



GADRI ACTIONS

Summer 2024
Volume 21— Number 1



Meeting of the Board of Directors of GADRI



5th Open Discussion Forum of GADRI—Contributions to the Political Declaration of the SFDRR*: An Academic and Science Perspective, Collaborative Research Hub -3F, DPRI, Kyoto University, Japan, 12 March 2024 from 9:00h to 17:00h JST

Dear Members,

Greetings!

This issue of the newsletter, GADRI Actions, covers mainly the 5th Open Discussion Forum held at the Disaster Prevention Research Institute (DPRI), Kyoto University, Uji Campus, Japan on 12 March 2024. We had a very fruitful meeting with interesting deliberations and valuable outcomes. A copy of the draft resolution compiled by the task force team is also included in the newsletter.

Taking advantage of the in-person attendances of the members of Board of Directors of GADRI, the 40th Meeting of the Board of Directors of GADRI was held during the afternoon of 11 March 2024. During this meeting, the Chair and all present appreciated the contributions to GADRI by the five outgoing members of the Board. Although their terms of office of the Board of Directors of GADRI expires, they will remain as staunch supporters of GADRI through their engagement in various capacities within the GADRI Committees. For example, Prof. John van de Lindt will host the 7th Global Summit of GADRI in 2025 at the Colorado State University, USA.

A warm welcome was extended to the five new members appointed by the GADRI General Assembly to the Board of Directors of GADRI. Their term of office will start from 1 April 2024 for a period of four years.

We are pleased to bring to you a research report from the NATECH team on their recently conducted survey of industry managers in Colombia. The report discusses “making recommendations on how to improve supply chain managers proactiveness in preparing against flood-triggered chemical accidents. Further the research proposes a modified “revised Protection Motivation Theory (PMT) (Rogers, 1983) conceptual model to understand how managers perceive flood-related Natech accidents and the cognitive mediating processes of their intentions to adopt protective measures.”

Prof. Ortwin Renn, a valued former member of the Board of Directors of GADRI; and a member of the GADRI Community, was on a sabbatical at the Disaster Prevention Research Institute (DPRI), Kyoto University. We were quite fortunate to have him deliver a lecture to DPRI faculty and students. His wife, Prof. Regina Renn, who accompanied him, was kind enough to share her time to deliver a lecture to our faculty and staff too.

We hope you enjoy the GADRI Actions. If you have any information which you would like to share with us, please do not hesitate to contact us.

With best wishes,

Hirokazu Tatano

Secretary-General, GADRI;

Head, Social Systems for Disaster Risk Governance

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

Contents

- 5th Open Discussion Forum: Contributions to the Political Declaration of the SFDRR, 12 March 2024
- 40th Meeting of the Board of Directors of GADRI, 11 March 2024
- NATECH Risk Perception and Protection Motivation: A Survey of Industry Managers in Colombia
- GADRI Lecture Series
 - Lecture on Coping with Polycrisis: The concept of systemic risks and its contribution to risk management and communication by Prof. Ortwin Renn
 - Synchronicity: The Emergence of Meaning in the Process of Transformation by Prof. Regina Renn
- New Members of GADRI
- IDRiM Conference 2024

Photos are from the articles in the newsletter. © Copyright 2024 GADRI Secretariat.

All materials provided are subject to copyright permission. GADRI Actions is designed, formatted and edited by Hirokazu Tatano and Wilma James.

5th Open Discussion Forum of GADRI

Contributions to the Political Declaration of the SFDRR*: An Academic and Science Perspective

Collaborative Research Hub -3F, DPRI, Kyoto University, Japan

12 March 2024 from 9:00h to 17:00h JST

* **Political Declaration of the high-level meeting on the midterm review of the SFDRR 2015-2030 adopted by the UN General Assembly on 18 May 2023**



General Objective:

The Political Declaration adopted by the UN General Assembly on 18 May 2023 as the outcome of the Mid-term Review of the Sendai Framework implementation meeting held in May 2023, identified many areas of implementation for the Priority Areas of the SFDRR, which directly align with GADRI vision and objectives. For example, much emphasis is placed on enhancing public awareness, investing in academic and professional training, and wider dissemination of science-based methodologies and tools. It further proceeds, under the Follow-up and Review, to reiterate the importance of *cross-cutting role of science, technology and innovation in strengthening their greater application to support and accelerate the implementation of the Sendai Framework and its four priorities*.

Discussions captured the following topics:

- Introduction to GADRI activities, and the members of the Board of Directors of GADRI.
- encouraging and learning from current status and pathways to improve, strengthen and disseminate science-based knowledge, methodologies and tools for effective and efficient disaster risk resilience building through an academic and science perspective.
- Within the purview of GADRI Committees, to draw an outline of activities, voluntary commitments and contributions to be submitted along the lines highlighted in the Political Declaration of the Sendai Framework.

- Creating a platform to facilitate discussion between GADRI members and important stakeholders in matters related to academic and science-based disaster-resilience building.

During the final general discussion session, participants had an opportunity to interact with the panellists to share various suggestions to direct GADRI activities in achieving academic and science-based methodologies and tools in the most needed research areas for disaster risk reduction and resilience.

Priority 1:

(f) Enhancing efforts to promote a culture of disaster prevention, resilience and responsible citizenship and to promote education on disaster risk, including through the use of traditional, Indigenous and local knowledge and practices and, inter alia, raising public awareness and investing in academic and professional training, advocacy campaigns, social media and community mobilization.

Priority 4:

(b) Ensuring the incorporation of disaster risk management into post-disaster recovery, rehabilitation and reconstruction processes, enhancing the development and dissemination of science-based and targeted methodologies and tools and facilitating cooperation among States for the sharing of experiences;

Follow-up and review:

41. We reiterate the instrumental and cross-cutting role of science, technology and innovation in strengthening the effectiveness and efficiency of disaster resilience-building and encourage their greater application to support and accelerate the implementation of the Sendai Framework and its four priorities.

1st Session: Greetings and Introduction – Learning from Global Stakeholders

Chair: Prof. Norio Maki



A warm welcome was given to everyone by Prof. Norio Maki, Disaster Prevention Research Institute (DPRI), Kyoto

University, Chair of the Opening Session.

Prof. Hirokazu Tatano, Secretary-General, GADRI greeted all members and delivered a brief report on activities of GADRI and its current status.



Prof. Ryosuke Uzuoka, Deputy Director, DPRI,



Kyoto University delivered the Opening Remarks. He reiterated that DPRI strive to deliver studies on disaster prevention and cutting-edge

science and technology and their commitment to

support the SFDRR, Paris Agreement, SDGs, and other global agendas.



Prof. Paul Kovacs, Chair of the Board of Directors of GADRI, in his address stated that GADRI as a community is working together on the most pressing issues of disaster risk and reduction that is facing the world today. The current circumstances surrounding the world with devastating disasters and hazards, are not acceptable with excessive, preventable losses happening around the world and the scientific knowledge is available to do better. However, the challenge remains on how to bring that knowledge forward in a helpful way to allow decisionmakers to have the tools and the science to make the right decisions. This is in part why GADRI was formed right after Sendai Framework Agenda, to provide a forum to move forward science-based knowledge; to promote its implementation; and be part of the solution.

In addition to discussing the main agenda item, “Contributions to the Political Declaration of the SFDRR: An Academic and Science Perspective”, the occasion was used to acknowledge and thank the five outgoing Members of the Board of Directors of GADRI for their invaluable support and efforts during their term of office; and their continued contributions to science and technology and DRR initiatives. The members, through their presentations shared their views and expectation for GADRI moving forward.

The newly appointed Members of the Board too, were given a chance to briefly describe their respective institute activities, and to propose ways to improve GADRI visibility and its contributions in achieving

academic and science-based methodologies and tools in the most needed research areas for disaster risk reduction and resilience.

During the final general discussion session, the participants had the opportunity to review the presentations and messages shared by each speaker in support of the Political Declaration of the SFDRR.

It was concluded to form a committee to write a final resolution on the GADRI support and commitment to the Political Declaration of the high-level Meeting of the Midterm Review of the Sendai Framework. It is hoped, that the finalized resolution will be presented at the UNDRR Global Platform of DRR in June 2025.



Dr. Yuki Matsuoka, Head, UNDRR, Kobe Office delivered a keynote on “Strengthening DRR through Science: GADRI’s Role in Advancing Sendai Implementation”. Having arrived from the 11 March 2024 Memorial Day for the Great East Japan

Earthquake and Tsunami which marked 13 years since it happened in 2011, Dr. Matsuoka reiterated on the significance of education to sustain and further enhance disaster risk reduction culture among young children and communities.

