters in Bangladesh.
- Demonstrated the impact of SSTs on cyclones, intensity and tracks, and how those cyclones are felt in the local scale hazards.
- On Disaster management in Bangladesh:
 - ⇒ Moving from reactive humanitarian relief to proactive disaster risk reduction
 - ⇒ Establishment of early warning systems
 - ⇒ Number of Institutional commitments: technical monitoring, capacity building, preparedness & responses.
- Shared efforts by Bangladesh government on strategy on DRR
 - ⇒ Monitoring/observation, forecasting, warning, information dissemination
 - ⇒ As an example, she demonstrated the establishment of multi-purpose cyclone shelters, coastal greenbelt; and
 - ⇒ Mass awareness and educational programmes.

- **Prof. Mahua Mukherjee (IIT Roorkee)**

- Emphasized interconnectedness of COP21 (Paris Agreement), Sendai FW, SDGs
- Demonstrated the Understanding of urban risk: urban heat island, air pollution

⇒ Demonstrated the importance of geospatial mapping of natural ecosystem

- Identify hotspots at risk at local scales
- Use of GIS platforms to identify such urban risks

- Emphasised on how to incorporate SFDRR at local and urban scales.

⇒ Understanding risk

⇒ Strengthening disaster risk governance

⇒ Investing in disaster risk reduction for resilience

⇒ Enhancing disaster preparedness for effective response

- **Mr. Novvria Sagita, BMKG/DPRI**

- He demonstrated the weather forecasting in Indonesia on hydro-meteorological hazards such as thunderstorm, landslides, and floods

- BMKG early warning services provides:

⇒ Multi-hazard early warning systems

⇒ High-resolution weather prediction

⇒ Emphasized the importance of impact-based forecast – not only forecasting weather phenomena themselves, and how those extreme weather impacts the society

⇒ Special event weather forecasts for tourism, sports events, and other important functions

⇒ Early warning information: sent no later than 30 minutes before a severe weather event

- Introduced activities to promote building community awareness

⇒ Climate field schools, fishing weather schools, aviation weather schools

- Analysis of climate trend of risk score in order to identifying risk zones

Dr. Vibha Vaishnav, Sardar Patel University was given an opportunity to:

- Introduce activities at Sardar Patel University

- Green practice at Sardar Patel University

- Education, multidisciplinary approach, community awareness, sustainability initiative, eco-system restoration; and

- Share experiences of Sardar Patel University establishing community science center.



Outcomes and recommendations submitted by the Chairs of the Session to the Board of Directors of GADRI:

- Recognize the importance of long-term in-situ field observations and data accumulation for climate change monitoring in a changing climate especially for vulnerable regions.
- Sharing such observational data will be useful not only for climate change research purposes but also for regional collaborations and cooperation.
- Impact-based forecasting and future projection is important to build community resilience to be aware of disaster mitigation and climate change adaptation.
- Future projections for hazard, vulnerability and exposure will help societies for sustainable risk financing.
- Alignments of targets of different Frameworks (SDG, SFDRR, CC) will help to address real world problems with same strategic interventions.
- Recognize the importance of multi-disciplinary approach.
 - ⇒ eg. Connection between environmental analysis or climate research and solid-earth analysis.



II-C: Gender and Inclusivity in DRR Policy and Practice

The session was Chaired by Prof. Peter Sammonds, Gender and Intersectionality Ambassador for the UKRI GRRIPP (Gender Responsive Resilience in Policy and Practice) network+; and supported by Co-chairs Prof. Ana Maria Cruz, and Dr. Guirong Grace Yan.

The 2022 Global Platform for Disaster Risk Reduction in Bali was criticized for not providing a space where pervasive issues of gender inequality were engaged with seriously and addressed by all parties and participants ([Gender in DRR - Mainstreamed into Invisibility by Sara Bradshaw et al. \(2022\)](#)). Gender inequality and discrimination against marginalised groups needs to be addressed with urgency if DRR policy and practice is to meet the needs of all. But how should this be done? Which voices should be heard? Whose interests should be considered? In a session, which aims to put gender back onto the agenda, we have assembled an expert panel including:

Panelists of the session were:

- Dr. Punam Yadav, Associate Professor, Co-Director of the IRDR Centre for Gender and Disaster, UCL, U.K., and Co-Investigator of the GRRIPP project. Dr Yadav works on Gender, DRR and Conflict.
- Dr. Miwako Kitamura, Assistant Professor, works in international collaborative research at IRIDeS, Tohoku University, Japan.
- Prof. Shigeo Tatsuki, Sociology Department at Doshisha University, Kyoto, Japan, has conducted participatory research on societal and community responses to people with functional needs. He was awarded the Charles E. Fritz Award for Career Achievements and an award from the Japan Ministry of State



for Disaster Management.

- Prof. Ana Maria Cruz, Disaster Prevention Research Institute (DPRI), Kyoto University, Japan. Ana is President of the Society for Integrated Disaster Risk Management (IDRIM Society) and Editor In-Chief of the Journal of Integrated Disaster Risk Management.

Key questions addressed:

- Gender in DRR – why does it matter? What is the real problem?
- What should be measured, and which data collected to support an intersectional approach?
- What are the key opportunities for change?

Outcomes and observations were presented by Dr. Punam Yadav:

Dr. Yadav started her presentation by stating that “disaster is not natural. It is socially constructed.” Hence, the outcomes based on that.

Papers presented at the session related to gender. And, the majority of the audience were women. But we wondered, “where were the men”?

She provided a brief introduction.

- Behind every disaster, there are people.
- People are related to one another through gendered power relations.
- Gender norms and unequal, social, institutional and culture structures actually has impact on how one is going to experience disaster. Our experiences are constructed by unequal social, institutional and cultural structures.
- Men are also impacted although this is not talked about by these gendered structures.

She stated that the panel discussed gender inequalities and inclusivity in DRR policy and practice.

On behalf of the panel members, Dr. Yadav shared the following key insights from the discussion:

- Despite gender being considered in current DRR practices, it is often added at the end of a planning process. **Gender is included but not mainstreamed** even though gender mainstreaming has been in the discussant’s conversation and in practices for a very long time.
- Although **gendered social structures affected everyone** in any society, gender often equals women most of the time, often leaving men and sexual and gender minorities outside of the gender discourse.
- Women are not a homogeneous category - often they are

clubbed together with various identities. Each of us carry multiple identifies. All of those intersecting identities have an impact on how we are going to experience disaster. Therefore, the discussions also focussed on the importance of **intersectionality** in disaster discourse.

- Sex disaggregated data has been emphasised even by the Sendai Framework. Actually, when one looks at it, in practice, the data collection is very binary. Data is collected of casualties based on sex, for men and women. Children were clubbed together. The mid-term review includes women, age and disability.
- In recent years, disability has been part of the conversation when talking about DRR, especially since 2015. Often, gender is not mentioned there. All the disabled people are talked about as if they have no gender.
- Another important point discussed was the **Portrayal of women in DRR** discourse. If you look at the DRR frameworks, women are imagined as victims, not as agents of change.
- When women are talked about as agents or **agents of change or leaders**, they are also looked at victimhood framework. Women needs to be empowered. Women needs to be included. It is looked at within the victimhood framework. Whereas when we talk about men, we take men as resilient beings. As somebody who do not need a special category to that.
- Vulnerability is not a fixed category. It is not static but it is a dynamic process. One could be resilient at some instances and then maybe there are situations where one feels vulnerable. Categorizing some group of women as vulnerable at all times is not productive and do not reflect the reality on the ground and lived experiences of people in disaster context.

- Disaster is often seen as a technical fix – a material condition. Often objective structures are taken into consideration. But subjective structures are not. Discussions also focussed on bringing both material conditions as well as structural inequality into the conversation of disaster.
- There is a need to rethinking and question our own understanding of resilience – resilience is often taken as something as very positive, even though we know that in some of our own cultural context, there is no exact translation of resilience. People try to make sense of it. We need to rethink— what do we mean by resilience? What does it look if we look at it through a gender lense? Being a gender scholar, when I think about resilience, I wonder, can one be resilient to domestic violence or gender-based violence?
- Siloization of (or separation of) normal and disaster came out quite a lot. Especially when we talked about disability in disaster, what do we mean by that? When we talked about siloed approach, we talk about institutions, academic, research, and policies. Also, siloization of the normal from the disaster has actually have negative impacts. Prof. David Alexander was stressing it too. If you are resilient in normal society, you can be resilient during disaster as well.
- Separation of usual from emergencies. Emergencies are seen as something unique. It is removed from the usual. If the usual is better, the emergency situations will also be managed well.
- Pre-existing conditions affect not only post-disaster experience but also recovery efforts. Taking into consideration existing unequal social structure is important.

