

Sun. Nov 10, 2019**Room 1**

Oral Sessions | Open Session

[O1-1]

**Great East Japan Earthquake Memorial Symposium:
Passing Down Disaster Experience - Its True
Meaning and Reality**

11:00 AM - 12:30 PM Room 1 (Main Hall)

[O1-1-01] Great East Japan Earthquake Memorial

**Symposium: Passing Down Disaster Experience
- Its True Meaning and Reality**

Noriyuki Kurosaka¹, *Chihiro Minato², *Natsuki
Ikezawa³, *Hiroyasu Yamauchi⁴, *Kenji Shiga⁵,
*Masashige Motoe⁶ (1. Disaster-Resilient and
Environmentally-Friendly City Promotion Office, City
Planning Policy Bureau, City of Sendai, 2. Department
of Information Design, Faculty of Art and
Design, Tama Art University, 3. Author / Poet, 4. Rias
Ark Museum, 5. Hiroshima Peace Memorial Park, 6.
Graduate School of Engineering, Tohoku University /
Central Memorial Site Consideration Commission)

11:00 AM - 12:30 PM

Oral Sessions | Open Session

[O1-2]

**The past and present role of national universities
experienced the 2011 Tohoku Earthquake and
tsunami for discussion on the future BOSAI**

2:00 PM - 3:30 PM Room 1 (Main Hall)

[O1-2-01] The past and present role of national

**universities experienced the 2011 Tohoku
Earthquake and tsunami for discussion on the
future BOSAI**

*Fumihiko Imamura¹, Akira Iwabuchi², Hideo Ohno¹,
Katsumi Nakai³, Kiyoshi Murakami² (1. Tohoku
University, 2. Iwate University,, 3. Fukushima
University)

2:00 PM - 3:30 PM

Oral Sessions | Session

[O1-3]

**Accelerating formulation of local DRR plans
toward the next 10 years of their implementation -
How to achieve Global Target (e) of the
Sendai Framework?-**

4:00 PM - 5:30 PM Room 1 (Main Hall)

**[O1-3-01] Accelerating formulation of local DRR plans
toward the next 10 years of their
implementation - How to achieve Global Target
(e) of the Sendai Framework?-**

*Moderator Prof. Kimio Takeya¹, *Four (4) Speakers²,
Wataru Ono¹ (1. Japan International Cooperation
Agency (JICA), 2. National and/or local authority
related to DRR, Planning and Finance)

4:00 PM - 5:30 PM

Oral Sessions | Open Session

[O1-4]

**3.11 DENSHO ROAD to Hand down the Lessons of
the Great East Japan Earthquake ~Activities of
Memorializing the Earthquake in Industry-academia-
government-citizen Collaborations ~**

6:00 PM - 7:30 PM Room 1 (Main Hall)

[O1-4-01] 3.11 DENSHO ROAD to Hand down the

**Lessons of the Great East Japan
Earthquake ~Activities of Memorializing the
Earthquake in Industry-academia-government-
citizen Collaborations ~**

*Akira Matsumoto¹ (1. Tohoku Regional Bureau,
Ministry of Land, Infrastructure, Transport and
Tourism)

6:00 PM - 7:30 PM

Room 2

Oral Sessions | Open Session

[O1-6]

**"Moving Hearts" With Experiences and Lessons ~
Connecting Stories to Specific Disaster Prevention
Measures**

2:00 PM - 3:30 PM Room 2 (Tachibana)

**[O1-6-01] "Moving Hearts" With Experiences and
Lessons ~ Connecting Stories to Specific
Disaster Prevention Measures**

*Emiko Kuriyagawa¹ (1. Miyagi Prefectural
Government)

2:00 PM - 3:30 PM

Oral Sessions | Session

[O1-7]

**Cross-cutting the Disaster-Related Sciences:
Challenges of a Multidisciplinary Team in Tohoku**

University

4:00 PM - 5:30 PM Room 2 (Tachibana)

[O1-7-01] Cross-cutting the Disaster-Related Sciences:Challenges of a Multidisciplinary Team in
Tohoku University*Junko Okuyama¹, *Fumihiko Imamura¹, *Shuji Seto¹,
*Toru Matsuzawa¹, *Toshiki Iwasaki¹, *Hiroki
Takakura¹, *Yu Fukuda¹, *Kiyoshi Ito¹ (1. Core
Research Cluster of Disaster Science, Tohoku
University)

4:00 PM - 5:30 PM

Oral Sessions | Open Session

[O1-8]**Thinking about Disaster Storytelling: How to Use
Oral Narratives to Prevent Future Fatalities**

6:00 PM - 7:30 PM Room 2 (Tachibana)

**[O1-8-01] Thinking about Disaster Storytelling: How to
Use Oral Narratives to Prevent Future Fatalities***Jun Suzuki¹, *Mana Abe⁴, *Tatsuya Kishimoto⁵,
*Muzailin Affan², *Sushil Gyewali³ (1. The Kahoku
Shimpo, 2. Syiah Kuala University, 3. Government of
Nepal, 4. TV-U FUKUSHIMA, 5. THE KOBE SHIMBUN
DAIRY NEWSPAPER)

6:00 PM - 7:30 PM

Room 3

Oral Sessions | Session

[O1-9]**Media and Bosai: A Crucial Combination for Saving
Lives**

11:00 AM - 12:30 PM Room 3 (Hagi)

**[O1-9-01] Media and Bosai: A Crucial Combination for
Saving Lives***Takaaki Takai¹, *Minori Takao¹ (1. NHK World-
Japan)

11:00 AM - 12:30 PM

Oral Sessions | Open Session

[O1-10]**Disaster Risk Reduction and Women's Leadership**
2:00 PM - 3:30 PM Room 3 (Hagi)**[O1-10-01] Disaster Risk Reduction and Women's
Leadership**Taga Enomoto¹, *Asako Osaki², *Naomi Sato³,*Naomi Yatsu⁴, *Yaeko Kisu⁵, *Midori Shigeno⁶, *Isao
Yamauchi⁷ (1. Sendai Gender Equal Opportunity
Foundation, Citizen Cooperation and City Planning
Department, Community Affairs Bureau, 2. Kansei
Gakuin University / NPO Gender Action Platform, 3.
We Are One Kitakami, 4. Approved NPO After
School Paruke, 5. NPO The National Council of
Women's Centers, Sendai Gender Equal
Opportunity Foundation, 6. Nishitaga-kita
Neighborhood Association / Women Bosai Leaders
Network, 7. Yama-no-dera United Neighborhood
Association)

2:00 PM - 3:30 PM

Oral Sessions | Open Session

[O1-11]**Creating new disaster prevention industry based on
the lessons learned from the Great East Japan
Earthquake**

4:00 PM - 5:30 PM Room 3 (Hagi)

**[O1-11-01] Creating new disaster prevention industry
based on the lessons learned from the Great
East Japan Earthquake**
Nobuhiro Sato¹, *Yoshihiro Okami², *Barbara
Noonan³, *Shohei Sakoda⁴ (1. Industry Promotion
Section, Industrial Policy Department, Economic
Bureau, City of Sendai, 2. Industrial Policy
Department, City of Sendai, 3. Public Sector Sales
APAC, Nokia Solutions & Networks, Singapore, 4.
Industry Creation Policy Division, Ministry of
Economy, Trade and Industry)

4:00 PM - 5:30 PM

Oral Sessions | Open Session

[O1-12]**Teachers' Capacity Development for Enhancing
Disaster Risk Reduction at School**

6:00 PM - 7:30 PM Room 3 (Hagi)

**[O1-12-01] Teachers' Capacity Development for
Enhancing Disaster Risk Reduction at School**
*Takashi Oda¹, *Shinichi Takeda¹, *Takeshi Sato²,
*Shinya Morimoto³, *Masaaki Oka¹, *Takashi
Muramatsu¹, *Tuba Gokmenoglu Karakaya⁴ (1.
Miyagi University of Education, 2. Tohoku
University, 3. Ministry of Education, Culture, Sports,
Science and Technology, 4. Republic of Turkey)

Ministry of National Education)

6:00 PM - 7:30 PM

Room 4

Oral Sessions | Session

[O1-13]**State-of-the-art research on wind related disaster risk reduction**

11:00 AM - 12:30 PM Room 4 (Shirakashi 1)

[O1-13-01] State-of-the-art research on wind related disaster risk reduction

*Kazuyoshi Nishijima¹, *David O. Prevatt², *Frank Lombardo³, *Tetsuya Takemi¹, *Murray Morrison⁴, *Shuyang Cao⁵, Yukio Tamura⁷, Yuichi Ono⁶ (1. Kyoto University, 2. University of Florida, 3. The University of Illinois at Urbana-Champaign, 4. Insurance Institute for Business & Home Safety, 5. Tongji University, 6. Tohoku University, 7. Chongqing university)

11:00 AM - 12:30 PM

Oral Sessions | Session

[O1-14]**Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements**

2:00 PM - 3:30 PM Room 4 (Shirakashi 1)

[O1-14-01] Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements

*Riyanti Djalante¹, *MIZAN BUSTANUL FUADY BISRI¹, Giulia Roder¹, *Giles Sioen^{2,3}, *Sachi Suzuki⁴ (1. United Nations University-Institute for the Advanced Study of Sustainability, 2. FutureEarth, 3. The University of Tokyo, 4. UNESCO)

2:00 PM - 3:30 PM

Oral Sessions | Session

[O1-15]**Research, Development, and Utilization of Beppu Model Disability-inclusive Disaster Risk Reduction: Towards Seamless Connections between Normal and Disaster Times**

4:00 PM - 5:30 PM Room 4 (Shirakashi 1)

[O1-15-01] Research, Development, and Utilization of Beppu Model Disability-inclusive Disaster Risk Reduction: Towards Seamless Connections between Normal and Disaster Times

*Shigeo Tatsuki¹, *Junko Murano², *Kazuhiko Abe³, *Anna Matsukawa⁶, *Bill Ho⁴, *Taku Sugano⁵, *Aya Tsujioka¹ (1. Doshisha University, 2. Beppu City, 3. Tohoku Fukushi University, 4. Asian Disaster Preparedness Center, 5. Osaka City University, 6. Disaster Reduction and Human Renovation Institution)

4:00 PM - 5:30 PM

Oral Sessions | Session

[O1-16]**Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases**

6:00 PM - 7:30 PM Room 4 (Shirakashi 1)

[O1-16-01] Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases

*Takako Izumi¹, *Rajib Shaw², *Jessica Alexander³, *Sangita Das⁴, *Akilesh Surjan⁶, *Miwa Abe⁵, *Takeshi Komino⁷ (1. Tohoku University, 2. Keio University, 3. Sophia University/UNICEF Geneva, 4. CWS Japan, 5. Kumamoto University, 6. Charles Darwin University, Australia, 7. Asian Disaster Response and Reduction Network (ADRRN))

6:00 PM - 7:30 PM

Room 5

Oral Sessions | Session

[O1-17]**Creating a disaster-resilient society through industry-academia collaboration**

11:00 AM - 12:30 PM Room 5 (Shirakashi 2)

[O1-17-01] Creating a disaster-resilient society through industry-academia collaboration

*Fumihiko Imamura¹, *Hiroo Shimada², *Akihiro Hayashi³, *Anawat Suppasri¹, *Ryu Miyamoto¹ (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Tokio Marine & Nichido Fire Insurance Co., Ltd., 3. Tokio Marine & Nichido Risk Consulting Co., Ltd.)