She also stressed on the critical importance to renew commitments and intensify efforts and actions to address the challenges identified by the Midterm Review of the Sendai Framework and its outcome, the Political Declaration during the final seven years of the Sendai Framework. She concluded the message by welcoming participants and the GADRI community to share their inputs of achievements, progress and plans through Voluntary Commitments of the Sendai Framework; and further share insights at the forthcoming Asia Pacific Ministerial Conference on Disaster Risk Reduction in the Philippines in October 2024; and the UNDRR Global Platform for DRR in Geneva in June 2025.

The keynote speech was delivered by Dr. Lesley Jeanne Cordero, Senior Disaster Risk Management Specialist, The World Bank Office, Singapore focusing on “Harnessing Digital Innovations for Disaster Resilience”. She discussed The World Bank ASEAN Experience, and how to bring various stakeholders to the fold. Through examples of various projects and initiatives, Dr. Cordero portrayed how the ASEAN, as one of the most disaster-prone regions in the world, looks in terms of vulnerability. The World Bank report has indicated that “Innovation resulting from the creative new uses of data could prove to be one of the most life-changing events of this era.” Yet, the challenge is how fast can technology adapt and adjust and be able to support, respond, recover, and prepare for the type of disasters the world is facing today. The World Bank initiative “Harnessing digital innovations for climate and disaster resilience” covered the countries in Africa. For example, soil monitoring and the impact of climate change effects on agricultural crops in Tanzania; digital innovation for urban resilience in Kinshasa looked at drainage and flooding and the link to the transport mobility; Digital Earth for a Resilient Caribbean was one of the interesting initiatives which focused on skill development, trained volunteers and governmental staff to be able to capture using spatial data for infrastructure, AI, drones, Street View Imagery, and develop a replicable model for building exposure.

The Extreme Heat in Cities project was carried out in Europe, and Southeast Asia to provide evidence-based data through modelling to deliver heat tract projections in urban areas and urban cooling.



One of the most interesting projects in the one on Digital Innovation for Damage Assessment or the Global Rapid Damage Estimation (GRADE) applying innovative and replicable solutions using drones and spatial data.

Dr. Cordero also shared her own experience with the typhoon Haiyan in the Philippines where she was drafted to the Office of the President of the Philippines to support the rehabilitation and recovery efforts. She discussed challenges and lessons learned in detail. As one of the main challenges, she also mentioned communication. She stated that one of the important points is not just getting the message to the people but communicating the message in a language that is understood by the people; and the ability to describe and explain what certain types of hazards would look like and then call to action. She stated that consistency and credibility of the message and the messenger are important key factors in communication.

2nd Session: Challenges and Opportunities in disseminating disaster risk reduction and resilience awareness: An Academic and a Science Perspective

Chair: Prof. Yuichi Ono, and Ms. Ritsuko Yamazaki-Honda



The 2nd session was Chaired by Prof. Yuichi Ono, Member of the Board; and International Research Institute of Disaster Science (IRIDeS), Tohoku University; and Ms. Ritsuko Yamazaki-Honda, Co-Chair of the GADRI Committee on Networking; and Visiting Professor, National Research Institute for Earth Science and Disaster Resilience (NIED), Tsukuba, Japan.

Improving Resilience through Modelling and Community Engagement

Prof. John van de Lindt, Co-Director, Center of Excellence for Risk-Based Community Resilience Planning, Colorado State University, USA

The presentation on “Improving Resilience through Modelling and Community Engagement” by Prof. John van de Lindt discussed merging of academics with science in modelling and community engagement which would also be a theme in the 7th Global Summit of GADRI scheduled for June 2025. Prof. van de Lindt continued to share information on challenges in modelling which goes beyond physical infrastructure in the buildings. It also takes into account the social institutions, hospitals, schools, networks, households, people and then the economy and its interaction with everything. The key to modelling is how to be able to change something and improve it for better. In order to do that, the process requires measurements. And, it is about measurement science. He shared the five areas of community stability that need to measure; population stability; economic stability; social services, physical services, and then perhaps the hardest to measure is governance stability. He shared a graph which showed the conceptual framework for the modelling process.



Planning prior to an event is critical if measuring. Modelling is done in an “what if” scenario looking at the 4 Cs - capacity, cooperation, communication, coordination. Then, try to explore change not only to the design codes but mitigation to eliminate drops, or reduce that drop, and then accelerate the trajectory to hopefully, build back better.

In Community Resilience: Five Areas of Community Stability that must be measured

- **Population Stability** (e.g., measured by percent of people remaining in their homes)
- **Economic Stability** (e.g., measured by household income; employment rate)
- **Social Services Stability** (e.g., metrics to quantify availability of healthcare and educational facilities)
- **Physical Services Stability** (e.g., percentage of buildings remaining functional, metrics to quantify availability of utility and transportation services)
- **Governance Stability** (e.g., metrics to quantify police and fire protection and other essential services)



The Challenge and Some Questions

- Climate change and associated sea level rise (SLR) is happening now, but the magnitude is highly uncertain
- Solutions are possible but must go beyond just engineering and include:
 - Physical infrastructure and buildings
 - Social institutions
 - Households/people
 - The economy and its interaction with all of the above
- How can we measure the effect of facility design decisions on community resilience?
 - Interdependent models are ideal, but most models have one way dependencies
 - Good enough for level Gen 1 solutions?
 - Good enough to ensure social equity?



Conclusions

- Modeling provides an optimally technical solution but this may not be the socially/politically implementable solution, so iterative engagement is needed
- The IN-CORE community app approach provides a mechanism for communities to explore “what if” scenarios during engagement workshops
- A graphical user interface for moderately technical personnel is in progress



Thank you!

The Center for Risk-Based Community Resilience Planning is a NIST-funded Center of Excellence; the Center is funded through a cooperative agreement between the U.S. National Institute of Standards and Technology and Colorado State University (NIST Financial Assistance Award Numbers: 70NANB15H044 & 70NANB20H008). The views expressed are those of the presenters, and may not represent the official position of the National Institute of Standards and Technology or the U.S. Department of Commerce.



Center for Risk-Based Community Resilience Planning
A NIST-funded Center of Excellence



Integration of our efforts on research, educational innovation, and international collaboration

Prof. Gretchen Kalonji, Dean, Institute for Disaster Management and Reconstruction (IDMR), Sichuan University, China

Prof. Gretchen Kalonji stated that the main point she wants to stress is that though everyone thinks about the multiple functions of research universities, but the research missions and education missions are not well articulated.

In her presentation on “Integration of our efforts on research, educational innovation, and international collaboration”, Prof. Kalonji shared how we could better integrate our efforts on research and educational innovations to be more effective in serving our communities. A few slides from Prof. Kalonji’s presentation are given below:



Challenges for Higher Education to Promote Research and Education in Disaster Risk Reduction and Response

- Our universities and university systems are profoundly important players in the quest for sustainable development, perhaps the most important.
- However, among all the players, they are perhaps the most resistant to change
- A central challenge is the bifurcation between our “research” agenda and our “education” agenda.
- We are far stronger in international collaboration in

research than in education

- We also need to be far more effective in service to society

Our core strategic approach? Move to multinational, multidisciplinary, multisectoral research project-based approaches to **integrate** our contributions in research, education and service to society. Build on existing multinational, multi-institutional networks.

Students, professors and other partners work in multinational teams on research projects of mutual interest and of practical importance to participating regions.

Challenges for Higher Education to Promote Research and Education in Disaster Risk Reduction and Response

- Our universities and university systems are profoundly important players in the quest for sustainable development, perhaps the most important.
- However, among all the players, they are perhaps the most resistant to change
- A central challenge is the bifurcation between our “research” agenda and our “education” agenda.
- We are far stronger in international collaboration in research than in education
- We also need to be far more effective in service to society

Our core strategic approach? Move to multinational, multidisciplinary, multisectoral research project-based approaches to **integrate** our contributions in research, education and service to society. Build on existing multinational, multi-institutional networks.

Students, professors and other partners work in multinational teams on research projects of mutual interest and of practical importance to participating regions.