Other topics:

- **Moving beyond gender binary:** when we talk about gender, it

is not about man and woman. It is also not only about women. It is not only about women as a homogeneous category. We need to include all gender into the conversation of gender including men, women, and gender and sexual minorities and all of these categories have multiple identities.

- **Intersectionality** is extremely important to consider. People have different experiences depending on the different identities that they carry. It is necessary to consider all of those identities and their intersecting impacts when thinking about DRR.

Following this session, discussions were also held to talk about how to engage with the Sendai Framework for Action within our own context.

Recommendations arising from that discussion session are as follows:

- Tackling inequalities at the root should be a priority for implementation of the Sendai Framework for Action.
- In order to build back better, it is important to understand structural inequality. A gender perspective helps us understand the everyday experiences of people and their lived reality.
- Gender should be understood as relational. Why do we say that? We are related to one another through relation and those relations are gender. If you understand gender as a relational category, we can understand the fluidity, and we can understand that men are also impacted by these gender constructions and not just women.
- Adopting an intersectional approach to DRR policy will ensure inclusivity and equity in DRR practices.



Outcomes report was submitted by the Chair of the Session Prof. Peter Sammonds to the Board of Directors of GADRI:

Outcomes:

1. The session provided a space where gender inequalities and inclusivity in DRR policy and practice were discussed.
2. Gender does not mean just women. It includes men, women, and gender and sexual minorities and all of these categories have multiple identities. Intersectionality helps us understand intersecting identities of people in disaster setting and, with their participation, helps us identify appropriate interventions.

Following this session participants were asked to engage their home disaster research institutes on the need to listen, research and lead on the implementation of the Sendai Framework for Action.

Recommendations arising from the discussion session were proposed for consideration by the GADRI Board and the UNDRR Sendai Framework mid-term review.

Resolutions:

1. Tackling inequalities at the root should be a priority for implementing the Sendai Framework for Action and gender should be understood as relational, impacting all, including men, women, children and gender and sexual minorities.
2. Adopting an intersectional approach to DRR policy will ensure inclusivity and equity in practice.
3. In order to build back better, it is important to understand structural inequality. A gender perspective helps us understand the everyday experiences of people and their lived reality.

II-D: Putting Health into Disaster Risk Reduction (DRR) and Recovery

The session was Chaired by Prof. Virginia Murray, Head, Global Disaster Risk Reduction, UK Health Security Agency, UK; and Co-chairs Prof. Andrew Collins, DDN, Northumbria University, UK; and Dr. Ryoma Kayano, WHO Kobe Office, Japan

The Sendai Framework for Disaster Risk Reduction marked a step change in the way health is recognized as core to managing disasters effectively. The recent COVID 19 global emergency further sensitized governments, societies and the research community of the need to build prevention into the recovery process. The World Health Organization (WHO) published the [Health and Disaster Risk Management Framework](#) in 2019. This is part of an approach that includes multiple aspects of the now established health and disasters agenda.

From this the [WHO Health Emergency and Disaster Risk Management Research Network](#), launched in 2018, has developed opportunities to drive progress in its increasingly people-centered and impact orientated research agenda.

The session explored action on preparedness, response and recovery for future health and well-being, cognizant that health and wellbeing within disaster research is pivotal to multiple, if not all, of the objectives aimed at achieving a sustainable disaster-resilient world.

The session aimed to advance the agenda of putting health into disaster risk reduction and recovery through short interventions and a facilitated discussion.

Speakers of the panel session were:

- Dr. Ryoma Kayano, WHO Kobe, Japan
- Dr. Genta Nakano, DPRI, Kyoto University, Japan
- Prof. Virginia Murray, UKHSA, UK

Key questions to be addressed:

- [WHO Health and Disaster Risk Management Framework](#) and

the [WHO Guidance on Research Methods for Health Emergency and Disaster Risk Management, revised 2022](#) -: What additional actions might engage health and wellbeing to reach wider disaster risk reduction action?

- The WHO, UNDRR and other key representations of the United Nations recognize and promote an all of society orientation to disaster risk reduction. What are the opportunities to respond to and incorporate youth and the elderly into health disaster recovery processes?
- WHO has supported the development of a common understanding of how hazards via engaging with the [UNDRR/ISC Hazard definitions and classification](#) and the [UNDRR/ISC Hazard Information Profiles](#). What approaches can contribute to improving early warning systems and early action?



Outcomes and observations from the discussion session were presented by the Chair, Prof. Virginia Murray.

Prof. Virginia Murray expressed her delight to see an actual session on Health included in the programme of the 6th Global Summit of GADRI. Referring to the pre-conference survey undertaken by GADRI, Prof. Murray stated that there was a very small 1% of institutions who are working on health disaster related activities. Having attended quite a few GADRI meetings, she stated that it was timelier that health was incorporated to the GADRI conference agenda.

Objectives of the session:

The session discussed putting health into disaster risk reduction and recovery. This is within the context of COVID-19 and some of the impacts were reflected on.

Discussions centred around the Sendai Framework itself; and how to engage with WHO.

WHO has been committed to trying to supporting UNDRR and the health domains of the Sendai Framework by delivering the [WHO Health and Disaster Risk Management Framework](#) in 2019; and trying to bring that approach across a wider domain of all hazards.

Also looked at research networks. Just like GADRI, young scientists are critical and how we can develop these into the future. For us in health, it is just as critical.

Reflected on how preparedness, response and recovery for future health and well-being, areas might be of importance. But also to

find some sustainable disaster resilience in a world that is so complex.

It is about putting health into disaster risk reduction and recovery.

Thoughts from panel presenters:

1.First of all an introduction to the WHO Kobe Centre. In the heart of the WHO Kobe Centre, which is an incredible resource, WHO Health Emergencies and Disaster Risk Management team has a research network. And Dr. Ryoma Kayano talked about the research network and how all people can be participants of it. Also shared some of the outputs that have come out which are very important.

2.He presented a small book that represents Japan's incredible knowledge. [WHO Guidance on Research Methods for Health Emergency and Disaster Risk Management, revised 2022](#). There is a whole chapter specifically on what Japan had to face during COVID-19. But this is the guidance for research methods for health emergency and disaster risk management which was initially published in 2021, and a supplement on COVID epidemic added in 2022, and will be updated in 2024.

3.We normally do not print out. But a copy was specifically printed out for Prof. Tatano.

4. Why does it matter? Because what we found out was that health emergency disaster risk management is something that frightened people. People have never been quite sure about how they can investigate real time events. Not even prepared to investigate them in time. To do this, we have built a whole series of chapters, webinars, videos, podcasts, to try to make it as accessible as possible.
5. The aim is, through WHO and the regional networks, this will be launched across the world soon. One of the things I was so keen was, this should be linked to GADRI directly, particularly in its capacity development initiative.
6. It is a very exciting engagement. To complement that, there was a very wonderful presentation by Dr. Genta Nakano on "Community-based disaster risk reduction in an ageing society – shifting from social welfare to health maintenance–"
7. We were proud of that presentation and want to celebrate Dr. Nakano as a totally valuable young scientist. Bringing into our world, what you were doing, which is totally related to the health and wellbeing.
8. What Dr. Nakano explained through his presentation was, that there is a real concern about how the elderly can walk in the event of a tsunami or other event and move to an evacuation center. It talked about self-help. Not just getting mutual aid. And specifically highlighted some of the principles; and how to manage the evacuation centers.
9. What Dr. Nakano talked about was what we in our health domain, knowingly regarded as our business. But what was showed as a scientist working within GADRI, is that it is a partnership. It is a shared business. It is working together.
10. I have requested Dr. Nakano, that whatever he publishes on the important work he is conducting, to ensure that it goes into the health journals as well. So that everyone can celebrate and understand how to link with the work he and the country are doing on elderly here in Japan. We know that the rest of the world will be catching up with Japan in the future. What you showed was that science within GADRI links to our health domain.
11. Prof. Murray, once again, thanked Dr. Nakano for a tremendous presentation.
12. Prof. Murray also stated there was discussion on the work that they have been doing on "Hazard Definitions" and the work that is going on and the need to know that hazards definitions will work. Will they be useful? Will they deliver what is needed to make sure we talk the same language? We addressed these cascading and complex hazards and risks we discussed so much. Then moved toward regular review and update perhaps in time for 2025 Global Platform as was mentioned by Ms. Mami Mizutori.