11:00 AM - 12:30 PM

Oral Sessions | Session

[O1-18]

NATECH Risk in Asia Pacific

2:00 PM - 3:30 PM Room 5 (Shirakashi 2)

[O1-18-01] NATECH Risk in Asia Pacific

*Rajib Shaw¹, *Ana Maria Cruz², *Fatma Lestari³,
*Kampanart Silva^{3,4}, *Devendra Narayan Singh⁵,
*Antonia Loyzaga⁶, *Emily Chang⁷, *Takako Izumi⁸
(1. Keio University, 2. Kyoto University, 3.

University of Indonesia, 4. Thailand Institute of
Nuclear Technology, 5. IIT Bombay, 6. Manila
Observatory and Philippines National Resilience
Council (PNRC), 7. Chinese University of Hong
Kong, 8. Tohoku University)

2:00 PM - 3:30 PM

Sun. Nov 10, 2019**Flash Talk Presentation 1**

Flash Talk Presentation

Disaster Heritage to Promote Dark Tourism for Resilient Community

Nurjanah Jane

3:35 PM - 3:50 PM Flash Talk Presentation 1 (Meeting Room 6)

[MP1-E] Disaster Heritage to Promote Dark Tourism for Resilient Community

Nurjanah Jane (Tokyo Metropolitan University)

3:35 PM - 3:50 PM

Flash Talk Presentation

Recent Activity for DRR in Republic of Korea

Dr./Mr. Kang Chang Hyun

5:35 PM - 5:50 PM Flash Talk Presentation 1 (Meeting Room 6)

[MP1-F] Recent Activity for DRR in Republic of Korea

Dr./Mr. Kang Chang Hyun (Dankook University)

5:35 PM - 5:50 PM

Flash Talk Presentation 2

Flash Talk Presentation

Current state of SFDRR related research and education by universities and institutions

Mikio ISHIWATARI

12:45 PM - 1:00 PM Flash Talk Presentation 2 (Meeting Room 7)

[MP1-01] Current state of SFDRR related research and education by universities and institutions

Mikio ISHIWATARI (Japan International Cooperation Agency/ University of Tokyo)

12:45 PM - 1:00 PM

Flash Talk Presentation

Proposition of a New Ground-based Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto

1:05 PM - 1:20 PM Flash Talk Presentation 2 (Meeting Room 7)

[MP1-02] Proposition of a New Ground-based

Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto (Kochi University of Technology)

1:05 PM - 1:20 PM

Flash Talk Presentation

Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hideaki Murai.

Ikuo Oikawa

1:25 PM - 1:40 PM Flash Talk Presentation 2 (Meeting Room 7)

[MP1-03] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hideaki Murai. Ikuo Oikawa (All Japan Council Company)

1:25 PM - 1:40 PM

Flash Talk Presentation

Recovery Institutions to Build Back Better

Paul Rosenberg

1:45 PM - 2:00 PM Flash Talk Presentation 2 (Meeting Room 7)

[MP1-04] Recovery Institutions to Build Back Better

Paul Rosenberg (UNDRR/International Recovery Platform)

1:45 PM - 2:00 PM

Flash Talk Presentation

Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR

Eric Ariel Gonzales Rocha

3:35 PM - 3:50 PM Flash Talk Presentation 2 (Meeting Room 7)

[MP1-05] Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR

Eric Ariel Gonzales Rocha (United Nations Office for Disaster Risk Reduction)

3:35 PM - 3:50 PM

Flash Talk Presentation

You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!

KAZUYUKI TOHYAMA

5:35 PM - 5:50 PM Flash Talk Presentation 2 (Meeting Room 7)

[MP1-06] You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!

KAZUYUKI TOHYAMA (TRUSTIA CORPORATION)

5:35 PM - 5:50 PM

Sun. Nov 10, 2019

Reception

Reception

Reception

8:00 PM - 9:40 PM Reception (Hotel Metropolitan Sendai)

[RC-01] Reception

8:00 PM - 9:40 PM

Sun. Nov 10, 2019

Room 1

WBF Pre-Opening

WBF Pre-Opening

9:00 AM - 10:00 AM Room 1 (Main Hall)

[PO-01] WBF Pre-Opening

9:00 AM - 10:00 AM

Sun. Nov 10, 2019

Room 1

WBF Opening

WBF Opening

10:00 AM - 10:45 AM Room 1 (Main Hall)

[OP-01] WBF Opening

10:00 AM - 10:45 AM

Sun. Nov 10, 2019

Room 1

Keynote Speech

A Changing Risk Paradigm

Andrew Maskrey

9:41 AM - 9:53 AM Room 1 (Main Hall)

[K00] A Changing Risk Paradigm

Andrew Maskrey (Risk Nexus)

9:41 AM - 9:53 AM

Oral Sessions | Open Session

[O1-1]

Great East Japan Earthquake Memorial Symposium: Passing Down Disaster Experience - Its True Meaning and Reality

Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 1 (Main Hall)

Disaster-Resilient and Environmentally-Friendly City Promotion Office, City Planning Policy Bureau, City of Sendai

Simultaneous Interpretation is available. (同時通訳有り)

[O1-1-01] Great East Japan Earthquake Memorial Symposium: Passing Down Disaster Experience - Its True Meaning and Reality

Noriyuki Kurosaka¹, *Chihiro Minato², *Natsuki Ikezawa³, *Hiroyasu Yamauchi⁴, *Kenji Shiga⁵,
*Masashige Motoe⁶ (1. Disaster-Resilient and Environmentally-Friendly City Promotion
Office, City Planning Policy Bureau, City of Sendai, 2. Department of Information Design, Faculty
of Art and Design, Tama Art University, 3. Author / Poet, 4. Rias Ark Museum, 5. Hiroshima
Peace Memorial Park, 6. Graduate School of Engineering, Tohoku University / Central
Memorial Site Consideration Commission)

11:00 AM - 12:30 PM

11:00 AM - 12:30 PM (Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 1)

[O1-1-01] Great East Japan Earthquake Memorial Symposium: Passing Down Disaster Experience - Its True Meaning and Reality

Noriyuki Kurosaka¹, *Chihiro Minato², *Natsuki Ikezawa³, *Hiroyasu Yamauchi⁴, *Kenji Shiga⁵, *Masashige Motoe⁶ (1. Disaster-Resilient and Environmentally-Friendly City Promotion Office, City Planning Policy Bureau, City of Sendai, 2. Department of Information Design, Faculty of Art and Design, Tama Art University, 3. Author / Poet, 4. Rias Ark Museum, 5. Hiroshima Peace Memorial Park, 6. Graduate School of Engineering, Tohoku University / Central Memorial Site Consideration Commission)

Keywords: Great East Japan Earthquake, memory, experience, memorial, memorial site

Passing down the memories and experiences of the Great East Japan Earthquake, the City of Sendai has been working on projects for preserving the memory of the Great East Japan Earthquake. As a part of these projects, we are currently discussing development of the Disaster Memorial Site in the central area of Sendai. In this session, the City's current efforts will be introduced while deliberating over the fundamental meaning of the memorial and what aspects of the City will be influenced by the memorial site, while asking questions such as "what exactly is a memorial?", "how should we pass down this historic event to the future?" and "how will this memorial influence the future?"

Oral Sessions | Open Session

[O1-2]

The past and present role of national universities experienced the 2011 Tohoku Earthquake and tsunami for discussion on the future BOSAI

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 1 (Main Hall)

Tohoku University- IRIDeS

Simultaneous Interpretation is available. (同時通訳有り)

[O1-2-01] The past and present role of national universities experienced the 2011 Tohoku Earthquake and tsunami for discussion on the future BOSAI

*Fumihiko Imamura¹, Akira Iwabuchi², Hideo Ohno¹, Katsumi Nakai³, Kiyoshi Murakami² (1. Tohoku University, 2. Iwate University,, 3. Fukushima University)

2:00 PM - 3:30 PM

2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 1)

[O1-2-01] The past and present role of national universities experienced the 2011 Tohoku Earthquake and tsunami for discussion on the future BOSAI

*Fumihiko Imamura¹, Akira Iwabuchi², Hideo Ohno¹, Katsumi Nakai³, Kiyoshi Murakami² (1. Tohoku University, 2. Iwate University,, 3. Fukushima University)

Keywords: National universities, Science and technology, Human resources, education

The 2011 Tohoku earthquake tsunami caused massive damage over a wide area, leaving great shocks and scars in communities. It is still in the process of reconstruction, and new development at the affected areas is being explored while utilizing regional resources. Among these, the role of the university is large, the situation and issues of scientific and technological correspondence and dispatch at that time, human resource development necessary for reconstruction and rebirth, and further, leading the region, and one role in future disaster prevention and mitigation, there is a mission to In this symposium, keynote speeches will be given to the Presidents of Iwate University, Tohoku University, and of Fukushima University, who will report on the response from that time to the current efforts. On that basis, the existence and role of the university toward the future will be discussed by Prof.Kiyoshi Murakami, the coordinator at Iwate University's special assistant director', and information exchange will be conducted on the initiatives for the 10 years of the earthquake and the direction thereafter.

Oral Sessions | Session

[O1-3]

Accelerating formulation of local DRR plans toward the next 10 years of their implementation - How to achieve Global Target (e) of the Sendai Framework?-

Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 1 (Main Hall)

Japan International Cooperation Agency

Simultaneous Interpretation is available. (同時通訳有り)

[O1-3-01] Accelerating formulation of local DRR plans toward the next 10 years of their implementation - How to achieve Global Target (e) of the Sendai Framework?-

*Moderator Prof. Kimio Takeya¹, *Four (4) Speakers², Wataru Ono¹ (1. Japan International Cooperation Agency (JICA), 2. National and/or local authority related to DRR, Planning and Finance)

4:00 PM - 5:30 PM

4:00 PM - 5:30 PM (Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 1)

[O1-3-01] Accelerating formulation of local DRR plans toward the next 10 years of their implementation - How to achieve Global Target (e) of the Sendai Framework?-

*Moderator Prof. Kimio Takeya¹, *Four (4) Speakers², Wataru Ono¹ (1. Japan International Cooperation Agency (JICA), 2. National and/or local authority related to DRR, Planning and Finance)

Keywords: Sendai Framework for Disaster Risk Reduction 2015-2030, Global Target (e), Local DRR plans, JICA, International cooperation

This session will provide an opportunity to discuss and identify practical solutions for achieving Global Target (e) of the Sendai Framework for Disaster Risk Reduction 2015-2030, especially in developing local DRR strategies/plans, and accelerating their implementation. We are now facing two (2) key challenges of 1) how to develop and spread “practical” local DRR plans toward 2020 and 2) how to promote implementation based on plans by allocating appropriate resources including human, finance and techniques next 10 years. JICA has been continuously tackling these issues through leading discussions in international arenas and working with counterparts of developing countries. 8 STEPS – Practical Method for Developing Local DRR Strategies/Plans – is one of the remarkable outcomes, which is utilized in JICA’s knowledge co-creation programs and capacity development projects. The session will invite some practitioners from national and local governments of counterparts’ countries as panelist and discuss some key issues along with following questions.