Institutional and higher education policy variations

- **Huge** variations on the opportunities and constraints that our disaster research institutes face.
- Highly centralized national level policies can make innovation very difficult
- Resource imbalance amongst institutions also often places constraints on multinational collaboration
- Geopolitical tensions can also pose problems
- Faculty reward structures often discourage rather than encourage innovation
- Major distinctions amongst our disaster institutes embedded with research universities include:
 - Variations in nature of faculty appointments, e.g. within the disaster institute, within other departments and schools, or “mixed-mode” appointments
 - Major distinction between those institutions which have the ability to design and offer their own degree programs and those that do not
- GADRI offers a powerful platform for sharing pragmatic details of our strategies for strengthening our disaster research institutes, given our various institutional opportunities and constraints

Institutional and higher education policy variations

- **Huge** variations on the opportunities and constraints that our disaster research institutes face.
- Highly centralized national level policies can make innovation very difficult
- Resource imbalance amongst institutions also often places constraints on multinational collaboration
- Geopolitical tensions can also pose problems
- Faculty reward structures often discourage rather than encourage innovation

- Major distinctions amongst our disaster institutes embedded with research universities include:
 - ⇒ Variations in nature of faculty appointments, e.g. within the disaster institute, within other departments and schools, or "mixed-mode" appointments
 - ⇒ Major distinction between those institutions which have the ability to design and offer their own degree programs and those that do not
- GADRI offers a powerful platform for sharing pragmatic details of our strategies for strengthening our disaster research institutes, given our various institutional opportunities and constraints.

Example of the Institute for Disaster Management and Reconstruction (IDMR)

- In terms of faculty appointments, we have a flavor of "mixed mode"
 - ⇒ About 30 with full-time IDMR appointments, and a limited degree of institutional flexibility in management
 - ⇒ About 40 with appointments in other departments/schools who have the right to serve as doctoral supervisors
- We offer our own masters and PhD degrees, under the title of "Safety Science and Disaster Reduction", an MOE-approved "secondary discipline". Within that umbrella, we have had considerable flexibility in curricular design
- IDMR also accepts masters and PhD students from

multiple other departments/schools, e.g. civil engineering, environmental sciences, public health, emergency medicine, law, etc.

- We do not have an undergraduate degree yet, but offer a three-year, research-based undergraduate "innovation class", entitled "*International Collaborations on Disaster Sciences and Emergency Management*".
- Our research and educational efforts build on our roles in various collaborative international networks, most notably in the High-Level Experts and Leaders Panel on Water and Disasters (HELP), and its "Alliance of Alliances", and ANSO-DRR.
- In our curriculum development efforts in disasters sciences, we have been deeply influenced by lessons learned from the evolution of materials science as a discipline

Example of the Institute for Disaster Management and Reconstruction (IDMR)

- In terms of faculty appointments, we have a flavor of "mixed mode"
 - About 30 with full-time IDMR appointments, and a limited degree of institutional flexibility in management
 - About 40 with appointments in other departments/schools who have the right to serve as doctoral supervisors
- We offer our own masters and PhD degrees, under the title of "Safety Science and Disaster Reduction", an MOE-approved "secondary discipline". Within that umbrella, we have had considerable flexibility in curricular design
- IDMR also accepts masters and PhD students from multiple other departments/schools, e.g. civil engineering, environmental sciences, public health, emergency medicine, law, etc.
- We do not have an undergraduate degree yet, but offer a three-year, research-based undergraduate "innovation class", entitled "*International Collaborations on Disaster Sciences and Emergency Management*".
- Our research and educational efforts build on our roles in various collaborative international networks, most notably in the High-Level Experts and Leaders Panel on Water and Disasters (HELP), and its "Alliance of Alliances", and ANSO-DRR.
- In our curriculum development efforts in disasters sciences, we have been deeply influenced by lessons learned from the evolution of materials science as a discipline

Research themes for the IDMR Undergraduate "Innovation Class"

- Disaster Mental Health (*collaboration with UC San Francisco*)
- Mapping of International Collaborations in Research and Education (*Wang Juanle from UNESCO Category 2 Center IKCEST and Soichiro Yasukawa from UNESCO are collaborators*)
- Disaster Risk Education and Service Learning (*Center for Crisis Management, Tribhuvan U*)
- Climate Stress and Urban Resilience (*Keio University; IIT Roorkee, ITB joining*)
- Water, Disasters and Culture (*Partners include the Graduate Institute of Policy studies in Japan (GRIPS), and the UN Center for Regional Development, in Nagoya.*)
- Earth Sciences for Disaster Resilience (*Tribhuvan University*)
- Resilience of Health Care Systems (*HK Poly U; Bangladesh Agricultural U joining*)
- Post-Disaster Environmental Management, including themes of water and air quality, and disaster waste management: (*Tohoku University*)

Open to additional research themes and partners, as well as to collaborations at postdoctoral level. First group graduated in 2023 and were highly successful in PhD offers from world-class U's

Links to our participation in various multinational networks, e.g. [HELP](#) and its [AoA?](#)



IDMR

Lessons from the evolution of materials science as a discipline

- "Materials Science" as an academic discipline did not exist formally anywhere until the first department was formed at Northwestern University in 1960.
- As a field of human activity, however, its history is very long:

(See: "The Search for Structure", Cyril Stanley Smith, MIT Press. 1981)

- "Materials science" now incorporates contributions from the basic sciences (physics, chemistry, more recently life sciences), essentially all of the engineering disciplines, computational sciences, economics, etc.

- "It is the first example of a new academic discipline emerging by **fusion** rather than **fission**" (Rustum Roy, Interdisciplinarity in Higher Education, Penn State Press 1979).
- Formalization of the new field faced considerable opposition from component disciplines.
- Materials science is now a top priority for all national funding agencies, and programs at undergraduate, Masters and Phd levels exist at almost all universities. Component disciplines have been strengthened by the creation of this new interdisciplinary field.
- How and why did this happen? Combination of needs, and emerging tools, and **VISION**
- Community gelled around a **comprehensive conceptual framework**

Prof. Kalonji concluded her presentation with the following slide:

Suggestions for potential future activities of GADRI?

- Design mechanisms for sharing information about the pragmatics of overcoming various institutional organizational challenges, e.g. in faculty appointments and reward structures
- Disseminate information on curricular innovation, with a focus on project-based approaches

- Share information on the challenges of catalyzing and maintaining multi-institutional networks?
- Build on some of our existing networks of youth and young professionals to get advice and help in creative ways to strengthen our collective efforts?

Establish cross-sectoral frameworks to link cutting-edge science with on-site decision-making and action

Prof. Toshio Koike, Executive Director, International Centre for Water Hazard and Risk Management (ICHARM), Japan

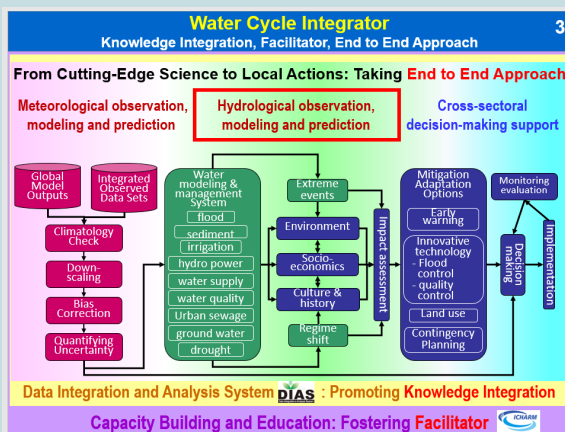
Prof Toshio Koike's presentation on "**Establish cross-sectoral frameworks to link cutting-edge science with on-site decision-making and action**" was a demonstration with evidence how science can integrate from cross-sectoral frameworks and link them to global and local levels.

Focusing on water related disasters in the context of GADRI strategy, Prof. Koike stated that the number of water-related disasters, especially, floods, storms, have been increasing dramatically. IPCC, mentioned, that the extreme daily precipitation event projected to intensify by 7% for each 1 degree centigrade of global warming.

Climate change will continue to exacerbate water related disasters in the future. How can we address to reduce water related disaster risks now? He shared a model with which to accomplish by using climate projection models, after downscaling and bias correction, quantifying uncertainty that can be inputted to hydrological models. It provides extreme events information in advance of the event. The model can also provide climate change induced regime shifts of the water cycle.



He stated that this information should be interpreted to environmental issues, socio economics counters, culture and historical aspects of the society. It can then be implemented to provide a holistic impact assessment of the climate change. Based on that assessment, it is possible to select the mitigating adaptation options from early warning, innovative technology, institutional and community approach and management to contingency planning. Once a decision is made, the policy is implemented. The monitoring and evaluation of the implementation should be reflected to the next stage of decision making.



Moving on the next slide, Prof. Koike referred to the framework developed by them, he stated that quantifying of the uncertainty should be reflected to the decision makers as it is necessary to categorize science to climatology and hydrology to local action. To establish end-to-end framework, there is a need to integrate data and information knowledge to promote the knowledge integration. That is called consilience.

It is also necessary to identify the gap between the science community and society; and a person is

needed to fill the gap in the form of a facilitator. Fostering facilitators are also very important to realize cutting-edge science in the society.

He then proceeded to show how the framework can be realized from hydrological science, and connect with other sciences. Climate projections, weather forecasting model and snow model, they are closely related to energy and water flux balance component. Agriculture production - crop and rice production, they are closely related to the surface energy and water flux, and vertical soil moisture component. Sediment disaster is basically connected with vertical soil moisture, surface flow and river flow. Dam operation is mainly connected with the river flow.