Key questions submitted by the Chair, Prof. Virginia Murray to the Board of Directors of GADRI:

- [WHO Health and Disaster Risk Management Framework](#) and the [WHO Guidance on Research Methods for Health Emergency and Disaster Risk Management, revised 2022](#) -: What additional actions that might engage health and wellbeing to reach wider disaster risk reduction action that we need?
- It was already shown how WHO Health Emergency and Disaster Risk Management link to GADRI community. We can do something valuable.
- One opportunity, would be the meeting in November 2023, between GADRI and between WHO Kobe Centre and our research network; and can start planning for this to really work together.
- What are the opportunities to respond to, and incorporate youth and the elderly into health disaster recovery processes?
- We also have shown that by linking together, we might be able to incorporate more on youth and elderly. Through Dr. Nakano's presentation, we understand that the elderly work was really important. We have worried about how to support WHO Kobe with this area. Partnership working is absolutely critical.
- There was also a good discussion on behavioural science. For us, in the health domain, behavioural science is critical. COVID-19 has shown that we all have to change our behaviours. What was wonderful was that those who were in the audience, were really anxious to see how their skills in behavioural science within GADRI, could be brought to share with WHO. That was truly exciting.
- We looked at the Hazard Definitions to try and see how we can bring these together to enrich our mutual work together. There is a real opportunity, that if UNDRR, and the International Science Council, want to go to a Phase Two, we will have a process by which we can all share the best practices and best knowledge between us and try and take this forward.

II-E: Young Scientists Session on Youth and DRR

The Role of Youth and Young Professionals in data and knowledge sharing in disaster risk management

Session was Chaired by Prof. Gretchen Kalonji, IRDR, Sichuan University, China; and Co-Chaired by Prof. Wei -Sen Li, NCDR, Chinese Taipei; and supported by Dr. Mizan Bisri, Kobe University, Japan/U-INSPIRE



To resolve inter-generational challenges brought by disaster risks and climate impact as well as the existing digital transformation, youth and young professionals (YYPs) should and already have the capabilities to lead the processes within society. Therefore, this session will highlight the three roles of YYPs across the globe in data and knowledge sharing in multi-hazards disaster risk management, namely as producer, broker, and synthesizer. First, data and knowledge producers devoted themselves solely to capturing natural and social phenomena essential for understanding the landscape of disaster risk. Second, **brokers** provide challenging services to ensure stakeholders can access the most relevant disaster-related data and knowledge based on their needs. Third, **synthesizers** access and craft the available disaster-related data

and knowledge by consolidating, combining, and providing meaning-making that could inspire or trigger societal changes, such as to policy-making or implementation, program ideation, and capacity-building, among others. The session showcases country-specific examples that exhibit each of the roles and explore challenges and future joint works of YYPs from diverse backgrounds, including, but not limited to, earth scientists, social scientists, engineers, policy-makers, and emergency management professionals.

The session had a talk show – sharing experiences of YYPs in data & knowledge sharing for disaster-risk management. Panelists were:

- Dr. Mizan B. F. Bisri, Kobe University / U-INSPIRE Indonesia
- Mr. Ryo Tsuchida, Ph.D. Student Kyoto University / U-INSPIRE, Japan
- Dr. Ranit Chatterjee, RIKIA, U-INSPIRE, India
- Dr. Maria Camila Suarez-Pablo, UNGRD, Colombia
- Dr. Chipo Mudavanhu, Bindura University of Science and Education, Zimbabwe
- Dr. Nuraini Rama Hanifa, U-INSPIRE, Indonesia
- Dr. Mark Ashley Parry, European Youth Perspective, UKADR

Discussion Session Challenges and Ideas shared by Dr. Mizan Bisri

This session explored and tested the propositions of the three roles of Youth and Young professionals based on the panelists insights. Half of the panellists were GADRI members with exposure to the U-INSPIRE movement and were attending in-person.

Dr. Bisri also acknowledged Dr. Mark Ashley Parry from UK who brought in the European perspective to the session.

Dr. Bisri stated that youth and young professionals can play roles as data information and knowledge producer, broker or synthesizer, through their activities in education and research, to bring input of data, not only to natural science, but also to social sciences. Through their research activities, they generate information and knowledge with outcomes, hopefully for resilient-development.

He also mentioned about his own personal involvement with the UNMGCY which is a major group for Children and Youth, and also as a youth advisor for SFDRR article 36.2A - to include the sentence - children and youth as Agent of Change.

Inclusion of youth as Agent of Change is not sufficient. There is a need to push the young professionals, young scientists and also young politicians and young entrepreneurs, and get their involvement in the discussion of disaster risk management.

The discussions focussed on what would be the best formulation of the roles of Youth and Young professionals.

He shared a gist of the panellists’ statements as follows:

- Ryo Tsuchida talked and showcased the local and national collaboration and various roles of Youth and Young Professionals within UINSPIRE Japan.
- To highlight the essence of his presentation Ryo Tsuchida stated that the Japanese youth clearly can shift at the time of disaster. They play roles as volunteers. But once disasters are over and it is time for the recovery phase, and risk reduction, they play the role within the labour market and that is the key to their involvement.



- Nuraini Rahma Hanifa who is also the UNDRR rising award recipient and also Secretary-General of U-INSPIRE, showed the history, the model, the movement, of U-INSPIRE. After the launch of the Sendai Framework, it quickly emerged in 14 Asia Pacific countries with over 1,000 young professionals. She highlighted that it is not only scientists, but also politicians, innovators, and also entrepreneurs.
- Ranit Chatterjee highlighted the importance of ecosystem creations. Not only as a volunteering work, not only as capacity building for students and for early career researcher, but genuinely for job creation. He showed that U-INSPIRE India model RIKA, which is also applicable in the context of Indonesia and Nepal.
- Maria Camila Suarez Paba highlighted the experiences from Colombia; prospects and needs to create a critical mass of engagement by Youth and Young professionals. Not only to become future leaders but also to become present leaders.
- Chipso Mudavanhu brought in the experiences of Zimbabwe and stressed why youth is important. Also mentioned an important question- to mitigate brain drain, and ensure that the biggest contribution should be made at country and local levels.

Where does U-INSPIRE and GADRI fits in this synthesis?

It is about ecosystem creation. There were three models that has worked well over the years:

In India it - RIKA— works as a social Venture and social entity which has a closer engagement with U-INSPIRE India and at Regional and Global level through U-INSPIRE Alliance mechanism.

In Indonesia, including I myself as diaspora Indonesian abroad, it demonstrate the engagement between volunteers, young businesses, and young scientists through U-INSPIRE Indonesia mechanism and also U-INSPIRE Alliance.

In Indonesia, there are many young entrepreneurs with drone companies and their services are being widely used to conduct real-time ariel observations for plantations, for mining, etc. Once a disaster happens, they become volunteers. They send their drones to collect emergency related observations that the government really needs. There are also AI companies, CARI, that shows the disaster knowledge in Indonesia. At country level, they are competing but at the same time cooperating for showing the potential of Youth and Young professional.

There are similar models in Nepal. There are youth Innovation Labs and other social ventures interacting with U-INSPIRE Network in Nepal as the umbrella at country level and leveraging from the network of U-INSPIRE Alliance.

Where does GADRI fits in all this?

It is expected to have closer ties and more productive collaboration with GADRI Secretariat and GADRI members to highlight and connect science and research with job creation, entrepreneurship and also policy advocacy by Youth and Young Professionals.

It is about pushing for early adopters in science and technology and also to diffuse Asia-Pacific experience and models for wider outreach.

Similar demands and trends are also followed in Africa, America and also in Europe, to continuously prepare and produce present and future science, political, business young leaders for a sustainable disaster resilient world.