1. What is the key component to be included in the local DRR plans for promoting pre-disaster investment?
2. What are the challenges for developing local DRR plans?
3. Do you have any good practices and lessons learned to develop local DRR plans?
4. What is a key factor to achieve actual implementation of local DRR plans?
5. How can we accelerate implementation of local DRR plans?

Oral Sessions | Open Session

[O1-4]

3.11 DENSHO ROAD to Hand down the Lessons of the Great East Japan Earthquake ~Activities of Memorializing the Earthquake in Industry-academia-government-citizen Collaborations ~

Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 1 (Main Hall)

Disaster Memorial Network Council (Tohoku Regional Bureau MLIT, Aomori Prefecture, Iwate Prefecture, Miyagi Prefecture, Fukushima Prefecture, Sendai City)

Simultaneous Interpretation is available. (同時通訳有り)

[O1-4-01] 3.11 DENSHO ROAD to Hand down the Lessons of the Great East Japan Earthquake~Activities of Memorializing the Earthquake in Industry-academia-government-citizen Collaborations ~

*Akira Matsumoto¹ (1. Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism)

6:00 PM - 7:30 PM

6:00 PM - 7:30 PM (Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 1)

[O1-4-01] 3.11 DENSHO ROAD to Hand down the Lessons of the Great East Japan Earthquake~Activities of Memorializing the Earthquake in Industry-academia-government-citizen Collaborations ~

*Akira Matsumoto¹ (1. Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism)

Keywords: The Great East Japan Earthquake , The 3.11 DENSHO ROAD, Memorializing the Earthquake

It has been 8 years since the Great East Japan Earthquake occurred and fading memories over time is a deep concern. It has been said that damage might be reduced if the lessons of past disasters are passed down.

We have launched “ the Disaster Memorial Network Council” through the collaboration of industry, academia, government and citizen sectors, and have started activities for handing down the lessons of the earthquake across the sectors in the Tohoku Region. We are setting up the project of the 3.11 DENSHO ROAD to transmit the lessons by connecting memorial facilities in the four disaster affected prefectures. This project includes making maps utilizing a standard set of pictogram and building its website, both will be multilingual, to guide memorial facilities on-site.

In our session, we will introduce the 3.11 DENSHO ROAD, which aims to enhance disaster management capacities in Japan and overseas by passing on the lessons, and also to cheer up the affected area by increasing the flow of people.

Oral Sessions | Open Session

[O1-6]

"Moving Hearts" With Experiences and Lessons ~ Connecting Stories to Specific Disaster Prevention Measures

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 2 (Tachibana)

Simultaneous Interpretation is available. (同時通訳有り)

[O1-6-01] “Moving Hearts” With Experiences and Lessons ~ Connecting Stories to Specific Disaster Prevention Measures

*Emiko Kuriyagawa¹ (1. Miyagi Prefectural Government)

2:00 PM - 3:30 PM

2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 2)

[O1-6-01] “Moving Hearts” With Experiences and Lessons ~

Connecting Stories to Specific Disaster Prevention Measures

*Emiko Kuriyagawa¹ (1. Miyagi Prefectural Government)

Keywords: “Moving Hearts”

How did people who previously experienced natural disasters pass on their stories and lessons they learned as well as prepare others for later disasters?

Using remaining records and conveying the scene of the disaster at that time to people who did not experience the calamity first-hand allows them to relive the situation as if they were there. This session discusses the initiatives needed to increase the number of people able to properly react and take action in emergency situations as a result of storytelling.

Additionally, experts and the regional community members involved share opinions regarding initiatives aimed at achieving regional revitalization by creating networks between different disaster memorial facilities, where they pass on memories and lessons concerning disasters to the world and future generations.

Oral Sessions | Session

[O1-7]

Cross-cutting the Disaster-Related Sciences: Challenges of a Multidisciplinary Team in Tohoku University

Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 2 (Tachibana)

The Core Research Cluster of Disaster Science

Simultaneous Interpretation is available. (同時通訳有り)

[O1-7-01] Cross-cutting the Disaster-Related Sciences: Challenges of a Multidisciplinary Team in Tohoku University

*Junko Okuyama¹, *Fumihiko Imamura¹, *Shuji Seto¹, *Toru Matsuzawa¹, *Toshiki Iwasaki¹,
*Hiroki Takakura¹, *Yu Fukuda¹, *Kiyoshi Ito¹ (1. Core Research Cluster of Disaster Science,
Tohoku University)

4:00 PM - 5:30 PM

4:00 PM - 5:30 PM (Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 2)

[O1-7-01] Cross-cutting the Disaster-Related Sciences: Challenges of a Multidisciplinary Team in Tohoku University

*Junko Okuyama¹, *Fumihiko Imamura¹, *Shuji Seto¹, *Toru Matsuzawa¹, *Toshiki Iwasaki¹, *Hiroki Takakura¹, *Yu Fukuda¹, *Kiyoshi Ito¹ (1. Core Research Cluster of Disaster Science, Tohoku University)

Keywords: Core Research Cluster of Disaster Science, cross-cutting the disaster-related sciences, collaboration of citizens and researchers, the town of Shichigahama

This study presents the research activities, results, and progress of the Core Research Cluster of Disaster Science at Tohoku University. Our cluster adopts a multidisciplinary approach to disaster studies, linking natural science, engineering, medical science, and the social sciences and humanities. The town of Shichigahama in Miyagi, on Japan's northeastern coast, was severely inundated by the tsunami following the Great East Japan Earthquake in 2011. We will report the results of the town's two-year disaster-related activities as well as the prospects drawn from a recent workshop in September 2019. We begin with an overview of our project followed by presentations from the disaster medicine research group and the disaster social sciences and humanities research group, which are based on the field studies in Shichigahama and consider the relation between local culture and health. The natural hazard science research group and the applied disaster risk reduction research group will discuss both past and future regional risk environment evaluation efforts and which factors caused actual damages in society in the context of the 2011 disaster. After the presentations, we intend to gather feedback from our overseas collaborative partners from the Association of Pacific Rim Universities (APRU) network, Indonesia, and the United Kingdom regarding further investigations that would enhance disaster preparedness. Such endeavors will guide cross-cutting research on climate change, natural disasters, survival, health, and culture.

Oral Sessions | Open Session

[O1-8]

Thinking about Disaster Storytelling: How to Use Oral Narratives to Prevent Future Fatalities

Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 2 (Tachibana)

The Kahoku Shimpō

Simultaneous Interpretation is available. (同時通訳有り)

[O1-8-01] Thinking about Disaster Storytelling: How to Use Oral Narratives to Prevent Future Fatalities

*Jun Suzuki¹, *Mana Abe⁴, *Tatsuya Kishimoto⁵, *Muzailin Affan², *Sushil Gyewali³ (1. The Kahoku Shimpō, 2. Syiah Kuala University, 3. Government of Nepal, 4. TV-U FUKUSHIMA, 5. THE KOBE SHIMBUN DAIRY NEWSPAPER)

6:00 PM - 7:30 PM

6:00 PM - 7:30 PM (Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 2)

[O1-8-01] Thinking about Disaster Storytelling: How to Use Oral Narratives to Prevent Future Fatalities

*Jun Suzuki¹, *Mana Abe⁴, *Tatsuya Kishimoto⁵, *Muzailin Affan², *Sushil Gyewali³ (1. The Kahoku Shimpō, 2. Syiah Kuala University, 3. Government of Nepal, 4. TV-U FUKUSHIMA, 5. THE KOBE SHIMBUN DAIRY NEWSPAPER)

Keywords: Disaster Storytelling

Our goal is to create a space where general audiences can listen to domestic and foreign reporters, journalists, broadcasters, research scientists, and administrators of past disaster sites as they present examples of their research investigations and participate in panel discussions. We aim to convey the importance of survivors of natural disasters sharing their stories as a long-term method of preventing future large-scale loss of life.

Oral Sessions | Session

[O1-9]

Media and Bosai: A Crucial Combination for Saving Lives

Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 3 (Hagi)

NHK World-Japan

[O1-9-01] Media and Bosai: A Crucial Combination for Saving Lives

*Takaaki Takai¹, *Minori Takao¹ (1. NHK World-Japan)

11:00 AM - 12:30 PM

11:00 AM - 12:30 PM (Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 3)

[O1-9-01] Media and Bosai: A Crucial Combination for Saving Lives

*Takaaki Takai¹, *Minori Takao¹ (1. NHK World-Japan)

Keywords: The Role of Public Broadcast

Speakers: Minori Takao(Ms.) and producers(TBD) NHK, Japan' s sole public broadcaster, is addressing disaster preparedness and DRR through TV, radio and the Internet. Using its multi-language and cross media platform, NHK World Japan delivers “ information that saves lives” from every angle, including emergency broadcasting, disaster resilience and public awareness activities.Minori Takao, news anchor at NHK World - Japan will present the team' s role in issuing multi-language emergency warnings to help foreign language speakers in Japan. The team will also present its role in preparing wide audiences around the world for the next disaster through its educational programs and web contents.They include a TV series “ Bosai: An Educational Journey” , featuring disaster preparedness education in Japan and other parts of Asia, Bosai radio programs aired in 17 languages and BOSAI homepage launched last year. This session will look into the role of media in “ Bosai” , and what more can be done to mitigate disaster through media outlets.

Oral Sessions | Open Session

[O1-10]

Disaster Risk Reduction and Women's Leadership

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 3 (Hagi)

Simultaneous Interpretation is available. (同時通訳有り)

[O1-10-01] Disaster Risk Reduction and Women's Leadership

Taga Enomoto¹, *Asako Osaki², *Naomi Sato³, *Naomi Yatsu⁴, *Yaeko Kisu⁵, *Midori Shigeno⁶,
*Isao Yamauchi⁷ (1. Sendai Gender Equal Opportunity Foundation, Citizen Cooperation and
City Planning Department, Community Affairs Bureau, 2. Kansei Gakuin University / NPO
Gender Action Platform, 3. We Are One Kitakami, 4. Approved NPO After School Paruke , 5.
NPO The National Council of Women's Centers, Sendai Gender Equal Opportunity
Foundation , 6. Nishitaga-kita Neighborhood Association / Women Bosai Leaders Network, 7.
Yama-no-dera United Neighborhood Association)
2:00 PM - 3:30 PM

2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 3)

[O1-10-01] Disaster Risk Reduction and Women's Leadership

Taga Enomoto¹, *Asako Osaki², *Naomi Sato³, *Naomi Yatsu⁴, *Yaeko Kisu⁵, *Midori Shigeno⁶, *Isao Yamauchi⁷

(1. Sendai Gender Equal Opportunity Foundation, Citizen Cooperation and City Planning Department, Community Affairs Bureau, 2. Kansei Gakuin University / NPO Gender Action Platform, 3. We Are One Kitakami, 4. Approved NPO After School Paruke, 5. NPO The National Council of Women's Centers, Sendai Gender Equal Opportunity Foundation, 6. Nishitaga-kita Neighborhood Association / Women Bosai Leaders Network, 7. Yama-no-dera United Neighborhood Association)

Keywords: Women, Leadership, Diversity, Great East Japan Earthquake, Sendai Framework for Disaster Risk Reduction 2015-2030

Women play an important role in Disaster Risk Reduction. In order to build a disaster-resilient community, it is essential for women to participate in opportunities for making decisions in ordinary times. Based on the experiences from the Great East Japan Earthquake and other disasters, issues and future perspectives will be discussed, focusing on the diverse power of women who actively engage in Disaster Risk Reduction and recovery, as well as our nations' efforts towards promotion of women's leadership.