This way the hydrological model can be identified and connected with other science fields and establish the interface. That is the task of the science community.

Prof. Koike stated that the framework on water cycle integrator was proposed at the UN Conference in March 2023; and it was adopted as an action agenda of the conference.

To support his presentation, Prof. Koike shared the following two examples:

This case of the application of the system to Solo River in corporation with the Government of Indonesia. By applying dynamic downscaling, they were able to identify monthly rainfall increases in the rainy season, and decreases in the dry season. It is predicted that the heavy precipitation events will increase by 1.4 times in future; and the inundation areas and the depths will increase too. However, on the other hand, root zone soil water content which is a very important parameter for agricultural productions, will decrease by half in the dry season. At the end, a change of the variation of rice wins and they were able to keep the same level of the production. The framework can be connected from the global climate model, to the local action level which turned out to be a good driver of the society.

The case study of the online synthesis system for sustainability and resilience in Davao, Philippines was under the supervision of the minister. It was to develop a flood early warning systems; a climate change impact assessment system; and a support system for fostering

facilitators by inviting various stakeholders from the government and local government, national government, local academia and even the media. Once the facilitators were identified, there was a facilitator training program as all of them will be working together with the community by using the above-mentioned system.

In conclusion Prof. Koike mention that at the UN Water Conference held March 2023, Prof. Sewilam and Ms. Kamikawa who was from the envoy of the Prime Minister of Japan (currently she is the Minister of Foreign Affairs of Japan), co-chaired the session on Interactive Dialogue: Water for climate Resilience and Environment. They concluded the discussion by stating “the key for breakthrough among other things, is Open Science Policy, facilitation between sciences and decision making, end-to-end approach, and water cycle integration”. The action agenda presented by Prof. Koike was the concept and the tool for the direction identified by the UN Water Conference.

Status Report of the Noto Peninsula Earthquake Occurred on 1 January 2024

Prof. Hiroyuki Goto, Disaster Prevention Research Institute (DPRI), Kyoto University, Japan

Prof. Hiroyuki Goto presented a brief status report of the Noto Peninsula earthquake which occurred on 1 January 2024. The earthquake occurred in a depopulated area with about 150,000 people. There was very large motion ground shaking with a maximum seismic intensity of M7 which was observed by Japan Meteorological Agency. The recorded fatality of this earthquake was 241 people and nearly 1,299 persons injured.

Prof. Goto stated that while it is not possible to explain or give all details of the earthquake due to its ongoing disaster stage; he briefly summarized four points which are affecting the rescue/recovery efforts:

- Impact of multiple disasters - ground motion, tsunami, fire and landslides

The ground motion shaking was observed in an area with a width of about 100km and a length of 150km source fault. Almost the entire region of the northern Noto Peninsula is located above the source fault. The ground motion shaking which was observed in the areas of Wajima, Susu, and Anamizu was almost comparable to the 1995 Kobe Earthquake. In addition, there were observations of tsunami, fire and landslides. The fire, though small, caught a large area due to ground motion shaking. The eastern and



southern coasts of the peninsula were inundated by tsunami; and inland landslides.

- Vulnerability in depopulated areas - Key factor of difficulties

Vulnerability of the depopulated areas possessed a significant problem. It is populated with a higher ageing population and around 27.8 per cent of the population exceeded the age of 75 years. Meaning 1 in 3 persons is over 75 years. Noto Peninsula had a very large number of elderly people residing in the area. That was one of the major issues and difficulties related to this earthquake.

In addition, there were very few buildings that met the earthquake building standards established in 1982 for earthquake resilience in Japan. In the Noto Peninsula, most buildings did not meet these standards and therefore, they were quite vulnerable to the earthquake situation. Buildings that did not meet the standards were damaged due to lack of progress in replacement and reinforcement.

- Availability of major roads – a key damage factor of this earthquake

This area is a peninsula and the accessibility is important. There were many main roads in the peninsula. Unfortunately, these roads which were damaged due to the earthquake, could not be used even at this moment - nearly after two and a half months after the earthquake. On 1 January, main points of the city were accessed by going through sidewalks and small alleys, and it took two hours to get to the main points. Access to other the main bases took 3 days which caused obstruction to the rescue teams. Major roads are not yet fully available as significant time is required for restoration. The first 72-hour window after

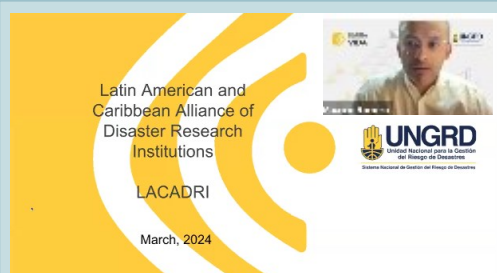
an earthquake is very important for rescue efforts. However, due to unavailability of the main roads, everything was hampered. That posed a major hindrance and caused delays and obstacles in the rescue and restoration efforts of the earthquake.

- Low recovery rate of lifeline systems

Recovery rate of the lifeline systems such as water, and electricity, took a longer time than in past major earthquakes compared to the 1995 Kobe and 2011 Tohoku earthquakes. Even after two months after the earthquake, the water recovery rate was quite low compared to previous earthquakes due to several factors. Few reasons that come to mind are the accessibility of major roads which hindered reaching the affected areas. Other factors involved in the situation are such as the system itself. Water pipelines are deeply embedded in the affected areas and could not be excavated easily. Only 60 percent of the water supply was recovered. Some cities in the area received water resources from 120 km away. Therefore, once it was cut out, they had no water supply.

Launch of the Latin American and the Caribbean Alliance of Disaster Research Institutions (LACADRI)

Dr. Mauricio Romero on behalf of the Deputy Director, Regional Affairs, UNGRD, Colombia



Dr. Mauricio Romero briefly shared information of the

recently established Latin American and the Caribbean Alliance of Disaster Research Institutions (LACADRI) which is expected to increase the visibility of the Latin Americas Regional representation at GADRI.

As a first step, Mr. Romero stated, they connected with the members in the region who are already members of GADRI. The first meeting of the Alliance was held on 30 January 2024. The main objective of the meeting was to work on a roadmap. The roadmap discussion covered the following points:

- the name of the alliance; proposal of the alliance objectives; how to create a charter, the Secretariat, and functioning; and actions to follow

In addition to UNGRD, ten other members of GADRI from Argentina, Brazil, Chile, Colombia, Ecuador, and Mexico participated with members of their institutes or with their delegates.

Discussion for the choice of the name of the alliance

followed the structure used by other regional alliances such as the African, North America, and the United Kingdom. The proposed name was Latin American and the Caribbean Alliance of Disaster Research Institutions (LACADRI) for GADRI. It was agreed to change the word Institutes to institutions due to the characteristics of the Latin American organizations.

The second topic discussed during the meeting was the objectives of the alliance which also adhered to the main objectives of GADRI. These objectives will be adjusted to reflect regional needs.

With regard to a charter, it was decided to walk the path that others have already walked, and proposed that the North American Alliance Charter will be followed to guide the construction of the LACADRI charter. The charter will also correspond to the local context of all members.

It was agreed to share the draft copy of the Charter among all members prior to the next meeting. UNGRD, Colombia has taken the lead to create the agenda and call for the meetings.

The next meeting agenda will include the approval of the Charter; build an activity plan for 2024-2025; and start to participate and plan joint activities such as workshops, seminars, and search for funding at regional level.

3rd Session: Introduction of the New Members of the GADRI Board of Directors – Current Status and contributions to promote a culture of disaster resilience

Chair: Prof. Paul Kovacs and Prof. Gretchen Kalonji



The session was chaired by Prof. Gretchen Kalonji, Dean, IDMR, Sichuan University, China; and Prof. Paul Kovacs, Chair of the Board of Directors of GADRI; and Executive Director, ICLR, Western University, Canada.