Dr. Bisri, in particular, highlighted the following three points:

- Youth and Young Professionals in DRM should shift beyond volunteering. There should be more opportunities for providing

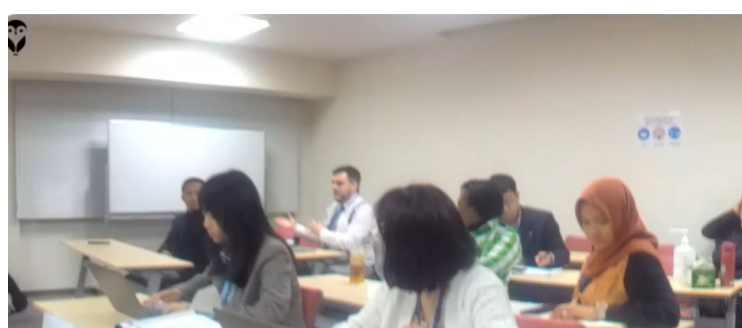
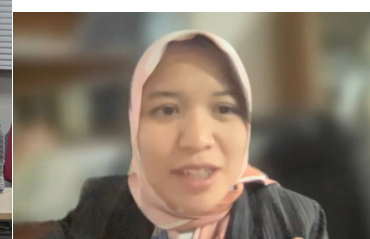
decent jobs and they should be integrated in political decisions. It was also noted that there is a changing landscape within institutions before and after COVID pandemic, to provide better opportunities for youth and young professionals.

- What is Young? Discussion on this led to being young at heart for advancing DRM which is essentially a multidisciplinary and interdisciplinary field.

Outcomes of the session and recommendations for the Board of Directors of GADRI Secretariat:

- ⇒ Youth and Young Professionals' role is validated as not limited to timely knowledge sharing. It is extended and not limited to data information producers but it is also to provide opportunities to be improved and become efficient collectors of data information. For example – the models in Asia Pacific countries can be used - which through the engagement and deployment of youth having businesses in drone and ariel observation, crowdfsource application and numerator, AI based scrolling engine, that was highlighted earlier.
- ⇒ knowledge brokers and facilitators are also catalytic beings in Youth and Young Professional as demonstrated in U-INSPIRE which also showed agility to advocate for political decision making at country level, as well as within regional and international domains.
- ⇒ It is about knowledge base synthesizer and implementers. The areas of Youth and Young Professionals falls within the GADRI Committees on Institutional Capacity Building, Data and Information Sharing, and Advocacy.

Through the discussion it was proven that the models for youth and young professional engagements are in the field of DRM, they are proven their usefulness; and ability to take action to mitigate disaster and disaster risk management. Now it is time to put it in to action beyond the Asia Pacific region.



Poster Session: Contributions to the Science and Technology Roadmap for the implementation of the Priority Areas of the Sendai Framework

Through the poster session, institutions were given an opportunity to showcase each institute's research work and their contributions to the targets of the Science and Technology Roadmap for the implementation of the priority areas of the Sendai Framework Agenda and to indicate the Priority area targeted by the research work; and/or the agenda of COP28. In addition, the presenters were requested to align their contributions to be relevant to policy makers and directed towards global disaster risk assessment – not only hazards – dimensions to assess the risks. Posters could also be reporting on research challenges, contributions, achievements, etc. and stressed the importance of frameworking the data in terms of -

whether it is global, national, or local. For example, with hazards, it is important to mention whether it is technological, natural or other aspects, is it on exposure, or vulnerability, or hazards which will be a good way to summarize the current status of science and research targets.

Out of the 47 abstracts approved by the Poster Selection Committee, 34 of the posters were presented during the summit. Six of the presenters received the GADRI Scholarship for best abstracts.

All authors of the 47 abstracts will be invited to submit their full paper towards the Proceedings of the 6th Global Summit of GADRI.

Effects of Climate Change and Hydrometeorological Hazards		
Quantitative Evaluation of Reduction of Flood Damage to Residential Households by Adaptation Options in the Bengawan Solo River Basin of Indonesia	Badri Bhakta Shrestha, Mohamed Rasmy, and Takafumi Shinya	P11
Urban Flood Risk Assessment at Catchment Scale: case study Chaktai Khal, Chattogram, Bangladesh.	Archita Saha 1) *, Atul Kumar 2) *	P16
*The Development of Flood Risk Analysis for Critical Infrastructure in Pinang River Basin Malaysia	Yusrin Wahab, Eliza Alias, Aznah Anuar	P10
Exploring the Impact of Wind Field on Intense Rainfall in Taipei Metropolitan Area Using Self-Organizing Maps and Radar Reflectivity Data	Lo-Yi Chen, Tsung-Yi Pan, Yi-Huan Hsieh, Jihn-Sung Lai, Hsin-Hsing Chia, and Yih-Chi Tan	P17
Assessing Taipei City's resilience for Natural Disasters through the implementation of the UNDRR's Disaster Resilience Scorecard.	Tsung-Yi Pan, Jing-Ting Wang, Cheng-Chi Cheng, Jihn-Sung Lai, and Hung-Chi Kuo	P18
New challenges, how could human beings could cope with disaster threats in the future	Xiao HAN	P19
The use of remote sensing to understand drought risk and its consequences for biomass productivity in the Eastern-Sahel region	Gergely Tóth ¹ , Solomon Tesfamichael ² , Yeganew Shiferaw ² , Tamás Hermann ¹ and Elhadi Adam ²	P20
Developing a Disaster Risk Reduction System to meet the Sustainable Development Goals	Maciej Pawlik, Soma Nomoto, Ravindra Jayaratne, Hideyuki Shiroshita & Kaori Kitagawa	P21
Using the UNDRR/ISC Hazard Information Profiles to manage risk and implement the Sendai Framework for Disaster Risk Reduction	Virginia Murray Chair of the UNDRR-ISC Hazard Definition and Classification Technical Working Group and the many authors, reviewers and contributors	P22
Green practices for Sustainable Development at Sardar Patel University, India and proposed Inclusive Climate Action Programmes	Vibha S Vaishnav	P23
Comprehensive study of energy and water exchange process over the Tibetan Plateau: A review and perspective	Yaoming Ma	P24
Analyzing Thermodynamic Condition of different Atmospheric Hazards that affect Lives and Livelihoods of the People in Bangladesh	Fatima Akter and Saurav Dey Shuvo	P25
British Cognizance of Climate Change	Mark Ashley Parry	P26
Introduction to the observational system of land-air interaction on the Tibetan Plateau and its related results	Weiqiang Ma, Yaoming Ma	P28
Challenges in integrating disaster risk reduction and climate change adaptation in household level management in Vietnam context	Bui Phan Quoc Nghia, Indrajit Pal, Nuwong Chollacoop	P29
*Decision-making model supported by multi-stakeholders ensures effective flood management	Minhaz Farid Ahmed ¹ , & Mazlin Bin Mokhtar ^{1, 2}	P12
*Spring Disappearance in the Himalayas: An appraisal on climate change perspective	Netrananda Sahu	P27
*Long-term variability and future projections of Tropical Cyclogenesis over the Bay of Bengal	Towhida Rashid	P40
*Vulnerability of the Food Security Sector to Climate Change and Climate-induced Disasters in Sri Lanka	Sisira Madurapperuma	P41
Healthcare, Covid-19 pandemic		
Cyclonic Disaster Resilience of Coastal Healthcare Infrastructure of Bangladesh: Evaluation Approach for Action Planning	Gulsan Ara Parvin, 2. Md. Anwarul Abedin and 3. Nina Takashino	P30
Resilience during lockdown: Changes in behaviour and attitudes among UK population during COVID-19 lockdown in the UK	Lan Li; Ava Sullivan	P31
*Hearing the voices that matter: community engagement in multi-hazard preparedness planning amid of COVID-19 pandemic in Sri Lanka	Thushara Kamalrathne, Lahiru Kodituwakku, Dilanthi Amaratunga, Richard Haigh	P45
*Community participation as a versatile approach for mitigating disaster risks among vulnerable communities: The case of the COVID-19 pandemic	Thushara Kamalrathne	P46