Oral Sessions | Open Session

[O1-11]

Creating new disaster prevention industry based on the lessons learned from the Great East Japan Earthquake

Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 3 (Hagi)

City of Sendai

Simultaneous Interpretation is available. (同時通訳有り)

[O1-11-01] Creating new disaster prevention industry based on the lessons learned from the Great East Japan Earthquake

Nobuhiro Sato¹, *Yoshihiro Okami², *Barbara Noonan³, *Shohei Sakoda⁴ (1. Industry Promotion Section, Industrial Policy Department, Economic Bureau, City of Sendai, 2.

Industrial Policy Department, City of Sendai, 3. Public Sector Sales APAC, Nokia Solutions & Networks, Singapore, 4. Industry Creation Policy Division, Ministry of Economy, Trade and Industry)

4:00 PM - 5:30 PM

4:00 PM - 5:30 PM (Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 3)

[O1-11-01] Creating new disaster prevention industry based on the lessons learned from the Great East Japan Earthquake

Nobuhiro Sato¹, *Yoshihiro Okami², *Barbara Noonan³, *Shohei Sakoda⁴ (1. Industry Promotion Section, Industrial Policy Department, Economic Bureau, City of Sendai, 2. Industrial Policy Department, City of Sendai, 3. Public Sector Sales APAC, Nokia Solutions & Networks, Singapore, 4. Industry Creation Policy Division, Ministry of Economy, Trade and Industry)

Keywords: Fully autonomous drone, Private LTE

Sendai City aims to create new disaster prevention industry based on the lessons learned from the Great East Japan Earthquake by utilizing ICT and conducting demonstration experiments on drones.

In this session, we introduce the latest initiatives and future directions for the creation of disaster prevention industry by Sendai City, the national government, and private companies.

Oral Sessions | Open Session

[O1-12]

Teachers' Capacity Development for Enhancing Disaster Risk Reduction at School

Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 3 (Hagi)

Miyagi University of Education

Simultaneous Interpretation is available. (同時通訳有り)

[O1-12-01] Teachers' Capacity Development for Enhancing Disaster Risk Reduction at School

*Takashi Oda¹, *Shinichi Takeda¹, *Takeshi Sato², *Shinya Morimoto³, *Masaaki Oka¹, *Takashi Muramatsu¹, *Tuba Gokmenoglu Karakaya⁴ (1. Miyagi University of Education, 2. Tohoku University, 3. Ministry of Education, Culture, Sports, Science and Technology, 4. Republic of Turkey Ministry of National Education)

6:00 PM - 7:30 PM

6:00 PM - 7:30 PM (Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 3)

[O1-12-01] Teachers' Capacity Development for Enhancing Disaster Risk Reduction at School

*Takashi Oda¹, *Shinichi Takeda¹, *Takeshi Sato², *Shinya Morimoto³, *Masaaki Oka¹, *Takashi Muramatsu¹, *Tuba Gokmenoglu Karakaya⁴ (1. Miyagi University of Education, 2. Tohoku University, 3. Ministry of Education, Culture, Sports, Science and Technology, 4. Republic of Turkey Ministry of National Education)
Keywords: DRR education, teacher training, in-service, pre-service, curriculum

During this session, experts from Japan and abroad on DRR education and teacher training discuss the states and challenges on the teachers' capacity building for DRR teaching and school safety. Some invited presenters include ministerial officials in charge of school DRR and some master teachers. The session is organized by 311 Disaster Risk Reduction Learning Institute for Educators (DRR-LIFE) established at Miyagi University of Education, Sendai, Japan in April, 2019 and will be co-sponsored by the Japan Association of National Universities, and International Research Institute of Disaster Science, Tohoku University.

Oral Sessions | Session

[O1-13]

State-of-the-art research on wind related disaster risk reduction

Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 4 (Shirakashi 1)

International Group on Wind-Related Disaster Risk Reduction

[O1-13-01] State-of-the-art research on wind related disaster risk reduction

*Kazuyoshi Nishijima¹, *David O. Prevatt², *Frank Lombardo³, *Tetsuya Takemi¹, *Murray Morrison⁴, *Shuyang Cao⁵, Yukio Tamura⁷, Yuichi Ono⁶ (1. Kyoto University, 2. University of Florida, 3. The University of Illinois at Urbana-Champaign, 4. Insurance Institute for Business & Home Safety, 5. Tongji University, 6. Tohoku University, 7. Chongqing university)

11:00 AM - 12:30 PM

11:00 AM - 12:30 PM (Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 4)

[O1-13-01] State-of-the-art research on wind related disaster risk reduction

*Kazuyoshi Nishijima¹, *David O. Prevatt², *Frank Lombardo³, *Tetsuya Takemi¹, *Murray Morrison⁴, *Shuyang Cao⁵, Yukio Tamura⁷, Yuichi Ono⁶ (1. Kyoto University, 2. University of Florida, 3. The University of Illinois at Urbana-Champaign, 4. Insurance Institute for Business & Home Safety, 5. Tongji University, 6. Tohoku University, 7. Chongqing university)

Keywords: Observation, Damage survey, Full-scale experiment, Numerical simulation, Climate change

Wind-related disaster is the most devastating disaster around the world, causing enormous severe injury and fatality as well as economic losses. Climate change can increase the risk of damages to our built and surrounding environments, subjected to intensified tropical cyclones and other meteorological phenomena.

Over the last decades, wind engineering and related research communities have made efforts to reduce wind-related disaster risk reduction. These include diagnosis of damage process through post disaster surveys, better understanding of aerodynamic characteristics of building structures and their surrounding wind flows through wind tunnel experiments and numerical simulations, and evaluation of wind-resistant performance of building elements by experiments with partial or scaled models. These efforts were partially successful in reducing wind-induced damages. However, significant damages and losses caused by wind have yet been reported around the world. This has necessitated the research communities to direct new research agenda.

This session organizes a series of presentations on the state-of-the-art research facilitating to wind-related disaster risk reduction. The topics covered by this session range from meteorological observation technology, disaster survey, performance evaluation of infrastructure, super-high-resolution numerical simulation and future climate projection with climate models. Through the presentations and discussion that follows, the session expects to deepen the understanding of the current situation and future prediction on wind-related disasters, and to share with audience the frontier of the research on wind-related disaster risk reduction.

Oral Sessions | Session

[O1-14]

Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 4 (Shirakashi 1)

United Nations University-Institute for the Advanced Study of Sustainability

[O1-14-01] Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements

*Riyanti Djalante¹, *MIZAN BUSTANUL FUADY BISRI¹, Giulia Roder¹, *Giles Sioen^{2,3}, *Sachi Suzuki⁴ (1. United Nations University-Institute for the Advanced Study of Sustainability, 2. FutureEarth, 3. The University of Tokyo, 4. UNESCO)

2:00 PM - 3:30 PM

2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 4)

[O1-14-01] Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements

*Riyanti Djalante¹, *MIZAN BUSTANUL FUADY BISRI¹, Giulia Roder¹, *Giles Sioen^{2,3}, *Sachi Suzuki⁴ (1. United Nations University-Institute for the Advanced Study of Sustainability, 2. FutureEarth, 3. The University of Tokyo, 4. UNESCO)

Keywords: coherence, SFDRR, networks, science-policy-actions, sustainable development goals

Sustainable development endeavor is at risk in the face of hazards and disasters perpetuated by climate change. Thus, countries continuously pledging and committing to various international and regional agreements/frameworks on disaster risk reduction (DRR) and climate change adaptation (CCA). However, despite efforts in science, technology, grass-roots initiatives, and actions, it seems risk governance of various levels have not been able to become an enabling factor for a genuine resilience building. Despite the current rate of ratification/adoption of various post-2015 international frameworks to country-level legislation and science/technology-driven risk assessments, the number of disasters, affected people, economic damage and losses continuously increased.

This session will deliberate and review comprehensively the political and public administration aspect of risk governance across geographical regions to expedite implementation of post-2015 global agreements, its monitoring, and outlook towards 2030. It investigates, stock takes, and confirm whether political architecture and processes in those regions and its member states enable DRR/CCA advancement to enrich and informed policy discourse and actions, or instead it becomes a hindrance. By leveraging on machine learning and various network analyses techniques (social, network, citation, and discourse networks), this session will discuss whether it is possible to predict subsequent dynamic and state of coherence/divergence between science-policy interactions of DRR/CCA across levels. It is deliberating whether a complementary function exists in the implementation of various international and regional agreements/frameworks through national policy and global/regional resource mobilizations.

At a practical level, this session is providing an independent review on the status of science adoption into SFDRR Target E report by Member States of United Nations as well as outlining opportunity and pathway for increasing Target F on international cooperation for achieving global DRR targets. The session will also release the concept of “vertical and horizontal coherence” of post-2015 global agreements for guiding and monitoring of global governance implementation in the period of 2020-2030 surrounding the implementation of SFDRR, Paris Agreement, New Urban Agenda, Agenda for Humanity, Addis Ababa Action Agenda, and Sustainable Development Goals.