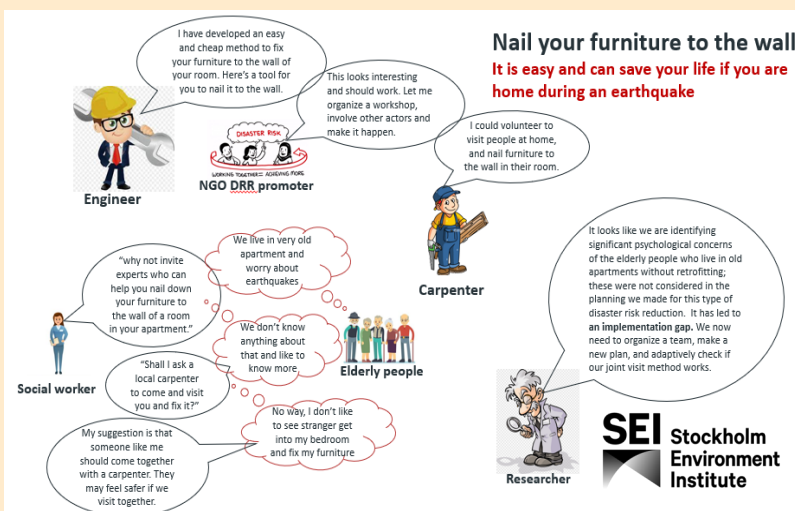
Bridging science, policy, and practice: Towards implementation science Dr. Guoyi Han, Stockholm Environment Institute (SEI), Sweden

The Stockholm Environment Institute, Dr. Guoyi Han stated, was established after the 1972 Stockholm Environment Summit which started the global sustainable development journey. Although the institute is named Stockholm, most of its work is carried around the world. The key impact areas of the institute take seriously to map to the 17 goals of SDGs. Dr. Han continued to present on syndromes or dilemmas – knowing more, losing more - pace of vulnerability reduction seems always behind its creation. Sendai Framework is very much managing disaster to managing disaster risk which is to avoid creation of disasters. Short-term vulnerability reduction often undermines long-term resilience to



transformative development pathways and transforming between development and disaster risks. He continued to discuss on implementation gaps describing the differences between and what was expected and what occurred. He referred to the “Implementation Task Force” under the leadership of Prof. Norio Okada by the IDRiM Society.

As for GADRI, he stated that GADRI may in cooperation with the existing task force, develop a framework to guide the structure to highlight implementation gaps. For example, the GADRI Annual Report could be on a themed annual report – ask members to report on what they say as a typical implementation gap case.



Implications of co-evolved DRR learning for disaster resilience

Prof. Andrew Collins, Disaster and Development Network (DDN), Northumbria University, Newcastle, UK

On behalf of Disaster and Development Network (DDN), Dept of Geography and Environmental Sciences, Northumbria University, UK, Prof. Andrew Collins, who was the first Chair of the Board of Directors of GADRI; and currently appointed as a members of the Board, delivered a talk on the “Implications of co-evolved disaster risk reduction learning for disaster resilience”. It is about intersecting disaster and development issues which is programmed in the UK and possibly in the world. It focuses entirely on intersecting disaster and development issues and vice versa. There are about 500 alumni from the programme disbursed around the world. The programme which started in 2000 as a research programme has currently evolved to a research network with partners around the world.

He spoke about the learning cycles and associated processes; responding to disaster risk reduction learning implications through co-evolved actions; and Co-evolved disaster risk reduction learning into action.



Conclusions:

- More widespread **disaster risk awareness** has been assisted by co-evolved knowledge alliances
- Relative action on reducing disaster risk is however entirely **disproportionate to knowledge attained**. i.e. insufficient co-evolved application
- **Knowledge implications** demand progressing DRR as co-evolved actions that can deliver the **greater impact** we need to become
- Initiatives for **identifying co-evolvable actions that bring change locally**, is within the grasp of a major science and education-based alliance to facilitate
- **Enabling environments for co-evolved local solutions require removal of political barriers to DRR** progress aided by a powerfully expanded evidence base
- Advances in co-evolved evidence-based **change with cascading and compounding impacts** that contribute to disaster risk reduction even beyond the intended outcomes of the SFDRR.

Advancing disaster resilience through academic and research activities at CoEDMM IIT Roorkee with a special focus on Himalayan region

Prof. Sumit Sen, Centre for Disaster Mitigation and Management, Indian Institute of Technology (IIT), Roorkee, India



From the Centre for Disaster Mitigation and Management, Indian Institute of Technology (IIT), Roorkee, India, Prof. Sumit Sen, Head of the Centre, talked about “Advancing Disaster Resilience through Academic and Research Activities at CoEDMM IIT

Roorkee with a special focus on the Indian Himalayan Region” especially on the “early warning system in the Himalayas”. The Centre was established in 1847 as an autonomous public institute for higher education with a vision “To emerge as a Premier Centre for Disaster Mitigation and Risk Management for sustainable habitat”; and a mission to “Human resource development for disaster mitigation and management to protect the people, environment and economy and ensure a disaster resilient society through education, research and development.”

Flood Early Warning System for a Mountain Watershed



Looking forward

- Developing stronger research collaboration between the GADRI members
- Focus on SFDRR priority #1 and #2.
- Connect the GADRI with the local/regional disaster research institutes, like SAADRI
- Work with GADRI members towards developing short-term educational modules/courses on disaster mitigation and management

Study Area

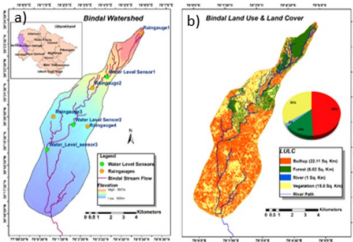


Fig: a) Bindal watershed with gauging points. b) Land Use Land Cover (LULC) map.

- Small hilly river basin in lesser Himalayas
 - Area of 44.4 km²
 - Elevation difference of 458m.
- Monitoring network has:
- 3 LIDAR river water level sensors
 - 4 tipping-bucket rain gauges

Community Involvement



- To position the sensors installation
- To know about the frequency and intensity of the flood
- To know about the nature and extent of damage
- To know who and how the people are affected

Real-Time Data Collection

Lidar based water level sensor

- Low cost of purchase (~US\$300)
- Low cost of installation and maintenance
- Lower cost of power supply (6W solar panel)
- State-of-the-art telemetry, Logging interval: 5 min

Davis tipping bucket rain gauge

- Sensor Type: Tipping spoon with magnetic switch
- 0.2 mm per tip and 214 cm² collection area
- For a rainfall of 50mm/hr, the error in reading is 2mm.
- State-of-the-art telemetry, Logging interval: 15 min.

Copies of slides from Prof. Summit Sen presentation.

Disaster in Context – An inter-disciplinary approach to disaster resilience and environmental sustainability

Dr. Roger Cloud Baars, Graduate School of Global Environmental Studies, Kyoto University, Japan

Dr. Roger Cloud Baars, Graduate School of Global Environmental Studies, Kyoto University, Japan

Dr. Roger Baars presented a brief outline of the Graduate School of Global Environmental Studies (GSGES), Kyoto University, Japan on behalf of the Dean of the Graduate School, Prof. Chihiro Tanaka.

He presented an overview of the institute (GSGES); what they do – inter-disciplinary approach to disaster work; and the GSGES agenda for GADRI.



Graduate School of Global Environmental Studies (GSGES)

Disaster as Context (Indirect Relationship)

- **Environmental Engineering**
e.g., Earthquake Resilient Construction, Flood Protection (Tsunami)
- **Water Environment Conservation**
e.g., Post-Disaster Contamination, Emergency Access
- **Terrestrial Ecosystems Management**
e.g., Hazards to Ecosystems, Disaster Recovery of Systems

KYOTO UNIVERSITY

6

京都大学

Environmental Education Lab (EELab)

Current Work (Key Projects)

- **Disaster Resilience Education**
Transformative Pedagogy, Social Systems, Emotional Lens
- **Gender and Disaster**
Societal Framings, Minority Groups, Empowerment
- **Disaster in Context**
Non-Western Approaches, Youth / Elderly, Climate and Disaster

KYOTO UNIVERSITY

8

京都大学

Graduate School of Global Environmental Studies (GSGES)

Disaster as Focus (Direct Relationship)

- **Global Environmental Architecture**
e.g., Disaster Recovery & Housing, Tourism and Disaster
- **Environmental Education**
e.g., Disaster Resilience Education, Inclusive DRR Approaches

KYOTO UNIVERSITY

7

京都大学

Focal Points (Agenda)

1. **Youth Engagement**
(Non-) Formal Education, Giving Youth Voice and Agency
2. **Inclusivity (Gender)**
Non-Binary Approach, ITK Systems, Diversity & Complexity
3. **Real-World Action**
Transformative & Empowering Community Outreach

KYOTO UNIVERSITY

10

京都大学

Disaster Risk Reduction and Resilience: A Contribution from Geography

Prof. Irasema Alcántara Ayala, Institute of Geography, Universidad Nacional Autónoma de México (UNAM), Mexico



Prof.

Irasema Alcántara Ayala presented the Institute of Geography, UNAM, Mexico. The Institute has 96 full-time researchers engaged in:

- Manifestations of the interaction between humans and nature throughout space,
- Links between the physical or natural sciences and the social sciences,
- Addressing and solving problems of a global, regional, and local nature from a spatial perspective.

There are three departments: Economic Geography, Physical Geography and Social Geography.