Volcanic Hazards		
Risk Communication with a Long-Term Perspective: Collaborative Activities with Local Communities to Prepare for a Large-Scale Sakurajima Eruption	Masamitsu ONISHI • Shunsuke SUZUKI • Katsuya YAMORI • Masato IGUCHI • Yoshiyuki YAMA • Genta NAKANO • Kensuke TAKENOUCHI	P05
Geohazards		
Source processes associated with the 2021 glacier collapse in the Yarlung Tsangpo Grand Canyon, southeastern Tibetan Plateau	Ling Bai	P06
National landslide quantitative risk assessment in Italy	Veronica Tofani, Nicola Casagli	P07
The activity of the International Consortium on Landslides for disaster risk reduction	Nicola Casagli, Kyoji Sassa, Veronica Tofani	P08
*A comparison of frequency ratio and machine learning methods for landslide susceptibility assessment	José Maria dos Santos Rodrigues Neto; Netra Prakash Bhandary	P39
Integrated Art and Sciences for Disaster Risk Reduction		
Fire Disasters		
Framework design of fire safety behavior model for residential building	Aishwarya Narang, Shivani Chouhan, Ravi Kumar, Amit Dhiman	P01
Experimental investigation of elevated pool fire toxicity in a compartment	Aishwarya Narang, Ravi Kumar, Amit Dhiman	P02
Disaster Information Database		
Disaster data linkages: application of GLIDE	Shiomi Yumi	P03
Evacuation		
Lessons from 2021 South Kalimantan Flood: What Triggers People to Evacuate?	Khonsa Indana Zulfa	P13
Study of IoT-Community Observation System utilizing Flood Crisis Management Water Level Gauge	Kensuke Takenouchi	P14
Map-making for enhancing awareness of disaster preparedness and improving community resilience among citizens: Reports on the Children's Map Contest for Community Safety	Kazumasa HANAOKA, Akio MURANAKA	P15
Emergency Preparedness, Risk Management		
Strengthening health system resilience: the potential of behavioural theory-based social media interventions in addressing vaccine hesitancy	Lan Li	P32
Exercise design for inter-agency collaboration training: The case of maritime nuclear emergency management tabletop exercises	Natalia Andreassen and Rune Elvegård	P33
Perceptions of Disaster Preparedness: a holistic multi-cultural study	Irene Petraroli, Roger C. Baars	P34
*The Significance of Using Models in Emergency Management	Naif Rashed Alrehaili Prof. David Alexander Dr. Gianluca Pescaroli	P35
Disaster Risk Reduction Education		
A Disaster Education Framework and Discrepancy from Protective Motivation Components for Behavioral Responses: A Systematic Review	Kullanan Sukwanchai (1), Indrajit Pal (1), Takuji W. Tsusaka (2), Takashi Oda (3)	P36
Lessons from recent disasters caused by natural hazards in Brazil	Masato Kobiyama, João Gabriel Fontes Maciel, Emanuel Fusinato, Alessandro Gustavo Franck	P37
Experiences and challenges of emergency management volunteers.	Akhilesh Surjan	P38
New approaches in education in disaster management using modern technologies	Katarina Holla	P09
BCP (Business Continuity Planning), Housing, Seismic resilience, Economic		
*Business Continuity Level of Quezon City in the Advent of Environmental Catastrophe towards Business Sustainability Development	Tabassam Raza ^{1,2} ; Indrajit Pal ^{1,3} ; Jose F. Peralta ¹ ; Thess Khaz S. Raza ^{2,4} ; and Erick Onde ¹	P04
*Integrated system modelling for desirable housing	Mohsen Ghafory-Ashtiany, Amir Shahmohammadian	P42
*Introducing a hybrid simulation approach to evaluate industrial plant resistance to earthquakes: from modeling to application	Mohammadreza Hamadi , Mohsen Ghafory-Ashtiany	P43
*In-GIVE: Informing Green Infrastructure Value and Eco-Services to Community	Atul Kumar	P44
* Poster abstract was approved. Poster not presented due to unavoidable circumstances		





Seeds and Needs: Networking with Institutions

This session provided institutes with opportunities to network and connect with other institutes, and showcase each institute’s resources; and to find potential partners among GADRI members to collaborate, engage and enhance ongoing or new research project activities. For instance, some institutes may have their own methodologies, datasets, experimental equipment, computer resources, etc., but lack users, application fields, in-situ data for

validation, etc. Other institutes may have enough human resources (researchers) but many unsolved issues and in need of scientific knowledge, experience, experimental and observation equipment, and technological supports and vice versa. The session, particularly, explored research seeds and needs to realize the effective/active collaboration among GADRI members.

Title	Presenter
Report of activities developed at the Hydraulic Research Institute (IPH), Federal University of Rio Grande do Sul (UFRGS), Brazil	Masato Kobiyama, João Gabriel Fontes Maciel, Emanuel Fusinato, Alessandro Gustavo Franck, Hydraulic Research Institute, Federal University of Rio Grande do Sul, Brazil
Bridging governments and academia through research	Sandra Sotomonte, National Unit for Disaster Risk Management, Unidad Nacional para la Gestión del Riesgo de Desastres, Colombia
Green practices for Sustainable Development at Sardar Patel University, India and proposed Inclusive Climate Action Programmes	Vibha S Vaishnav, Electronics and Community Science Centre, Sardar Patel University, India
Assessment of Spatiotemporal Trends of Winter Warming in India using Global Climate Models	Netrananda SAHU, Department of Geography, Delhi School of Economics, University of Delhi, India
Supporting Emerging Disaster Risk Reduction Practitioners for a Smarter and Stronger DRR Workforce in Digital Public Health	Veronica Tofani, Department of Earth Sciences, University of Florence, Italy
International Training Course (ITC) on Disaster Risk Management (DRM) of Cultural Heritage (CH): Our Progress and Challenges Towards New Normal	Lata Shakya, Ritsumeikan University, Institute of Disaster Mitigation for Urban Cultural Heritage (DMUCH), Japan
Collaboration Complexity in Nuclear Emergency Preparedness in the Maritime Arctic	Natalia Andreassen, Rune Elvegaard, Emmi Ikonen, Andrey Kazakov, Associate Professor in Organization and Management, Program responsible for Master in Preparedness and Emergency Management, Nord University Business School, Norway
Sediment Transport Modelling	Presented by Prof. Vahid Nourani on behalf of Prof. Ekkehard Holzbecher, German University of Technology in Oman, Oman
Can we do the training more immersive for the students in emergency services?	Katarína Hollá and Jozef Ristvej, University of Žilina, Faculty of Security Engineering, Department of Crisis Management, Slovakia
Supporting Emerging Disaster Risk Reduction Practitioners for a Smarter and Stronger DRR Workforce	Ava Sullivan and Lan Li, University College London, Centre for Digital Public Health in Emergencies (dPHE), United Kingdom
Action Orientated Data Impact in At Risk Marginalised Settings	Andrew Collins, Disaster and Development Network (DDN), Northumbria University, United Kingdom
The ARRC’s mission is to create a confluence of science and engineering in radar and applied electromagnetics that empowers research, enhances collaboration, inspires discovery, and improves lives	Robert Palmer and Tian-You Yu, Advanced Radar Research Center, University of Oklahoma, USA
Wind Hazard and Infrastructure Performance Center	Kishor C. Mehta(1), Delong Zuo(1), Ioannis Zisis(2), Jean-Paul Pinelli(3) (1)Texas Tech University, (2)Florida International University, (3)Florida Tech, USA



Wrap-up and the Closing Session

Chair: Ryosuke Uzuoka, Vice-Director, DPRI, Kyoto University



The final Wrap-up Session was chaired by Prof. Paul Kovacs and the Closing Ceremony was chaired by Prof. Ryosuke Uzuoka, Vice-Director, Disaster Prevention Research Institute (DPRI), Kyoto University. Closing remarks were delivered by Prof. Eiichi Nakakita who thanked the participants for joining the 6th Global Summit of GADRI in person at the DPRI, Kyoto University; and for the successful completion of the Summit.



Outcomes and Resolutions of the 6th Global Summit of the Global Alliance of Disaster Research Institutes

The member institutes of the Global Alliance of Disaster Research Institutes (GADRI) fully recognise the importance of the United Nations Office for Disaster Risk Reduction (UNISDR) Sendai Framework for Disaster Risk Reduction 2015–2030 Mid Term Review.