Oral Sessions | Session

[O1-15]

Research, Development, and Utilization of Beppu Model Disability-
inclusive Disaster Risk Reduction: Towards Seamless Connections
between Normal and Disaster Times

Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 4 (Shirakashi 1)

Doshisha University

Simultaneous Interpretation is available. (同時通訳有り)

[O1-15-01] Research, Development, and Utilization of Beppu Model Disability-
inclusive Disaster Risk Reduction: Towards Seamless Connections
between Normal and Disaster Times

*Shigeo Tatsuki¹, *Junko Murano², *Kazuhiko Abe³, *Anna Matsukawa⁶, *Bill Ho⁴, *Taku Sugano⁵, *Aya Tsujioka¹ (1. Doshisha University, 2. Beppu City, 3. Tohoku Fukushi University, 4. Asian Disaster Preparedness Center, 5. Osaka City University, 6. Disaster Reduction and Human Renovation Institution)

4:00 PM - 5:30 PM

4:00 PM - 5:30 PM (Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 4)

[O1-15-01] Research, Development, and Utilization of Beppu Model

Disability-inclusive Disaster Risk Reduction: Towards

Seamless Connections between Normal and Disaster Times

*Shigeo Tatsuki¹, *Junko Murano², *Kazuhiko Abe³, *Anna Matsukawa⁶, *Bill Ho⁴, *Taku Sugano⁵, *Aya Tsujioka

¹ (1. Doshisha University, 2. Beppu City, 3. Tohoku Fukushi University, 4. Asian Disaster Preparedness Center, 5. Osaka City University, 6. Disaster Reduction and Human Renovation Institution)

Keywords: Disability-inclusive Disaster Risk Reduction, Leave no one behind during disaster times, seamless connection between social services and disaster response

Older and/or disabled people have been known to suffer more serious damages in disasters. After the Great East Japan Earthquake, Tatsuki (2013) pointed out that the root cause of the proportionately heavier damages is due to the siloed approaches taken by everyday social service and crisis time disaster management organizations and to the lack of coordination between normal and disaster time responses. One solution is to involve social workers who make care plans for everyday living needs during normal time and to ask them to simultaneously prepare disaster care plans. This session shares a Research, Development and Utilization project that interlinks normal time social services and disaster time local responses to persons with disabilities (PWD). A three-year project was launched in Beppu City in 2016 that led to the standard operation procedure (SOP) for assessment, informal human resources matching, and inclusive disaster response simulation during disaster drills. At the end of the project, a quasi-experimental, inverse propensity score weighted impact evaluation demonstrated a significant increase of DRR literacy scores only among the experimental group PWDs. In 2018, Hyogo prefecture initiated the Beppu-model SOP utilization grant program. Based on the preliminary results in Harima township, one of the two initial municipalities, Hyogo prefecture decided to expand the grant program to all Hyogo municipalities. As a result, 37 out of 41 local governments applied for the project as of April, 2019. The similar Beppu model SOP utilization have been spreading to other areas of Japan such as Sendai, Kyoto, Ibaraki and Sugunami cities. Overseas applications of Beppu Model is also currently being planned. This session concludes with future research/practice directions such as integrating pre-disaster care planning to post-disaster case management practices.

Oral Sessions | Session

[O1-16]

Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases

Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 4 (Shirakashi 1)

Tohoku University- IRIDeS

[O1-16-01] Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases

*Takako Izumi¹, *Rajib Shaw², *Jessica Alexander³, *Sangita Das⁴, *Akilesh Surjan⁶, *Miwa Abe⁵, *Takeshi Komino⁷ (1. Tohoku University, 2. Keio University, 3. Sophia University/UNICEF Geneva, 4. CWS Japan, 5. Kumamoto University, 6. Charles Darwin University, Australia, 7. Asian Disaster Response and Reduction Network (ADRRN))

6:00 PM - 7:30 PM

6:00 PM - 7:30 PM (Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 4)

[O1-16-01] Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases

*Takako Izumi¹, *Rajib Shaw², *Jessica Alexander³, *Sangita Das⁴, *Akilesh Surjan⁶, *Miwa Abe⁵, *Takeshi Komino⁷ (1. Tohoku University, 2. Keio University, 3. Sophia University/UNICEF Geneva, 4. CWS Japan, 5. Kumamoto University, 6. Charles Darwin University, Australia, 7. Asian Disaster Response and Reduction Network (ADRRN))

Keywords: Non-profit Organization, Recovery, Coordination

Local non-profit organizations and volunteer networks can play a critical role in preparing for and responding to disasters, often filling in gaps not provided for by the government or international responders. As they are usually closer to the communities being served, their efforts have often been found to be more flexible, relevant and efficient than other stakeholders. Leveraging these inputs and connecting them to other recovery efforts can contribute to a more coherent, sustainable and effective response. Yet experience has shown that if these efforts are not well-coordinated, or done with insufficient capacity, they run the risk of creating duplication, frustration and potentially doing more harm than good.

Using both international case studies - including from Australia, Haiti, and regional networks such as ADDRN - as well as those from inside Japan - including the Great East Japan Earthquake of 2011, Kumamoto earthquake of 2016, and West Japan floods of 2018 - this session will focus on 1) the contributions of NPOs and volunteer networks in disaster recovery, 2) challenges in coordination and capacity building and the implications of these, and 3) best practices with regards to their engagement and involvement in preparing for and responding to disasters.

Oral Sessions | Session

[O1-17]

Creating a disaster-resilient society through industry-academia collaboration

Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 5 (Shirakashi 2)

Tohoku University-IRIDeS

[O1-17-01] Creating a disaster-resilient society through industry-academia collaboration

*Fumihiko Imamura¹, *Hiroo Shimada², *Akihiro Hayashi³, *Anawat Suppasri¹, *Ryu Miyamoto¹

(1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Tokio Marine & Nichido Fire Insurance Co., Ltd., 3. Tokio Marine & Nichido Risk Consulting Co., Ltd.)

11:00 AM - 12:30 PM

11:00 AM - 12:30 PM (Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 5)

[O1-17-01] Creating a disaster-resilient society through industry-academia collaboration

*Fumihiko Imamura¹, *Hiroo Shimada², *Akihiro Hayashi³, *Anawat Suppasri¹, *Ryu Miyamoto¹ (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Tokio Marine & Nichido Fire Insurance Co., Ltd., 3. Tokio Marine & Nichido Risk Consulting Co., Ltd.)

Keywords: Eco-DRR, Mangrove Planting Project, Coastal Disaster Prevention Forest, Global Tsunami Risk, Disaster Risk Quantification

1. Fumihiko Imamura;

Greetings and introductions from Representative

2. Hiroo Shimada;

Creating Value through Mangrove Planting Project as 'Insurance for the Future of the Earth'

3. Akihiro Hayashi;

Tsunami disaster risk prevention/mitigation effect by coastal forest

4. Anawat Suppasri;

Global tsunami hazard and risk assessment: Suitable countermeasures and impact on container vessels network

5. Ryu Miyamoto;

Advancement of tsunami risk assessment

Oral Sessions | Session

[O1-18]

NATECH Risk in Asia Pacific

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 5 (Shirakashi 2)

Keio University

[O1-18-01] NATECH Risk in Asia Pacific

*Rajib Shaw¹, *Ana Maria Cruz², *Fatma Lestari³, *Kampanart Silva^{3,4}, *Devendra Narayan Singh⁵, *Antonia Loyzaga⁶, *Emily Chang⁷, *Takako Izumi⁸ (1. Keio University, 2. Kyoto University, 3. University of Indonesia, 4. Thailand Institute of Nuclear Technology, 5. IIT Bombay, 6.

Manila Observatory and Philippines National Resilience Council (PNRC), 7. Chinese University of Hong Kong, 8. Tohoku University)

2:00 PM - 3:30 PM

2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 5)

[O1-18-01] NATECH Risk in Asia Pacific

*Rajib Shaw¹, *Ana Maria Cruz², *Fatma Lestari³, *Kampanart Silva^{3,4}, *Devendra Narayan Singh⁵, *Antonia Loyzaga⁶, *Emily Chang⁷, *Takako Izumi⁸ (1. Keio University, 2. Kyoto University, 3. University of Indonesia, 4. Thailand Institute of Nuclear Technology, 5. IIT Bombay, 6. Manila Observatory and Philippines National Resilience Council (PNRC), 7. Chinese University of Hong Kong, 8. Tohoku University)

Keywords: NATECH Risk, Asia-Pacific, Science policy dialogue, private sector, citizen perspectives

The Sendai Framework for Disaster Risk Reduction 2015-2030 highlights the need to better understand different hazards, including technological and so-called Natech (conjoint natural and technological) hazards. There is growing evidence, for example from the Great East Japan earthquake, tsunami and consequent incident at the Fukushima-Daichii nuclear power plant, that natural hazards can trigger technological accidents, leading to natural hazard triggered technological (Natech) disasters. These complex hazard events may have catastrophic consequences, in particular in countries that are not prepared for them. They require extended and specific risk management strategies that need to be based on a deeper understanding of their causes and cascading consequences. they run the risk of creating duplication, frustration and potentially doing more harm than good.

Natech risk management needs a holistic approach of government regulations, private sector management, and community's awareness. As the first phase, this work proposes to engage science technology academic community for collecting evidences on Natech risk in the region, followed by policy dialogue with governments for co-designing Natech Risk Management framework. At certain point, there needs to have a dialogue with private sector, through ARISE network in certain countries. Finally, citizen awareness will be enhanced through citizen science approach as well as through civil society networks.

The session aims at presenting initial findings of the NATECH science policy dialogue in Asia Pacific. This session is considered as one of the series of events leading to the Asia Pacific Science Technology Conference on DRR in Malaysia in March 2020, and Asia Pacific Ministerial Conference on DRR in Australia in June 2020.

Flash Talk Presentation

Disaster Heritage to Promote Dark Tourism for Resilient Community

Nurjanah Jane

Sun. Nov 10, 2019 3:35 PM - 3:50 PM Flash Talk Presentation 1 (Meeting Room 6)

Tokyo Metropolitan University

[MP1-E] Disaster Heritage to Promote Dark Tourism for Resilient Community

Nurjanah Jane (Tokyo Metropolitan University)

3:35 PM - 3:50 PM

3:35 PM - 3:50 PM (Sun. Nov 10, 2019 3:35 PM - 3:50 PM Flash Talk Presentation 1)

[MP1-E] Disaster Heritage to Promote Dark Tourism for Resilient Community

Nurjanah Jane (Tokyo Metropolitan University)

Any major catastrophe will leave many relics. Messages of disaster survivor's testimonies and the relics are important to preserve disaster risk reduction. By using disaster heritage seems to be important to community resilient in disaster affected areas. To accomplish this purpose, we try to formulate the connection between keeping disasters heritage with economics creative post disaster. To shows the other benefit of disaster heritage, we conducted survey in the disaster site in Aceh Indonesia, the heritage of disaster does not only include sorrow and it serve as a dark tourism attraction. It can be tools for sustainability of disaster education for the next generation and increasing economics of communities surrounding historical sites. It is serve as a lesson for other disaster areas such as Japan, where many disaster relics have been destroyed.

Flash Talk Presentation

Recent Activity for DRR in Republic of Korea

Dr./Mr. Kang Chang Hyun

Sun. Nov 10, 2019 5:35 PM - 5:50 PM Flash Talk Presentation 1 (Meeting Room 6)

Dankook University

[MP1-F] Recent Activity for DRR in Republic of Korea

Dr./Mr. Kang Chang Hyun (Dankook University)

5:35 PM - 5:50 PM

5:35 PM - 5:50 PM (Sun. Nov 10, 2019 5:35 PM - 5:50 PM Flash Talk Presentation 1)

[MP1-F] Recent Activity for DRR in Republic of Korea

Dr./Mr. Kang Chang Hyun (Dankook University)

Typhoon sometimes triggers torrential rains and subsequent floods in Republic of Korea (ROK).

And tragic forest fire was occurred in the norther part of Korea in April 2019. Forest fire is one of major disasters in recent year. For strengthen disaster management, a lot of research institution and universities in ROK have been conducting multi DRR projects and studies such as capacity building, education program, etc.

In this presentation, Professor Kang of Dankook University would like to share an information about recent activity for DRR including good practices.