- Geospatial Analysis Laboratory
- Academic Unit of Territorial Studies in Oaxaca
- Academic Unit of Territorial Studies in Yucatán; Editorial Section

In addition, there are three support units: the Information Technology Unit, the Map Library and the Science Communication Unit.

The Institute is not limited to the above.



Draft Structure of the Collection of World Disaster Research Databases – Global Disaster Researcher Directory

Prof. Hiroyuki Goto, Disaster Prevention Research Institute (DPRI), Kyoto University, Japan

Prof. Hiroyuki Goto once again took the podium to give a brief status report for the project on Collection of World Disaster Research Databases (CWDRD); and the Global Disaster Researcher Directory, which is a proposed activity by the GADRI Committee on Networking under GADRI objective – to promote exchange and sharing of data and information for scientific research across the globe.

The concept is to build a database in cooperation with the GADRI Committee on Data and Information Sharing, that will contribute to the research activities among the members of the GADRI community. The database project is funded by DPRI, Kyoto University

through the Collaborative Research Planned and Proposed by GADRI. The structure of the Database is almost at its completion.”



The Global Disaster Researcher Directory which is part of the database, allows individual researchers to connect through the ORCID ID.

According to the current schedule, the system design was completed in 2022; implementation of disaster collection databases started in 2023 and is an ongoing process; and in the year 2024, it is expected to start to network. Implementation of case studies will commence in the future too.

Database Project

World Disaster Research Databases

The database allows users to search for Websites, Researchers, and Documents related to disaster reduction research to take advantage of the wealth of data resources on disaster reduction research that exists around the world.

Passive DB

Case Study Database

The database for cases related to disaster reduction research. Data items to be stored in this database should be entered in a fixed format, such as implementation date/evaluation date/location, etc., and these items should be searchable.

Active DB

Final Session: Panel Discussion Session – Towards a Collective Contribution by GADRI to the goals stipulated in the Political Declaration of the SFDRR



The final discussion session was chaired by Prof. Charles Scawthorn, Chair, GADRI Committee on Networking; and Visiting Professor, University of California, Berkeley, USA; Prof. Paul Kovacs; and Prof. Hirokazu Tatano.

The session focused on the deliberations of the previous discussion session; and recommendations shared by the members of the Board and audience. Particular focus was directed to share the ongoing support for the overall context of the Political Declaration of the high-level meeting on the midterm

review of the SFDRR 2015-2030. GADRI member activities are closely interlinked with the objectives of the global political agendas—SFDRR, Paris Agreement, SDGs. It was agreed to form a task force to prepare a draft resolution collating various recommendations by each presenter and the comments received by the audience.

It is expected to present the document at the next UNDRR Global Platform for Disaster Risk Reduction to be held in Geneva, Switzerland in June 2025.



Resolution of the 5th Open Discussion Forum of GADRI

12th March 2024

As part of its ongoing series of discussion forums attended by incoming and outgoing board members, committee chairs and the DPRI secretariate, GADRI considered its commitments and contributions to the 2023 Political Declaration of the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR).

The forum included 15 academic and scientific presentations and accompanying discussions spanning perspectives drawn from its wide-ranging fields of expertise in disasters related research across 208 member institutions worldwide.

The Forum resolved to:

Emphasise the critical ongoing global challenges that provide the context and imperative for the UN General Assembly to assess the progress of SFDRR on “integrating disaster risk reduction into policies, programmes and investments”;

Promote the implementation of the SFDRR through scientific knowledge and technologies in support of decision making, recognising the need to accelerate the path to achieving the outcome and goal of the SFDRR across all its seven targets, guiding principles and four priorities for action.

In line with the GADRI mission to share evidence-based research and to find implementable solutions to existing and emerging disaster risks, the Forum further resolves that:

i) As stipulated in SFDRR and the Resolution of the General Assembly on 18 May 2023, global policy on disaster risk reduction must be

evidence-based and development risk-informed.

- ii) Although the science and knowledge environment has significantly expanded to recognise the multi-causality and consequent general complexity of disaster risk, that accelerated action is needed to effect disaster risk reduction.
- iii) Science should be greater emphasized throughout the whole process or cycle of disaster risk reduction, from understanding risk to the post-disaster Build Back Better phase, and be linked to implementation.
- iv) Failure of nation states and their international alignments to invest in disaster risk reduction and to prevent the process of disaster risk creation in the context of much needed progress across all SGDs is a threat to global health and well-being.

Further, the Forum reaffirms GADRI’s commitment to serve as a collaborative platform for engaging discussion, sharing knowledge and promoting research on disaster risk reduction and resilience. It maintains a purpose to deepen the understanding of disaster risks, promote evidence-based implementation of disaster risk reduction strategies, and transfer and disseminate scientific knowledge and technologies in close collaboration with organizations around the world.





40th Meeting of the Board of Directors of GADRI
Room S-519D, Disaster Prevention Research Institute (DPRI), Kyoto University
Uji Campus, Kyoto, Japan
11 March 2024



40th Meeting of the Board of Directors of GADRI

Room S-519D, Disaster Prevention Research Institute (DPRI), Kyoto University

Uji Campus, Kyoto, Japan

11 March 2024



The 40th Meeting of the Board of Directors of GADRI was held at the DPRI, Kyoto University on 11 March 2024 from 17:00h. The Chair of the Board, Prof. Paul Kovacs was supported by Prof. Hirokazu Tatano, Secretary-General of GADRI. Most of the current members of the Board attended the meeting in person. The newly appointed members of the Board were invited to attend the 40th Meeting of the Board as well.

The Chair commenced the meeting by asking all members to briefly introduce themselves.

The occasion was also used to thank the outgoing members of the Board for their invaluable contributions to the activities of GADRI and tireless efforts to the Board of Directors of GADRI throughout their 4-year tenure at the Board. Further, they were given a chance to share their viewpoints as to the future directions and pathways for GADRI.

Our special thanks to the outgoing members of the Board:

- Prof. Peter Sammonds, Director, IRDR, University College London, UK
- Prof. David Alexander, IRDR, University College London, UK
- Dr. Zita Sebasvari, UNU-EHS, Germany
- Prof. Gretchen Kalonji, Dean, IMDR, Sichuan University, China
- Prof. Toshio Koike, Executive Director, ICHARM, Japan
- Prof. John van de Lindt, Co-Director, Center of Excellence for Risk-Based Community Resilience

Planning, Colorado State University, USA

Although the above-mentioned members' current term of office with the Board of Directors of GADRI come to an end, they will be engaged in various other roles with the GADRI Committees.

Prof. John van de Lindt's institute will host the 7th Global Summit of GADRI in 2025.

The new members of the Board were welcomed by the Chair and all members of the Board. They were given a chance to introduce themselves; and share their contributions to GADRI and expectations. The new members will start their term of office from 1 April 2024 for a period of four years.

The New Members appointed to the Board of Directors as of 1 April 2024 are as follows:

- Prof. Guoyi Han, Senior Research Fellow, Stockholm Environment Institute (SEI), Sweden
- Prof. Andrew Collins, Leader, Disaster and Development Network, Northumbria University, Newcastle, UK
- Prof. Sumit Sen, Head, Centre for Disaster Mitigation and Management, Indian Institute of Technology (IIT), Roorkee, India
- Prof. Takeshi Katsumi/Prof. Chihiro Tanaka, Dean, Graduate School of Global Environmental Studies, Kyoto University, Japan
- Prof. Irasema Alcántara Ayala, Director, Institute of Geography, Universidad Nacional Autónoma de México (UNAM), Mexico

Natech Risk Perception and Protection Motivation: A Survey of Industry Managers in Colombia

Namulun Borjigin, Lina Maria Parra¹, Ana Maria Cruz^{1*}

Introduction

Flooding is one of the most problematic natural hazards threatening industrial areas in many countries. Supply chain disruptions caused by flooding can be further exacerbated in the chemical industry when they trigger chemical accidents (known as Natech). The accidents and the disrupted supply chains can have detrimental effects on enterprises, which could further significantly impact the economy and daily life.

To make recommendations on how to improve supply chain managers proactiveness in preparing against flood-triggered chemical accidents, this research proposes a modified “revised Protection Motivation Theory (PMT) (Rogers, 1983) conceptual model to understand how managers perceive flood-related Natech accidents and the cognitive mediating processes of their’ intentions to adopt protective measures. To test the conceptual model, this international collaborative research, together with Colombian partners at the Colombian Safety Council (CSC) carried out an online questionnaire survey targeting supply chain managers in the chemical industry in Colombia. The questionnaire survey was followed by industrial visits to 9 companies, and a workshop with safety managers from 15 chemical companies.