1. The Summit affirms that:

1.1 Traditional approaches to risk management are being overwhelmed by the increasing complexity of systemic risk and its cascading impacts. The findings of the Midterm Review of the Sendai Framework, Global Assessment Report 2022 and the work of various GADRI members points to the need for radical changes to strengthen risk-informed decision-making.

1.2 The intensity and impact of the recent earthquakes in Turkey are a reminder of unresolved high levels of exposure and vulnerability to large scale rapid onset hazards occurring against a backdrop of global instability.

1.3 Climate change is projected to increase and intensify extreme weather events and associated disasters. Climate change is adversely impacting the health of humans, animals and entire ecosystems; the climate crisis is a health crisis. Meanwhile, the potential to adapt to climate change is not limitless.

1.4 Disaster research, policy and practice should be inclusive and equitable. Adopting an intersectional approach will ensure inclusivity and equity in practice. Gender should be understood as relational. Research into gender inequalities and inclusivity need to be central concerns of forums such as GADRI and researchers should strive to collect and analyse gender disaggregated data.

1.5 To be able to provide resilience-informed decision support that provides socially equitable solutions whole city models need to combine approaches from different disciplines crossing traditional boundaries; essentially combining physics-based and data-driven models.

1.6 Science should provide information to support policy planning for avoiding extreme short- and long-term emergencies including through further investment in and interpretation of the role of early warning and action.

1.7 In recovery there is political will and financial support for bold action to address awareness, incentives, and change in regulations. Recovery planning is essential to achieve transformative DRR.

1.8 The emergence of polycrisis demands a more coherent, integrated, inter-disciplinary and inclusive strategy to deal with multiple hazards at the same time. The disaster management agencies need better decision-making tools to deal with conflicting values, multiple trade-offs and complex causal structures. To be legitimate and socially accepted these judgments must be made in a transparent und inclusive manner.

1.9 Enhanced situational awareness for crisis management requires better early warning for crises based on anticipation of their impacts. Science needs to enable acting on those risks by providing local, regional and national authorities with our knowledge, data and tools to help them act on resilience building, risk reduction and climate change adaptation.

1.10 Theory is our 'road map' in disaster risk reduction but, as the modern world is changing very rapidly, we need to update theory to take account of very dynamic conditions.

1.11 In order to save more lives and reduce damage in disasters, we need to adopt a more rigorous, scientific approach to emergency planning and management.

1.12 Even in larger research institutes, it is difficult to gather sufficient researchers to cope with various type of disaster events, but cooperative system over several institutes greatly helps to solve this problem.

1.13 Pathways for multiple nations to work together to confront climate related hazard exposure and vulnerability through co-funded projects that facilitate mechanisms for researchers to share experiences would expand research impact.

2. The GADRI Committees on Networking, Science and Technology Roadmap, Institutional Capacity Building, Data and Information Sharing and Advocacy report the following:

2.1 Networking:

2.1.1 GADRI should create a Global Disaster Researcher Directory: voluntary compilation of individuals engaged in disaster research, channeled through GADRI member institutes, perhaps building on Orcid IDs.

2.1.2 GADRI should develop a strong social media presence (Facebook, Instagram, Twitter, Linked-in, YouTube). Each platform requires different approach. YouTube allows the use of GADRI lectures and more detailed lengthier presentations appropriate to academic audiences and can be foundational for all 5 platforms.

2.1.3 GADRI should create GADRI Fellow and Young Researcher Programs: This would be based on (a) Nominations of accomplished senior disaster researchers, from which GADRI Fellows will be selected. GADRI will extend invitation for Fellows to visit/lecture DRIs on a case-by-case basis at no financial burden to GADRI. (b) A Young Researcher program to foster exchange of early career researchers.

2.2 Science and Technology Roadmap:

2.2.1 The future vision and directions of S&T activities should be shared among members of GADRI and hopefully influence policy and systems transformation towards disaster resilient and sustainable societies.

2.2.2 The science and technology community will develop and strengthen three key functions, including knowledge integration, capacity integration and process integration.

Knowledge integration can be promoted by integrating the knowledge of natural and social sciences and humanities using well-organized observation, modelling, and data and information systems based on the Open Science policy.

Capacity integration can be fostered by integrating "facilitators" to work as catalysts capable of providing expert advice based on a broad range of scientific and indigenous knowledge in the local context.

Process integration can be operated by establishing cross-sectoral frameworks at local, national, regional, and global levels to link cutting-edge science beyond disciplines with on-site decision-making and action using an "end-to-end approach".

2.3 Institutional Capacity Building:

2.3.1 GADRI should place enhanced focus on assisting member institutions with sharing approaches to overcoming challenges to institutional capacity building, focusing on some targeted and concrete challenges that many or most of us face. These include, for our higher education institutes, overcoming the challenges of disciplinary silos and creating new opportunities for faculty and students for interdisciplinary research, educational and service activities.

2.4 Data and Information Sharing:

2.4.1 GADRI is committed to promoting "action data", "bridging gaps to knowledge sharing", developing an "active database".

2.4.2 The GADRI Committee is acutely aware of data issues flagged in the Sendai Framework MTR under priority one (understanding risk). The GADRI Committee is committed to continuing in many ways the work of the Global STAG working group.

2.4.3 The Committee emphasised the importance of the various elements of FAIR data: Findable, Accessible, Interoperable and Reusable.

2.4.4 Inputs at the Summit brought influential examples of; databases and their sustainability and the use of big data and high performance computing (DesignSafe) supporting engineering research and publishing workflows; the GADRI database project that intends to regularly scrape URLs from members and analyse the pages with keywords, so the data becomes searchable; local level data from narratives on risk from local, marginalized communities in particular children, which responds to the Sendai objective to understand the risk for the most vulnerable people. New action-oriented collection methods for data through drawings, art, stories, which works well for health-related risks and impact of wellbeing.

2.4.5 Priorities for the GADRI committee to consider include:

Good implementation of the FAIR principles by all its members, thinking of the sustainability of databases.

Identification of platforms or databases that can help make GADRI data FAIR. However, existing initiatives should be considered for their fitness for purpose. In particular, the UNDRR's own initiative on Risk Information Exchange. The design of the GADRI database must be flexible, able to collect quantitative and qualitative data, and developed by data scientists in collaboration with domain experts.

2.4.6 Collecting microdata from its members is an opportunity to develop a database of narratives about the most vulnerable people. There are issues of accessibility and a need for curation

of a data policy and governance of its members, and recommendations to all DRR actors, including on data principles in times of crises.

2.4.7 Reusable data means that Members are encouraged to monitor the ongoing use of data that supports the purpose of DRR

2.5 Advocacy:

2.5.1 The Committee emphasises that science advocacy needs to be cross-cutting, from grassroots to policy formulation. To do that, researchers need to co-design solutions along with civil society as well as top policy makers. The process of co-design, co-develop, and co-delivery of advocacy messages is important.

2.5.2 Media plays an important role in science advocacy, where risk communication to the people and communities as well as to the decision makers can be done effectively. Using diverse media (from conventional broadcasting to social media to community radio), and key change agent (who can plan the interface of researcher and communities) customized science advocacy can be effective.

3. Panel discussions on challenges for action by GADRI report the following:

3.1 Big Science for DRR: Large-scale Experiments

There are significant challenges of large-scale experimental facilities for DRR.

The panel identified the following key aspects for ongoing attention:

3.1.1 Acknowledge the importance of sharing facilities and existing experimental datasets with a systematic format / digital foundation.

3.1.2 Emphasise that benchmark tests using results of large-scale experiments will be beneficial to the community to understand the capability of numerical models/simulation codes.

3.1.3 Strengthen the tie between large-scale experiments and numerical modelling.

3.1.4 Enhance the use of new technologies to lower the cost of observation in the field and structures as well as experimental facilities.

3.1.5 Explore the use of large-scale experiments for disaster education to students and public, and not limit to scientific use.

3.2 Sustainable DRR integrating Climate Action, SDGs, Field DRR; and Data Sharing Experience

The panel emphasised:

3.2.1 The importance of long-term in-situ field observations and data accumulation for climate change monitoring in climate change vulnerable regions. Sharing such observational data will be useful not only for climate change research but also for regional collaborations and cooperation.

3.2.2 That impact-based forecasting and projection is important to build community awareness of disaster mitigation and climate change adaptation.