Flash Talk Presentation

Current state of SFDRR related research and education by universities and institutions

Mikio ISHIWATARI

Sun. Nov 10, 2019 12:45 PM - 1:00 PM Flash Talk Presentation 2 (Meeting Room 7)

Japan International Cooperation Agency/ University of Tokyo

[MP1-01] Current state of SFDRR related research and education by universities and institutions

Mikio ISHIWATARI (Japan International Cooperation Agency/ University of Tokyo)

12:45 PM - 1:00 PM

12:45 PM - 1:00 PM (Sun. Nov 10, 2019 12:45 PM - 1:00 PM Flash Talk Presentation 2)

[MP1-01] Current state of SFDRR related research and education by universities and institutions

Mikio ISHIWATARI (Japan International Cooperation Agency/ University of Tokyo)

A lot of research and educational organizations have a big interest on SFDRR. It is however, still not clear how SFDRR are addressed for research and education. By the literature review, this study examined the current state of SFDRR research and education by universities and institutions in the world. The study clarifies their current research themes and education policy. In addition, the study raises the further task of research and education for facilitating SFDRR.

Flash Talk Presentation

Proposition of a New Ground-based Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto

Sun. Nov 10, 2019 1:05 PM - 1:20 PM Flash Talk Presentation 2 (Meeting Room 7)

Kochi University of Technology

[MP1-02] Proposition of a New Ground-based Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto (Kochi University of Technology)

1:05 PM - 1:20 PM

1:05 PM - 1:20 PM (Sun. Nov 10, 2019 1:05 PM - 1:20 PM Flash Talk Presentation 2)

[MP1-02] Proposition of a New Ground-based Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto (Kochi University of Technology)

In order to mitigate tsunami disaster, we propose a new ground-based observation network of infrasound, human inaudible low-frequency sound, in the seashore region of marine nations. We have developed infrasound sensors with applying our own technologies and verified them with deploying a dense IoT sensor network in Kochi, Japan. Infrasound has an advantage of remote-sensing for many kinds of geophysical phenomena not only tsunami but also earthquake, typhoon, heavy rain, thunder, landslide, etc. Recent activities at Infrasound research laboratory, Kochi University of Technology will be introduced so as to expand our ideas to maritime regions in near future.

Flash Talk Presentation

Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hideaki Murai.

Ikuo Oikawa

Sun. Nov 10, 2019 1:25 PM - 1:40 PM Flash Talk Presentation 2 (Meeting Room 7)

All Japan Council Company

[MP1-03] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hideaki Murai. Ikuo Oikawa (All Japan Council Company)

1:25 PM - 1:40 PM

1:25 PM - 1:40 PM (Sun. Nov 10, 2019 1:25 PM - 1:40 PM Flash Talk Presentation 2)

[MP1-03] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hideaki Murai. Ikuo Oikawa (All Japan Council Company)

Activity content ・ We worked on business incubation facility "container Oami" which was not used for making of local bustling before earthquake disaster, but warehouse suffered from Great East Japan Earthquake before completion. The facility was unfinished but staff were employed, so the staff started a cell phone charging service. ・ RQ Citizen's Disaster Relief Center starts supporting activities. So we decided to make an original design "Eco Brush" In order to look for areas that can be tackled by the village's friends, we will hold a knitting class by visiting 40 or more temporary houses and residents' associations. Develops and sells "Eco-Brush" as a community business.

Flash Talk Presentation

Recovery Institutions to Build Back Better

Paul Rosenberg

Sun. Nov 10, 2019 1:45 PM - 2:00 PM Flash Talk Presentation 2 (Meeting Room 7)

UNDRR/International Recovery Platform

[MP1-04] Recovery Institutions to Build Back Better

Paul Rosenberg (UNDRR/International Recovery Platform)

1:45 PM - 2:00 PM

1:45 PM - 2:00 PM (Sun. Nov 10, 2019 1:45 PM - 2:00 PM Flash Talk Presentation 2)

[MP1-04] Recovery Institutions to Build Back Better

Paul Rosenberg (UNDRR/International Recovery Platform)

In the aftermath of disasters, such as the Gujarat Earthquake 2001, Indian Ocean Tsunami 2004, Kashmir Earthquake 2005, Canterbury Earthquakes 2010 and 2011, and Typhoon Haiyan 2013, governments often create ad-hoc institutions for recovery to ensure leadership, coordination, and to build back better. Is it cost-effective and efficient to create ad-hoc institutions after every large-scale disaster or is it time to strengthen the existing disaster risk management (DRM) institutions to handle recovery? Using evidence from case studies collected by the International Recovery Platform (IRP), this presentation compares the advantages and disadvantages between ad-hoc and permanent institutions for disaster recovery governance.

Flash Talk Presentation

Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR

Eric Ariel Gonzales Rocha

Sun. Nov 10, 2019 3:35 PM - 3:50 PM Flash Talk Presentation 2 (Meeting Room 7)

United Nations Office for Disaster Risk Reduction

[MP1-05] Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR

Eric Ariel Gonzales Rocha (United Nations Office for Disaster Risk Reduction)

3:35 PM - 3:50 PM

3:35 PM - 3:50 PM (Sun. Nov 10, 2019 3:35 PM - 3:50 PM Flash Talk Presentation 2)

[MP1-05] Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR

Eric Ariel Gonzales Rocha (United Nations Office for Disaster Risk Reduction)

The Sendai Framework Voluntary Commitments (SFVC) online platform allows stakeholders to inform the public about their work on DRR. The platform is a useful tool to know who is doing what and where for the implementation of the Sendai Framework, which could foster potential collaboration among stakeholders. All stakeholders (private sector, civil society organizations, academia, media, local governments, etc.) working on DRR can submit their commitments and report on their progress and deliverables. In addition, good practices and achievements are highlighted through the online platform.

Flash Talk Presentation

You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!

KAZUYUKI TOHYAMA

Sun. Nov 10, 2019 5:35 PM - 5:50 PM Flash Talk Presentation 2 (Meeting Room 7)

TRUSTIA CORPORATION

[MP1-06] You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!

KAZUYUKI TOHYAMA (TRUSTIA CORPORATION)

5:35 PM - 5:50 PM

5:35 PM - 5:50 PM (Sun. Nov 10, 2019 5:35 PM - 5:50 PM Flash Talk Presentation 2)

[MP1-06] You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!

KAZUYUKI TOHYAMA (TRUSTIA CORPORATION)

Japan is famous for its frequent & powerful earthquakes and its advanced technology for disaster preparedness. To the world, our site will introduce and sell high-quality products for disaster preparedness originated from our serious experience and those advanced technologies.

We hope, Various products active in Japan will be able to help people around the world.

Reception

Reception

Sun. Nov 10, 2019 8:00 PM - 9:40 PM Reception (Hotel Metropolitan Sendai)

[RC-01] Reception

8:00 PM - 9:40 PM

8:00 PM - 9:40 PM (Sun. Nov 10, 2019 8:00 PM - 9:40 PM Reception)

[RC-01] Reception

WBF Pre-Opening

WBF Pre-Opening

Sun. Nov 10, 2019 9:00 AM - 10:00 AM Room 1 (Main Hall)

[PO-01] WBF Pre-Opening

9:00 AM - 10:00 AM

9:00 AM - 10:00 AM (Sun. Nov 10, 2019 9:00 AM - 10:00 AM Room 1)

[PO-01] WBF Pre-Opening

WBF Opening

WBF Opening

Sun. Nov 10, 2019 10:00 AM - 10:45 AM Room 1 (Main Hall)

[OP-01] WBF Opening

10:00 AM - 10:45 AM

10:00 AM - 10:45 AM (Sun. Nov 10, 2019 10:00 AM - 10:45 AM Room 1)

[OP-01] WBF Opening

Keynote Speech

A Changing Risk Paradigm

Andrew Maskrey

Sun. Nov 10, 2019 9:41 AM - 9:53 AM Room 1 (Main Hall)

Risk Nexus

[K00] A Changing Risk Paradigm

Andrew Maskrey (Risk Nexus)

9:41 AM - 9:53 AM

RISK NEXUS INITIATIVE

Metrics, Indicators and Knowledge
for sustainability and resilience.

TRANSFORMING A WORLD ON FIRE:

from exotic to quotidian approaches to risk management

San Jose, Costa Rica, April 2019



FLACSO
Secretaría General

Based on a conversation convened by the Risk Nexus Initiative
in the Latin American Social Science Faculty (FLACSO)
on January 23 and 24, 2019

Written and edited by Andrew Maskrey and Allan Lavell with help
from Bina Desai, Garima Jain and Johan Schaar and contributions
from Luna Abu-Swaireh, Maria Veronica Bastias, Alonso Brenes,
Omar Dario Cardona, Cristina Equizabal, Wadid Erian, Pascal Girot,
Michelle Gyles-McDonnough, Ronald Jackson, Kika Klimsza, Dunja
Krause, Shwaib Lwasa, Mabel Marulanda, Richard Olson, Yuichi
Ono, Jose Riera-Cezane, Roberto Rudari, Katharina Schaaf, David
Smith Wiltshire, Atle Solberg and Emily Wilkinson.

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EXECUTIVE SUMMARY

Over two hundred years ago Hegel reflected: *"It is said that there are no sudden changes in nature, and the common view has it that when we speak of a growth or a destruction, we always imagine a gradual growth or disappearance. Yet we have seen cases in which the alteration of existence involves not only a transition from one proportion to another, but also a transition, by a sudden leap, into a ... qualitatively different thing; an interruption of a gradual process, differing qualitatively from the preceding, the former state"*.

Risk and uncertainty, generated where and when physical and social systems interface, now pervades and dominates the contemporary global landscape. A complex ecosystem of interdependent risk drivers including climate change but also environmental degradation, badly planned and managed urban development, displacement and migration, water and food stress, poverty and inequality translate into increasingly unpredictable outcomes for social and economic development and for the environment.

Wildfires around the world in recent years have become an icon of a rapid, global, qualitative transformation of risks generated at the human-nature interface that eerily echo the insights of Hegel. The world is now moving beyond an equilibrium state, be it in social, economic, political or environmental terms. Models of the future are characterized by increasing uncertainty, as outliers beyond the boundaries of what can be expected are becoming the new normal.

Unfortunately, the public policies pursued by most governments seem ineffective in the face of this qualitative transformation of risk. Risk management has become conceptually and institutionally separated from development, while exotic disciplines such as disaster risk reduction and climate change adaptation are ill equipped to manage the complexity of interdependent risk drivers and radical qualitative change.

The dominant meta-narrative of risk as the impact of extreme, unexpected and exogenous events on *normal* development has meant that such approaches literally *miss the point*, veiling and obscuring the pathways of risk causality. Ultimately, the objectives of these *exotic* approaches to managing risk are fundamentally contradictory: to protect the same development paradigm that generates the risk in the first place.

This paper, building on a two-day conversation held in Costa Rica in January 2019 seeks to conceptualise and unpack the qualitative transformation occurring in global risk, examine why current approaches to risk management are failing and to consolidate an emerging new meta-narrative of managing risks within sustainable and resilient development. The paper argues that a two-fold paradigm shift is required: to integrate existing fragmented approaches to risk management into an integrated and holistic framework, while at the same time transforming the focus from the *exotic* to the *quotidian*, from the corrective and reactive to the prospective and from protecting development against exogenous threats to managing risk as an internality inside sustainable and resilient development.