Previous studies and background

Though the chemical industry is relatively highly regulated, there is evidence that managers respond at different proactive levels when facing potential Natech hazards (OECD 2015). In particular, the impacts of natural hazards and potential Natech accidents on the

supply chains are often underestimated [2]. However, little research has touched upon this issue. Thus, more research is needed to better understand supply chain managers' protection motivation and risk perception regarding these external threats.

Based on a literature review, we propose an extended protection motivation theory (PMT) model for the purpose of understanding the influential mechanism of supply chain managers' risk perceptions on protective intentions under the threat of flood-triggered chemical accidents. The proposed revised PMT, shown in Figure 1, consists of a threat appraisal and a coping appraisal. Threat appraisal is also known as risk perception, which measures the perceived probability and severity of a risk. Distinguishing from the original model, the proposed model considers three types of risk perceptions, namely deliberative, affective, and experiential (Ferrer et al., 2016), which integrates rational analysis, negative emotions, and heuristic intuition into the measures of risk perception. The proposed model also includes resource deficiency as a fourth element in coping appraisal, which provides a resource-related attribute in the PMT model. Furthermore, this study analyzes five cognitive biases that could reduce risk perception and protective intention in the context of Natech risk management and supply chain risk management: normalcy bias, belief in the law of small numbers, the illusion of control, optimistic bias, and loss aversion.

The proposed revised PMT model examines for the first time the interacting relationships among risk perception, cognitive biases, and protection motivation in the context of Natech disaster risk management.

Second, none of the previously proposed PMT models have considered the recent advances in risk perception formation processes. This study applies the three types of risk perceptions in understanding risk perceptions and responses to Natech disaster risk.

Third, the results of this study will be analyzed to identify the significant factors that predict protective motivation, as well as the main barriers that defer supply chain managers from adopting protective measures against Natech risk. This can be applied to help improve Natech risk perception and consequently protection motivation for these types of hazards, representing an important first step towards improving supply chain risk management, contributing to societal resilience.

Methodology

A questionnaire survey was designed to measure all the factors in the revised PMT model. In addition, two pilot tests were carried out with faculty and students to get feedback. The questionnaire length was about 25 to 30 minutes and it was applied to the chemical industry in Colombia after translation into Spanish. 42 out of 161 valid responses were received and were analyzed by applying PLS-SEM to validate the theoretical model.

Concurrently, semi-structured interviews were conducted in companies located in multiple municipalities, encompassing Bucaramanga, Bogota, Barranquilla, and Cartagena, from March 18th to March 28th, 2023. Nine large-sized companies, one medium-sized company, and one industrial expert

agreed to participate in the interviews, sharing insights into their historical encounters with flooding, present risk management strategies, and particular protective measures they've implemented. Each interview spanned approximately 1 to 2 hours and was recorded after the interviewees explicitly gave their consent.

Furthermore, a workshop was held on 22nd March in Bogota, with the participation of 15 Health Safety and Environment (HSE) managers from the hydrocarbon industry in Colombia. Managers were divided into two groups depending on their mode of participation: in-person and online. The discussions focused on the challenges and difficulties in implementing risk management practices.

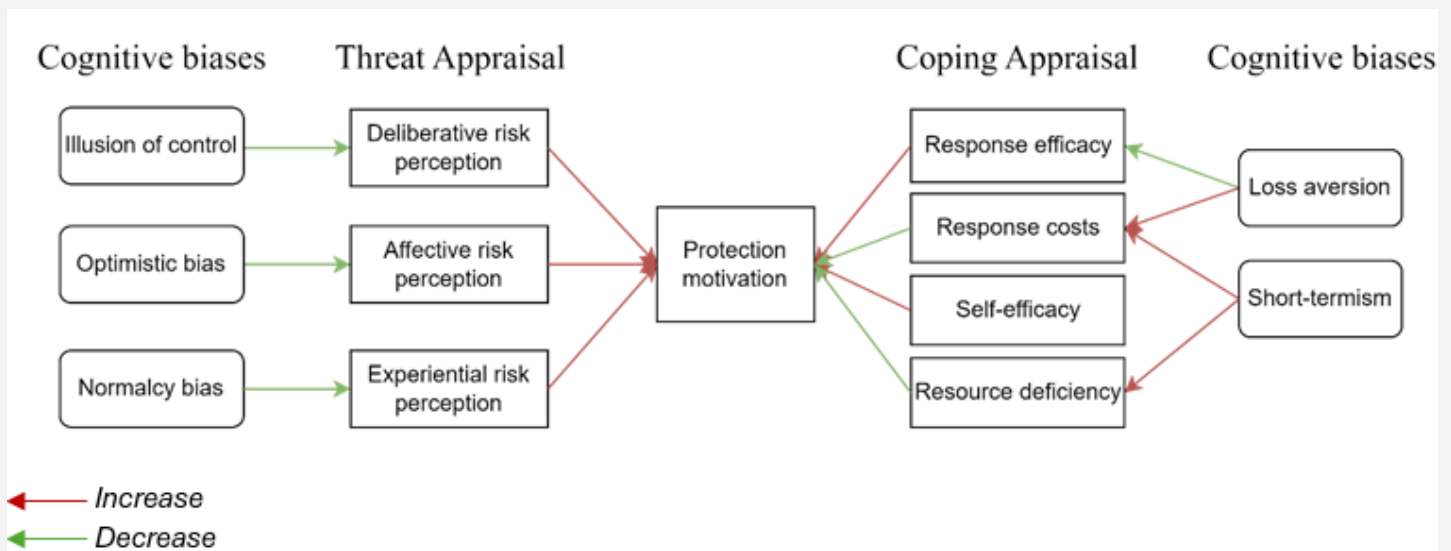


Fig. 1 The Enriched Protection Motivation Theory (PMT) model (Original work).

Results

The findings from the model validation indicated that experiential risk perception, resource deficiency, response efficacy, and self-efficacy serve as noteworthy predictors of protection motivation. Additionally, normalcy bias diminishes deliberative risk perception, subsequently reducing protection motivation indirectly. Short-termism exacerbates perceived resource deficiency, consequently decreasing protection motivation indirectly. Furthermore, optimistic bias decreases affective risk perception, albeit without a direct impact on protection motivation. However, the conclusive significance of deliberative risk perception, affective risk perception, response costs, illusion of control, and loss aversion remains uncertain, given the sample size limitation. The interviews delved into 15 events, primarily focusing on floods, rain-induced flooding, and hurricanes. Of these events, 14% experienced a loss of containment (LOC). Notably, approximately 40% of the events discussed during the interviews occurred within their supply chain network, involving both customers and suppliers. Additionally, over 70 flood risk management practices were outlined, encompassing physical measures, procedural protocols, equipment design and retrofitting, safety barriers and auxiliary systems, emergency planning and response, and risk communication activities. Despite certain companies' efforts to mitigate flooding, the importance of community collaboration in maintaining functional infrastructure within the local vicinity remains evident.

Finally, the workshop discussions highlighted some significant challenges in managing flood and flood-related Natech risks, primarily stemming from inadequate cooperation and communication among stakeholders. This deficiency extends across various domains, including the business network, the coordination with governmental entities, and the engagement of the communities in the vicinity. Additionally, managers emphasized that factors such as the social context, political dynamics, cultural influences, the inherent uncertainty nature, and the scale of events, pose formidable obstacles in enhancing protection against future occurrences.

Reference

- Ferrer, R. A., Klein, W. M., Persoskie, A., Avishai-Yitshak, A., & Sheeran, P. (2016). The tripartite model of risk perception (TRIRISK): distinguishing deliberative, affective, and experiential components of perceived risk. *Annals of Behavioral Medicine*, 50(5), 653-663
- OECD. (2015). *Addendum Number 2 to the OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response (2nd Edition) To Address Natural Hazards Triggering Technological Accidents (NaTech)*.
- Rogers, R. W. (1983). Cognitive and psychological processes in fear appeals and attitude change: A revised theory of protection motivation. *Social psychology: A sourcebook*, 153-176.

GADRI Lecture Series

Coping with Polycrisis: The concept of systemic risks and its contribution to risk management and communication

Lecture by Prof. Ortwin Renn, retired Scientific Director, International Institute for Advanced Sustainability Studies (IASS), Potsdam, Germany—15 May 2024

[Abstract]

In recent years, the entire globe has been exposed to a number of serious crises. Risk researchers call them polycrises (Homer-Dixon et al. 2021; Homer-Dixon and Rockström 2022). First came Corona, then came the further manifestations of climate change, for example floods, draughts and forest fires, the war in Ukraine, food crises in the world, inflation, galloping energy prices, more serious and intensive natural disasters, and there are more every day. The hallmark of polycrises is the mutual amplification of nested, interconnected risks.