3.2.3 That future projections for hazard, vulnerability and exposure will help societies for sustainable risk financing.

3.2.4 That alignments of targets of different frameworks (SDG, SFDRR, CC) will help to address real world problems with strategic interventions.

3.2.5 The importance of a multi-disciplinary approach.





3.3 Gender and Inclusivity in DRR Policy and Practice:

The session provided a space where gender inequalities and inclusivity in DRR policy and practice were discussed emphasising the following:

3.3.1 Gender does not mean just women. It includes men, women, and gender and sexual minorities and all of these categories have multiple identities. Intersectionality helps us understand intersecting identities of people in disaster setting and, with their participation, helps us identify appropriate interventions.

3.3.2 That following this session participants are asked to engage their home disaster research institutes on the need to listen, research and lead on the implementation of the Sendai Framework for Action.

3.3.3 That recommendations arising from the discussion session are proposed for consideration by the GADRI Board and the UNDRR Sendai Framework mid-term review.

The group resolved that:

3.3.4 Tackling inequalities at the root should be a priority for implementing the Sendai Framework for Action and gender should be understood as relational, impacting all, including men, women, children and gender and sexual minorities.

3.3.5 Adopting an intersectional approach to DRR policy will ensure inclusivity and equity in practice.

3.3.6 In order to build back better, it is important to understand structural inequality. A gender perspective helps us understand the everyday experiences of people and their lived reality.

3.4 Putting Health into Disaster Risk Reduction and Recovery

3.4.1 The session affirmed the broad and critical scope of putting health into DRR and recovery, including through a Japan based case study presented in the session that emphasised local level self-help.

3.4.2 GADRI members with these interests are encouraged to consider joining the WHO Health Emergency and Disaster Risk Management Research Network.

3.4.3 In the interests of developing opportunities for ongoing interactions in the health emergency and disaster risk management domains, a joint meeting between GADRI and WHO Kobe H-EDRM will be forthcoming reflecting an understanding that GADRI will incorporate an increased focus on health and well-being.

3.5 Youth and DRR

The session emphasised that:

3.5.1 Increasing the engagement of youth and young professionals, and the networks they have created, is of vital importance to enhancing the concrete impact of our DRR work.

3.5.2 This engagement can and should be linked to innovations in our higher education programs, through placing a greater emphasis on multidisciplinary, multisectoral, multinational models of integrating concrete DRR-related projects into our curriculum, across the majors.

3.5.3 Funding agencies and the private sector, at local, national and multinational levels, should prioritize providing support to existing and emerging youth organizations.

4. In response to these points recorded from the Summit, GADRI resolves to:

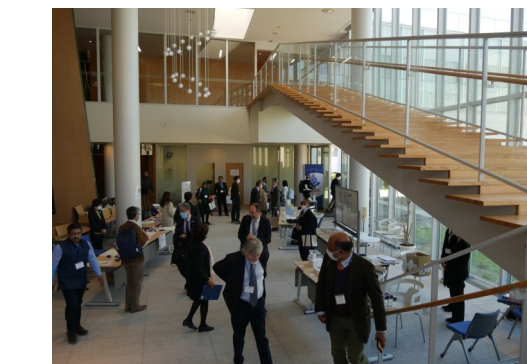
Bring all the above affirmations, findings and outcomes to its Board of Directors as GADRI resolutions.



It is not always possible to remember the full schedule of a 3-day conference. The three MCs, kept participants well informed of the agenda well in advance with timely announcements.

From L: Day 1 MC Dr. Masamitsu Onishi; Day 2 MC Dr. Yuki Matsushi; and Day 3 MC; Dr. Subhajyoti Samaddar—all three members are from DPRI, Kyoto University.

It also requires quite a lot of logistical support during the actual event; keeping everything on track, time management, managing the interns and other staff recruited to assist with the three-day conference, and zillion other hidden tasks. All these were efficiently and successfully managed by Dr. Toshio Fujimi, DPRI, Kyoto University.



Closing Banquet
Rihga Royal Hotel, Kyoto
MC: Dr. Yuki Matsushi, DPRI, Kyoto University

The closing Banquet was held at the Rihga Royal Hotel-2F – Shunju Hall with cherry blossom seasonal tapestries, fitting background for the 6th Global Summit of GADRI banquet.

The ceremony was opened to the sounds of Taiko Drum performance by the students of the Kyoto Tachibana High School in Fushimi, Kyoto. In their message, they stated that the Taiko Club consists of junior and senior high school students under the slogan of “one heart” and their “hope for a peaceful future”.

Opening Greetings were delivered by Prof. Kyoko Inagaki, Vice President, Kyoto University. The Mayor of Kyoto City, Mr. Daisaku Kadokawa, congratulated all participants for the successful completion of the 6th Global Summit of GADRI, and

also welcomed the participants to Kyoto. He expressed his profound gratitude for the Kyoto University, Disaster Prevention Research Institute (DPRI), for organizing the 6th Global Summit of GADRI.

Following the greetings, the “Kagami-biraki”, (kagami refers to the lid of the barrel and “biraki” means to break-open) a traditional Japanese ceremony performed at celebratory occasions where the lid of the “sake” barrel is broken with wooden hammers given to the members to perform the task. Then the “sake” was served to everyone present. All participants enjoyed the ceremony and the sake.



GADRI Side Event—Sendai Midterm Review – MTR-SF Viewpoints and Discussion for the Next Seven Years of the Sendai Framework

Kihada Hall, Oubaku Plaza, DPRI, Kyoto University, Uji Campus, Kyoto, Japan

14 March 2023 from 13:00 to 17:00h

MC: Dr. Kazuyoshi Nishijima, DPRI, Kyoto University, Japan

GADRI Secretariat organized the Side Event on Sendai Midterm Review to review the contributions by its members on 14 March 2023. The event took place one day prior to the 6th Global Summit of GADRI at the DPRI, Kyoto University, Uji Campus, Kyoto, Japan. The session looked into viewpoints and discuss actions needed by GADRI members and from disaster research community in general.

The meeting took stock of the implementation of the SF to date by various stakeholders, fields, outcome reports, and focus on the next seven years.

In addition, considered the current progress towards accomplishing the seven global targets of the Sendai Framework, and discussed:

- Whether there is still something that can be done to improve contributions to the remaining seven years of the Sendai Framework.
- The seven global targets of the SF show critically that there is still more work that needs to be done and to come up with a feasible roadmap for the full implementation of the Sendai

Framework. What therefore is the current status of the MTR-SF?

- From a researchers' point of view, what needs to be prioritised in the S&T Roadmap and within the Sendai Midterm Review?
- In what way GADRI can encourage members to create a framework of activity in relation to Sendai Framework, SDGs, and IPCC, IPBES for the next seven years?
- How can GADRI make knowledge and development of DRR be understood and accessible in civil society and amongst multi-stakeholders based on the *all-of-society* approach of the SF. How can the related science and technology be understood not only by the government or scientists but also by civil society, private sectors, academicians, and others?

The summary note of recommendations was shared among the participants during the 6th Global Summit of GADRI. The finalized summary recommendations was submitted to UNDRR Office in Geneva.



Dr. Yuki Matsuoka, Head, UNDRR Kobe Office



GADRI SPECIFIC COMMENTS ON THE SENDAI FRAMEWORK MIDTERM REVIEW -MTR SF

Beyond the above summary comments, we have the following specific comments on the text:

GADRI finds the Midterm Review summary statement too general and non-specific and recommends the Summary provides specifics re midterm status and progress toward the Sendai Framework's outcomes or goals.