TRANSFORMING A WORLD ON FIRE:

from exotic to quotidian approaches to risk management

Prelude

Following a period of unseasonal warm and dry weather, on Tuesday February 26th the mercury reached 21.2 C. at Kew Gardens, London, the hottest winter temperature on record in the United Kingdom. Later that night and two hundred miles further north, a normally damp and cold area of upland Britain, called Saddleworth Moor, burst into flames. Local residents were reported saying: “it looks like the end of the world, like the apocalypse is happening.”¹

The Saddleworth Moor blaze is no more than a manifestation of extensive risk, one of thousands of localised, frequently occurring events that occur around the world every day. While natural capital went up in smoke, there were no lives lost, nor buildings destroyed. In contrast, the wildfire that destroyed the town of Paradise in California in November 2018 killed 88 people, destroyed over 18,000 structures and led to direct losses valued at USD16.5 billion.

The destruction of Paradise, together with a sequence of heavily reported events in other regions² over the last few years, from Canada, Norway and Sweden to Greece, South Africa and Australia, seem to suggest that the world is already on fire. The subject of this paper, however, is not wildfires per se. The term world on fire is employed as an icon for the rapid, global, qualitative transformation of risks generated at the human-nature interface, as a result of extreme risk accumulation.

The evidence³ that anthropic climate change along with naturally induced change is forcing radical shifts in climate averages is now unquestionable. And as the averages change, what were previously extreme events become increasingly frequent and may tend to normality and regularity. And much of what have been described as manifestations of extensive risk (regular and recurrent smaller scale events and levels of impact) could now be considered as a normal characteristic of a new climate.

However, anthropic climate change is only one manifestation of how contemporary development configures and then locks risk⁴ into the social, economic and physical landscape. The Paradise disaster was driven not only by climate change but by other factors, including unbridled urban growth, the vulnerability to fire of building structures of mainly low and middle-income households and forest management techniques that create conditions for large wildfires. Throughout the world, while still reported as unusual or *extreme* events wildfires are only one visible manifestation of *extreme* risk accumulation in regional economies and their urban centres around the world.

1 The Independent, February 27th, 2019

2 There is no up to date published record of wildfires which allows a trend to be established. The Global Fire Monitoring Centre states: “A preliminary multi-year global database of vegetation fires for use in climate modelling has been established by the GFMC by the support of the German Federal Ministry for Education and Research in the frame of the German Climate Research Programme DEKLIM (BMBF 01 LD 0105). This dataset is not yet published. A complementary statistical enquiry is the GFMC Global Wildland Fire Assessment which currently is in a premature and developing stage.(<http://gfmcc.online/inventory/statistic.html>)”

3 IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

4 In the context of this paper the term risk covers what are currently described as climate, disaster and environmental risks, as well as associated drivers and outcomes such as displacement, migration, conflict, impoverishment, insolvency and other social and economic stresses. Other risks including those associated with cybercrime, terrorism, financial mismanagement, technological and industrial accidents will not be discussed here, except in the case of cascading and synchronic risks (for example droughts affecting power generation).

Risk and uncertainty, generated where and when physical and social systems interface, now pervades and dominates the contemporary global landscape. A complex ecosystem of interdependent risk drivers including climate change but also environmental degradation, badly planned and managed urban development, displacement and migration, water and food stress, poverty and inequality translate into increasingly unpredictable outcomes for social and economic development and for the environment. The world is now moving beyond an equilibrium state, be it in social, economic, political or environmental terms. Models of the future are characterized by increasing uncertainty, as outliers beyond the boundaries of what can be expected are becoming the new normal.

Over two hundred years ago Hegel⁵ reflected: *“It is said that there are no sudden changes in nature, and the common view has it that when we speak of a growth or a destruction, we always imagine a gradual growth or disappearance. Yet we have seen cases in which the alteration of existence involves not only a transition from one proportion to another, but also a transition, by a sudden leap, into a ... qualitatively different thing; an interruption of a gradual process, differing qualitatively from the preceding, the former state”*.

Interdependent global risks such as multiple breadbasket failure and concatenated and cascading systems collapse are now increasingly possible, indicating that such a radical qualitative transformation in global risk is indeed already taking place. At the same time, *extreme* risk accumulation in many countries, and not only in so-called fragile states, is challenging already limited capacities to provide adequate basic services and infrastructure, manage risks and achieve the 2030 Agenda for Sustainable Development.⁶

Unfortunately, if the *world is on fire*, the public policies pursued by most governments seem ineffective in the face of the qualitative transformation of risk now taking place. Research, policy and practice all exhibit the classic problem of *fragmented science*⁷ while institutional action seems trapped in impermeable silos. Risk management has become conceptually and institutionally separated from development, while *exotic*⁸ disciplines such as disaster risk reduction and climate change adaptation are ill equipped to manage the complexity of interdependent risk drivers and radical qualitative change. The dominant meta-narrative of risk as the impact of extreme, unexpected and exogenous events on normal development has meant that such approaches literally miss the point, veiling and obscuring the pathways of risk causality.

This paper, building on a two-day conversation held in Costa Rica in January 2019 seeks to conceptualise and unpack the qualitative transformation occurring in global risk, examine why current approaches to risk management are failing and to consolidate an emerging new meta-narrative of managing risks within sustainable and resilient development based on concepts such as inter-dependence and endogeneity.

5 Hegel, Friedrich, 2015, *The Science of Logic*, Cambridge University Press

6 including the Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction: 2015-2030, as well as the Paris Agreement on Climate Change, the Agenda for Humanity, and the New Urban Agenda.

7 Bohm and Peat, 1986, *Science, Order and Creativity*, Routledge

8 We use the adjective exotic here in that these approaches address problems that are conceptualised as exogenous threats to development. These exotic approaches therefore end-up as being exogenous to mainstream development planning and investment.

FROM EXTREME RISK ACCUMULATION TO THE RISK NEXUS

When the veneer of development starts to fade

Increasing levels of loss and damage in the context of disasters and conflict, including those associated with displacement, slow-onset impacts and climate change, provide indicators of *extreme* risk accumulation and of the qualitative transformation in global risk posed by Hegel.

The accumulated value of all finished goods and services produced globally, commonly known as GDP, is currently estimated at around USD 80 trillion per year. Global GDP growth is expected to be 2.9% in 2019, representing, therefore, approximately USD 2.4 trillion⁹.

Unfortunately, the development paradigm that generates global GDP growth is now generating both manifest and future risks the costs of which greatly exceeds the value generated.

The value of lost or damaged natural capital is now estimated at around USD 4.7 trillion per year¹⁰ and the cost of wildfires in the USA alone is estimated at between USD 71 – 348 billion per year. Thus, the cost of environmental destruction alone is already equivalent to around double the expected annual growth in GDP

The direct financial costs associated with armed conflict and interpersonal violence, including capital destruction and costs associated with security systems and medical care, were estimated at approximately USD 1 trillion¹¹ in 2016. Indirect costs are generated by productivity loss, lost life-time, economic output of victims and reduced economic growth resulting from a prolonged war or conflict. For example, Afghanistan's per capita income has remained at its 1970s level due to the continued war, and Somalia's per capita income has dropped by more than 40 percent over the same period¹².

In terms of disaster risk, an extrapolation from global probabilistic estimates¹³ from 2017¹⁴ implies future direct disaster losses of approximately USD 700 billion per year and indirect disaster losses¹⁵ of approximately USD 1 trillion. To the risks associated with conflict and disaster, it would be necessary to add the cost of both disaster and conflict driven displacement as well as the costs of other risks associated with air and water pollution, crime, lack of sanitation and other hazards.

Conflict, disaster and economic and political crisis, often magnified by other risk drivers, are leading to unprecedented levels of migration and displacement, if refugees and those internally and externally displaced are considered¹⁶. For example, in 2018, approximately 700,000 Rohingya

9 www.worldbank.org/en/publication/global-economic-prospects

10 <https://www.naturalcapitalcoalition.org/wp-content/uploads/2016/07/Trucost-Nat-Cap-at-Risk-Final-Report-web.pdf>

11 <http://visionofhumanity.org/app/uploads/2018/11/Economic-Value-of-Peace-2018.pdf>

12 <https://openknowledge.worldbank.org/bitstream/handle/10986/28337/211162ov.pdf?sequence=6&isAllowed=y>

13 The Average Annual Loss (AAL) in the built environment associated with physical hazards such as earthquakes, tsunamis, tropical cyclones and riverine floods has been estimated at USD 293,000 million. Assuming extensive risk adds an additional 30% to the AAL and that the agricultural drought AAL represents 10% of global agricultural GDP the total AAL would be around USD 700,000 million. Given that indirect disaster losses average at approximately 1.5 times direct losses, global indirect losses could be of an order of magnitude of USD 1 trillion-

14 United Nations, 2017, GAR Atlas, Geneva.

15 Reference UN terminology

16 IDMC, 2019, Global Report on Internal Displacement (forthcoming)

were forced to leave Myanmar to live in highly-vulnerable and hazard exposed conditions in Bangladesh, generating new risks. Around 3 million Venezuelans have abandoned their country due to deteriorating economic conditions, poverty and malnutrition. At the end of 2018, more people than ever were living in internal displacement; 41.3 million or around two-thirds of people displaced worldwide.

Displacement incurs additional direct and indirect financial costs that are currently not appearing on the balance sheets of national budgets. The direct cost of internal displacement is estimated to be USD 13 billion globally¹⁷ In the Central African Republic, for example, the direct economic impacts of internal displacement associated with conflict were around USD230 million every year, the equivalent of 11 per cent of the country's pre-crisis GDP. In Somalia, recent drought-related displacement resulted in direct costs of USD315 million per year or 4.7 per cent of pre-2017 GDP. When assessing the financing gaps that countries will face when experiencing disaster-displacement, many will not be able to absorb the associated costs. For example, Bangladesh would not be able to absorb the economic impacts of displacement associated with a 1 in 10 years disaster event¹⁸

These different global totals cannot be simply added together, given that some are estimates of what is currently being lost while others are probabilistic estimates of future risk. It is beyond the scope of this paper to try and reconcile the methodologies used. However, what is clear is that as an order of magnitude, the total risk associated with disasters, conflict, displacement and natural capital loss would now seem to be several times greater than the value of global GDP growth. This implies that development is increasingly fragile as the costs incurred and risks generated now greatly exceed the value created.

Short term gains and capital accumulation in specific social and territorial geographies continue to provide an illusion of development. However, in much of the world the smoke-screen is now rapidly dissipating, revealing contemporary development pathways as a thin veneer covering broad-based economic, social and ecological collapse.

This has very serious implications for the 2030 Agenda for Sustainable Development. Ultimately, risk is a contingent liability for future development. This implies that in any given country, when risk starts to represent a significant percentage of the value generated by development, governments will not be able to increase or even maintain the capital investments or social expenditure they need to achieve the Sustainable Development Goals (SDG).

For example, in Syria, Afghanistan and Iraq the economic cost of violence is estimated to be 68%, 63% and 51 %per cent of the value of their GDP respectively¹⁹. In Guatemala, Honduras and El Salvador the economic costs of crime and violence were already estimated to account for between 8 and 11 percent of GDP in 2011²⁰. Subsequently they may have increased. In countries like Philippines and Myanmar, estimates of average annual disaster risk in the built environment now exceed 100% of their social budgets²¹

17 IDMC 2019: Unveiling the cost of internal displacement. Thematic series The Ripple Effect. February 2019.

18 IDMC and IIASA 2019: Points of no return. Estimating governments' fiscal resilience to internal displacement. IDMC Thematic series: The Ripple Effect: economic impacts of internal displacement. March 2019.