Each and every crisis – whether political, epidemiological, military, economic or environmental - forces society to redefine and reshape its everyday understanding of what is normal and what can be expected in the near future. This juxtaposition of crises shows that we are dealing with a complex web of superficially different but in reality deeply interwoven crises (Lawrence et al. 2022). And it is precisely because these crises are so causally and functionally interwoven that they cause damage worldwide that is far greater than the sum of their individual damages.

These insidious risks that threaten people's welfare worldwide can be evidenced by the term systemic risks (Renn et al. 2020; 2019 Renn 2021). The cause-and-effect models that have been common up to now are less and less effective in a world that is characterized by systemic interactions between allegedly independent risk sources. For this reason, everyday phenomena in nature, technology and society can only be understood if they are viewed as dynamic processes in complex systems. Most of these systemic risks have become more severe, disruptive, and dangerous than in previous decades. Risk research has referred to this as risk amplification. (Kasperson et al. 1988) And in most cases, the likelihood and magnitude of these risks are also increasing more rapidly now than in the past.

Their analysis requires interdisciplinary scholarship, systemic concepts and methodologies



and in particular inclusive forms of risk governance (IRGC 2018).

The lecture on “Coping with Polycrisis: The concept of systemic risks and its contribution to risk management and communication” addressed the multiple parallel crises that influence and reinforce each other and emphasise the need for a comprehensive systemic understanding of the interactions between social, natural, technological and cultural hazards and domains. It explored the potential merits of a systemic risk approach and explain the new methods that are associated with its concept. It also addressed the need for unvarnished comprehensible communication that addresses the conflicting goals and described pathways of how to involve stakeholders and affected population in weighing

conflicting goals and to search for common solutions without wasting precious time.

[Short bio]

Prof. Ortwin Renn is a social scientist focusing on risk governance. He retired as scientific Director at the International Institute for Advanced Sustainability Studies (IASS) in Potsdam (Germany) in December 2022 and serves as a professor emeritus for environmental sociology and technology assessment at the University of Stuttgart. He directs the non-profit company DIALOGIK, a research institute for the investigation of communication and participation processes. Renn is Adjunct Professor for “Integrated Risk Analysis” at Stavanger University (Norway), Honorary Professor at the Technical University Munich and Affiliate Professor for “Risk Governance” at Beijing Normal University. His research interests include risk governance (analysis, perception, communication), stakeholder and public involvement in environmental decision making, transformation processes in economics, politics and society and sustainable development.



Synchronicity: The Emergence of Meaning in The Process of Transformation

Lecture by Prof. Regina Renn, Practitioner, and a licensed Psychological Psychotherapist, Stuttgart Regional Council, Germany

22 May 2024

The lecture addressed some theoretical background such as different types of Synchronicity, non-causal predispositions for it, and observations of a synchronistic field. It included the idea of the Transpersonal in the Individual and Collective Unconscious and illustrated the phenomena by various case examples, pointing to positive as well as negative impacts on the client's further psychological development.

Short Bio: Regina Renn is a practitioner, a licensed Psychological Psychotherapist (Stuttgart Regional Council, Germany), conducting private practice since 1995. She holds a diploma in Biology from the University of Cologne, and a degree in Analytical Psychology from the C.G. Jung Institute Zurich. She collaborates with Refugio Stuttgart (Center for

Victims of Violence), and she is an accredited Psychotherapist for Corrente AG (Mental Health at Work).

In the past she was a lecturer in "Environmental Studies" at Clark University in Massachusetts, USA, and worked as a high school Biology teacher. She was a member of the Executive Committee of the International Association of Analytical Psychology, serving also on several other committees. She was Vice-President of the German Association of Analytical Psychology (DGAP), and a member of its extended Board. She was visiting Japan with her husband, Prof. Ortwin Renn.



New Members of GADRI



Croatian Center for Earthquake Engineering (CCEE), Faculty of Civil Engineering University of Zagreb, Croatia

In Croatia, there is a long **tradition** of research in the field of earthquake engineering, but for decades we relied mainly on other regional centers (for example, IZiIS). After becoming an independent country (1991), most issues related to earthquake engineering were ignored (considering many other major problems), i.e. experts worked individually/scattered at universities all over Croatia, including in Zagreb. Experts and scientists from the **Faculty of Civil Engineering (FCE), University of Zagreb**, have participated for many years in various regional and international scientific projects, conferences and workshops on earthquake-related topics and are authors of numerous scientific papers published in regional and international journals. They have acquired their knowledge through participation in projects, training courses and workshops on disaster risk reduction, post-earthquake damage assessment and rescue team collaboration. They have expanded their field experience by participating in damage assessments after past devastating regional earthquakes and floods.

Although the CCEE research center was only **founded in 2021**, the research group's infrastructure has sufficient

Contact Person:

Prof Josip Atalić

Associate Professor and Head/Chair



financial support and a strong global network within the scientific and professional community in the fields of earthquake engineering, seismic risk assessment, seismology and the design and retrofitting of existing structures. As a branch of the Faculty of Civil Engineering, University of Zagreb, CCEE as a research center has the administrative support and available laboratory equipment of the Structural Testing Laboratory of the Department of Engineering Mechanics. After the 2020 earthquakes, establishment of a new laboratory started, more specialized for research in the field of earthquake engineering, and most key steps have already been taken.

For further details, please visit the website—<https://www.hcpi.hr/>



IDRiM CONFERENCE 2024—14th Annual Conference of the International Society for Integrated Disaster Risk Management: Disaster Resilient Communities for Life Cartagena, Colombia from 28 to 30 August 2024

The IDRiM Society is pleased to announce its 14th International Conference titled "Disaster Resilient Communities for Life," which will be held in Cartagena, Colombia. Organized in collaboration with IDRiM, the 2024 conference is hosted by the National Unit for Disaster Risk Management (UNGRD) in partnership with various national and international organizations. The conference theme, Disaster Resilient Communities for Life, mirrors the government's overarching vision, "Colombia, the world power of life." This vision aims to establish the foundations for Colombia to emerge as a global leader in the collective pursuit of life, humanity, and nature. The conference has a broader focus on integrated disaster prevention and mitigation, emergency response, and disaster recovery. It encourages the scientific community to

consider new perspectives beyond traditional risk management concepts, which seem insufficient to address emerging risks and uncertainties. As the nature of risk becomes increasingly systemic and complex, how we think and act must also become more systemic to maintain our health and well-being and to protect our lives against climate-related hazards and technological accidents. IDRiM2024 in Cartagena is a unique space for fostering dialogue and sharing experiences within the field. Under IDRiM's motto, "I dream, you dream, we all dream for a safer world," 2024 will be the year when Colombia envisions a safer and more integrated country and region.

[Conference link: https://idrim2024.com/](https://idrim2024.com/)

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,

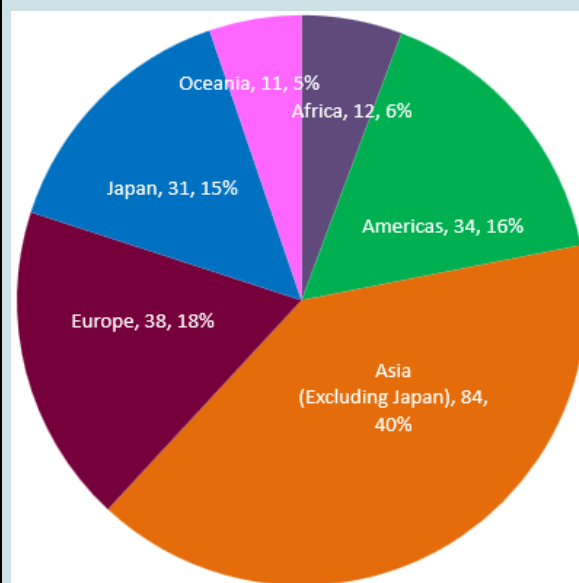
survivability and well-being, by integrating knowledge and technologies from around the world. Over 200 institutions have joined GADRI. GADRI membership is free; and completely voluntary and non-binding.

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 GADRI as of 30 June 2024

Area	Members	Economies
Africa	12	7
Americas	34	8
Asia (Excluding Japan)	84	24
Europe	38	14
Japan	31	1
Oceania	11	2
Total Institutes	210	56
	56 economies	



GADRI
Global Alliance of
Disaster Research Institutes

Global Alliance of Disaster Research Institutes (GADRI)
Secretariat

Disaster Prevention Research Institute (DPRI)

Kyoto University, Uji Campus, Gokasho, Uji-shi

Kyoto 611-0011, JAPAN

Tel: +81-774-38-4651

Fax: +81-774-38-4654

E-mail: secretariat-gadri@dpri.kyoto-u.ac.jp

Web: <https://www.gadri.net>