For specific paragraphs, we comment or recommend the following edits (in red):

1. The Sendai Framework for Disaster Risk Reduction 2015–2030 represents a shift from managing disasters to an approach of understanding and managing disaster risks inherent to the decisions and actions within social, economic, political and environmental systems in all geographies and at all scales. **GADRI applauds this shift toward integrating disaster risk reduction into normal operations.**

3. While progress has been made toward realizing Sendai Framework priorities, it is not consistent across countries. The unique challenges faced by the least developed countries, landlocked developing countries and small island developing States continue to hinder realization of the Framework outcome and goal. **GADRI concurs progress has been made, and finds the candor throughout the Midterm Review refreshing.**

4. (a) **Target A: Substantially reduce global disaster mortality by 2030.** The average annual mortality during 2015–2021 is 42,833 people. A decrease per 100,000 people from 1.77 in 2005–2014 to 0.84 in 2012–2021, this represents an improvement in the average annual number of deaths and missing persons in the event of a disaster. However, the COVID-19 pandemic offset this improvement, causing 599,239 deaths in 2020 and 237,518 deaths in 2021, as reported by 37 countries in the Sendai Framework monitor. These figures are likely a significant underestimation: the World Health Organization (WHO) estimates 1.9 million deaths in 2020 and 3.5 million deaths in 2021 as a result of the pandemic. **In fact, as of 12 April 2023 there have been 762,791,152 confirmed cases of COVID-19, including 6,897,025 deaths, reported to WHO. As of 9 April 2023, a total of 13,337,964,733 vaccine doses have been administered (<https://covid19.who.int/>).**

4. (g) **Target G: Increase availability and access to early warning systems and risk information.** Of 120 countries reporting via the Sendai Framework monitor, 95 reported the existence of multi-hazard early warning systems.

All of the above trends are based on relatively short periods of observation, so that the absolute numbers reported most likely require normalizing (for natural hazards frequency, population changes and other factors) to provide a more accurate understanding of the progress being made.

9. Gaps remain in data collection and analysis at the subnational and national levels, with very few countries reporting sex, age and disability disaggregated data to the Sendai Framework monitor. This challenge is not restricted to developing economies. Disaggregation of how hazards and risks, as well as disaster impacts, affect different groups within communities and nations is essential to understand the vulnerabilities and risks that need to be addressed. **Gender inequalities and inclusivity need to be central to analyses. Gender should be understood as relational. Adopting an intersectional approach will ensure inclusivity and equity in practice.**

15. The number of risk models and risk assessment studies has increased. However, fewer than half of the countries reporting

against Sendai Framework targets indicate having fit-for-purpose, accessible and actionable risk information. States in the Economic Community of West African States (ECOWAS) and the Economic Community of Central African States (ECCAS) recognize that the absence of data limits understanding and ability to address the systemic nature of risk. Data ecosystems, including for disaggregated data, need to be strengthened, including through enhanced interoperability across systems, as well as the inclusion of local, traditional and Indigenous knowledge, feedback and expert opinion. **Too many of the risk models are proprietary or have other obstacles to widespread use and access. GADRI recommends a set of open-source global models be developed for major disaster agents of damage (earthquake, wind, flood, volcanism, drought, fire etc.) which are freely available to anyone. In developing these models, consideration must be given to the variety of users and their needs, in order to maintain accuracy and currency yet remove obstacles of technical requirements. In other words, the models must be layered or multi-tiered to serve a variety of users. The models should be developed by international teams, and share common platforms of exposure, risk engines, user interfaces, etc.**

17. There are a growing number of useful indices advancing understanding of systemic risks, combining natural hazard-related data with data on pandemic threats, protracted crises, violence and armed conflict, economic insecurity and other measures. The multidimensional vulnerability index measures a country's vulnerability to shocks so that those most in need can define apposite and context-specific solutions to risk information and management. **The multiplication of indices is two-edged and can lead to confusion. A paradigm should be established that all indices are reducible to basic human, social and environmental impacts.**

19. Efforts to better understand disaster risk increasingly encompass aspects of justice, social cohesion and human rights. Consistent with the Sendai Framework guiding principles, efforts continue to operationalize rights-based approaches to disaster risk reduction at the national or international levels. Public trust and public engagement of socially vulnerable groups and an "all-of-society" approach are considered essential. Challenges remain regarding participation, including in data collection, with significant data gaps on women, **gender**, the elderly, persons with disabilities and children. Without such data, "problems remain invisible and thus are not solved within the policy framework".¹¹ The Commission on the Status of Women raised such concerns, recalling that disaster risk reduction requires "inclusive risk-informed decision-making based on the open exchange and dissemination of disaggregated data, including by sex, age and disability".¹² Member States called for the creation of centralized bodies with adequate budgets and the capacity to conduct consultations with various stakeholders and improved accountabilities.

113. Member States and stakeholders must place principles of resilience at the heart of developing infrastructure systems,⁸⁴ both in upgrading existing systems and integrating risk assessments and data into future projects **in collaboration with scientific and academic partnerships. This requires:** assessment of the resilience, exposure and performance of existing critical infrastructure (e.g., through stress-testing); taking resilience as a core value in infrastructure planning and implementation (e.g., building on the principles for resilient infrastructure) and investment in national and local-level capacity to operate and maintain infrastructure systems

3rd General Assembly Global Alliance of Disaster Research Institutes (GADRI) Campus Plaza Kyoto, Kyoto Station, Japan 17 March 2023

The 3rd General Assembly of GADRI was held at the Campus Plaza Kyoto, Kyoto, Japan on the last day of the 6th Global Summit of GADRI. Participation was limited to member institutes of GADRI. Nearly 40 members from 33 GADRI Member Institutes joined the 3rd General Assembly of GADRI held at the Campus Plaza Kyoto, Kyoto Station, Japan on 17 March 2023 from 16:00 to 17:00h.

The meeting was chaired by Prof. Paul Kovacs, Chair, Board of Directors of GADRI; and Prof. Hirokazu Tatano, Secretary-General, GADRI.

Agenda items covered the following:

- The Chair requested the Members of the Board of Directors

of GADRI to introduce themselves. There were 10 members from 9 institutes of the Board of Directors of GADRI.

A brief discussion took place on the outcomes of the 6th Global Summit of GADRI; and member contributions.

- Final outcomes and resolution document of the 6th Global Summit will be prepared by Prof. Andrew Collins with the support of Prof. Paul Kovacs and Prof. Hirokazu Tatano.
- The document will be shared among all members for their comments and inputs.
- Disaster and Risk Research: GADRI Book Series



GADRI Members

Established in March 2015, the Global Alliance of Disaster Research Institutes support the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) and the work of the Scientific and Technical Advisory Group of the United Nations Office for Disaster Risk Reduction (UNDRR).

In line with its vision, GADRI strives to deepen the understanding of disasters and find implementable solutions to achieve disaster resilience; i.e. human, technical system and infrastructure resilience, survivability and well-being, by integrating knowledge

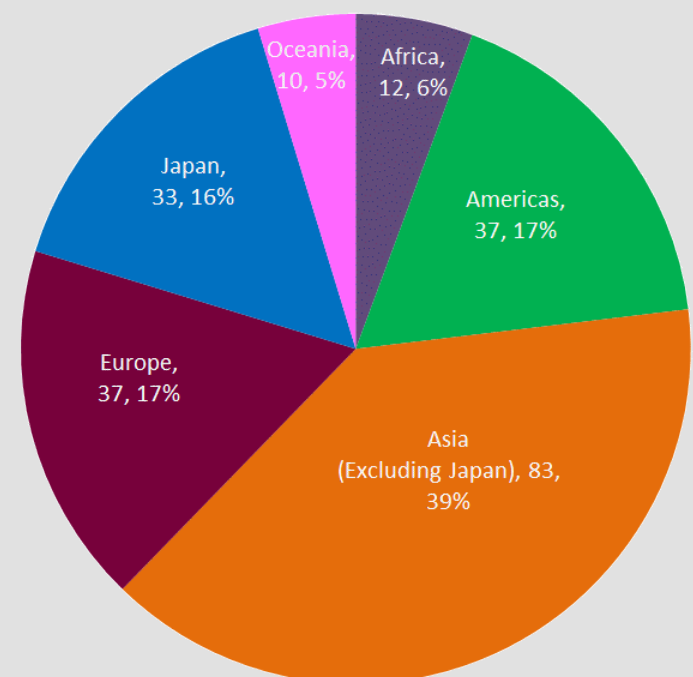
and technologies from around the world. Over 200 institutions have joined GADRI. GADRI membership is free; and completely voluntary and non-binding.

GADRI Secretariat is currently headquartered and hosted by the Disaster Prevention Research Institute (DPRI), Kyoto University, Japan.

To join GADRI, please contact the GADRI Secretariat: secretariat-gadri@dpri.kyoto-u.ac.jp

Geographical Distribution of Members of GADRI as of 31 March 2023

Area	Members	Economies
Africa	12	7
Americas	37	8
Asia (Excluding Japan)	83	23
Europe	37	13
Japan	33	1
Oceania	10	2
Total	212	54
	54 economies	



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