19 <http://visionofhumanity.org/app/uploads/2018/11/Economic-Value-of-Peace-2018.pdf>

20 World Bank, 2011, Crime and Violence in Central America: A Development Challenge.

21 United Nations, 2017 op.cit.

In all these different contexts, the risks generated by development now heavily compromise progress towards the achievement of the SDG. At the same time, neither the benefits nor the risks generated through development are accumulated or distributed equally in territorial or social terms. The geography of risk inequality occurs at all scales, between regions and countries, within countries and even within cities and localities.

THE HIDDEN VEINS OF RISK ACCUMULATION

The fact that risk itself is now reaching extreme levels, highlights the operation of underlying risk drivers which articulate contemporary development to the configuration and accumulation of risk. Many of these drivers are at the same time risk outcomes. Forced displacement, for example, occurs after both disaster and conflict. Displaced populations are often forced to occupy hazard exposed areas in extremely vulnerable living conditions, therefore increasing disaster risk. Displacement and migration can also create new conflict risks. For example, many of the countries that absorb displacement and migration, for example Lebanon in the case of Syria, Colombia in the case of Venezuela or Bangladesh in the case of Myanmar, are themselves countries with high-levels of risk, associated with conflict, physical hazards or both. Risk, therefore, is increasingly fluid, flowing and spilling over from crisis in neighbouring countries, and permeating and exacerbating existing situations.

Contemporary development, with its single-minded pursuit of economic growth above all other considerations, seems to reward risk accumulation. Opportunities for short-term capital accumulation continue to outweigh concerns about future sustainability, resulting in a massive discounting of all future risk. This leads to large flows of capital into hazard-exposed areas, where hidden contingent liabilities come bundled together with the comparative advantages offered to investors. The level of risk in many such locations is rarely explicit to investors and is often disregarded in the public investment that creates the necessary infrastructure or in the private investment that follows, as became brutally manifest in the flooding of industrial estates on the outskirts of Bangkok in 2011. With regional and global impacts in sectors such as semiconductors and automobiles, this disaster revealed how risk is locked into much new capital investment in hazard-exposed regions²².

At the same time, instead of being liable for the risk that private and public actors generate, risk is actively and often openly transferred to and borne by others, citizens, local governments and vulnerable populations. For the 2 billion people on the world living on less than USD 3.2 per day and the 800 million living on less than USD 1.9 per day, even small increases in income can lead to major gains in social welfare. However, the material gains from development are concentrated in a very small percentage of the global population, while the risks are transferred to the majority or to the global commons.

Poverty and inequality are both underlying risk drivers as well as risk outcomes. Sectors and territories without comparative advantages for capital accumulation are left behind. In those areas, risk is associated with an absence of development characterized by low levels of investment in infrastructure, weak or non-existent social and environmental protection, and rural and urban

22 United Nations, 2013, Global Assessment Report on Disaster Risk Reduction: The Business Case for Disaster Risk Reduction, Geneva.

poverty. This drastically reduces the space for managing risks in livelihoods, settlement or health for the vast majority, with the result that both every-day and extensive risk become embedded as attributes of multi-dimensional poverty.

Economic poverty, together with other poverty factors such as powerlessness, exclusion, low literacy and discrimination, translates into conditions of everyday risk, associated with poor health, crime, drug addiction, domestic violence and homelessness, which in turn reinforce poverty and generate patterns of extensive and intensive risk. Damage to housing, local infrastructure, livestock and crops then feeds back into a range of outcomes that include further impoverishment, displacement and increased conflict risk.

With opportunities constrained, political instability becomes another risk outcome, which in turn further erodes the consensus required to address risk.

Urban growth is also generally characterized by unequal access to urban space, infrastructure, services and security. This generates new patterns of both extensive and intensive disaster risk, particularly in informal settlements with deficient or non-existent infrastructure and social protection, and high levels of environmental degradation. At the same time, social and spatial segregation of risk in cities, contributes to the proliferation of other shocks and stresses, such as crime, high youth unemployment and political instability, all of which exacerbate vulnerabilities and social tensions and generate a vicious cycle of risk generation. Rapidly expanding city regions also generate new risks, as landscapes and ecosystems are degraded through mechanisms such as a low-density urban expansion, exhausting resources such as water in the surrounding regions, generating unsustainability. With exposure and vulnerability increasingly concentrated in urban areas, more people and assets are put at risk. Today, more than 80% of the global population at risk of being displaced by floods live in urban and peri-urban areas²³

Meanwhile, contemporary development is characterised by an increasing and unsustainable over-consumption of energy, fresh water, forests and marine habitats, clean air and rich soil. The loss of critical regulatory ecosystem services, including forests, mangroves, wetlands, coral reefs and aquifers, means that many ecosystems are now approaching tipping points beyond which recovery is difficult or impossible, with unpredictable but potentially dangerous implications for future risk. Water stress and land degradation have particularly dangerous implication for food security.

Global climate change is now fundamentally changing the risk landscape, magnifying the number and kind of hazards, through changing temperatures, precipitation and sea levels, among other factors. While ongoing changes in climate averages, sea level rise and ice cover constitute the principal stress to production, livelihood and settlement patterns, for example, reduced agricultural production due to declining water availability, climate change is still considered synonymous with extreme events, thus confusing changing climate variability with the underlying problem of a changing climate.

Climate change transfers risk as many of the territories most affected are those which have contributed least to greenhouse gas emissions. But at the same time, climate change is a meta-risk

23 IDMC, 2019: Global Report on Internal Displacement. An urban perspective, Geneva.

driver, as both its causes and consequences are global. In certain contexts, climate change-related effects may exacerbate existing tensions and influence other factors in a way that increases the risk of conflict, often linked to the control over natural resources at times of scarcity. In East Africa, for example, climate-conflict pathways include worsening livelihood conditions, increasing migration and changing pastoral mobility patterns²⁴. Fluctuations in agricultural production and food prices are other climate-related risk drivers²⁵.

INTERDEPENDENCE AND NON-LINEARITY

These risk drivers are closely interrelated and concatenated, and they are increasingly shaping local realities. Interactions between the different risk drivers create increasingly unpredictable risk outcomes, where risk drivers in physical systems translate into drivers in other systems and vice versa through feedback loops. Given the multiple feedback loops between the different drivers and their non-linearity and given that change seems to be occurring at a faster rate than expected, even slight changes in the evolution of any one driver can generate unexpected and radical changes in another, while at the same time magnifying and increasing interdependent global risk. The world seems now increasingly characterised by unknown things changing rapidly.

Examples of interdependence and feedback abound. The East Japan earthquake of 2011 triggered a tsunami, which damaged a nuclear power plant, in turn leading to cascading effects on energy production, food systems and water supplies. Concatenated drivers such as climate change, the growth of city regions and environmental degradation can lead to low levels of water recharge which are generating catastrophic water stress in major metropolitan areas such as Sao Paulo, Brazil and regions such as the South Western Cape in South Africa. Excessive extraction of groundwater is causing cities like Jakarta and Bangkok to sink, further exposing them to rising sea levels and flooding.

Many countries and communities in conflict, for example, in the Middle East and North Africa are also in regions severely affected by climate change, water stress and land degradation. Their capacity to deal with these risks is reduced by conflict, while risk outcomes, such as displacement at the same time magnify conflict risk. In Syria, almost all people displaced by heavy floods in 2018 had previously fled the conflict, resulting in cyclical and protracted displacement that humanitarian actors and government agencies alike were not equipped to deal with. In Greece, the capacity of government to respond to devastating wildfires in recent years was severely constrained by underinvestment in fire and emergency services following an ongoing and decadal financial crisis.

The risk nexus, therefore is characterised by a range of increasingly concatenated and interdependent risk drivers, outcomes such as disasters, migration, displacement, conflict and political instability, ongoing welfare, livelihood and life style impacts and unsustainable levels of risk. Extreme risk accumulation is also undermining the already weak and fraying political consensus that underpins the contemporary development paradigm. The risk nexus, would now seem to be the salient characteristic of our *world on fire*.

24 Van Balen, S. & Mobjörk, M. 2016. A Coming Anarchy? Pathways from climate change to violent conflict in East Africa. Stockholm University, SIPRI.

25 Busby, J. 2018. Climate and Security: Bridging the Policy-Academic Gap. PRIO blog, 15 May, 2018.

THE LIMITS OF RISK MANAGEMENT

From fragmented science to a communication breakdown

Because disasters, conflicts and crises are not recognised for what they are, as the manifest consequences of our development choices, the way the international community as well as most countries are currently addressing the risk nexus can be characterised more as another underlying risk driver than as an effective approach to risk management.

Disaster risk, conflict risk, displacement risk and risks associated with climate change and declining biodiversity continue to be examined analytically as separate categories, even though the increasing degree of interdependence between these risk categories, the underlying risk drivers and the range of risk outcomes has already eroded their value as compartmentalised fields²⁶.

In general, research, policy and practice in risk management exhibit the classic problem of *fragmented science*. Specialised research communities have developed in disaster risk management, climate change adaptation, displacement and migration and conflict prevention, with only weak channels of communication between them. For example, climate change and disaster risk reduction discourse are largely absent from the global conflict agenda. While attention has been given to elucidating the links between climate change impacts and the risk of violent conflict, much less focus has been given to analysing how conflict undermines the capacity to address other kinds of emerging threats and risks.

Academic journals have sprung up to service each research community, which normally only quote literature from within that community. Even within the disaster risk management and climate change adaptation research communities, which are addressing risks with a very large degree of commonality, few researchers in one community read or quote literature produced by the other, despite sporadic efforts to encourage convergence²⁷. The distance between these research communities and those working on conflict and displacement are greater still. Within each community there is further fragmentation as researchers focus in on specific analytical areas.

Research communities thrive by fabricating interpretative paradigms that distinguish them from other communities, for example between climate change adaptation and disaster risk reduction. But these paradigms often serve more to veil than to reveal the underlying commonality. As a consequence, dialogue on the risk nexus between different communities is hampered by differences in concepts, terminology and epistemology.

Fragmented science is associated with highly-specialized approaches that may work well within their particular (often narrowly defined) context but which are ill-equipped to address the interdependence and concatenation between different risk drivers. For example, wetland conservation could be seen as a disaster risk management issue, as it reduces flood risk, as a climate change adaptation issue, as well as a water availability, biodiversity and livelihood issue. The fragmentation of policies, budgets and bureaucracies conspires against addressing such issues in ways that could potentially produce multiple benefits and co-benefits.

²⁶ An issue already highlighted by Von Humboldt two hundred years ago.

²⁷ Reference IPCC SREX report

The 2030 Agenda consists of a number of distinct international policy frameworks²⁸ for sustainable development, climate change, disaster risk reduction and urban development, each supported by their own international bureaucracies. In 2018, the two Global Compacts to address and manage international migration and refugee flows respectively resulted from and reinforced separate institutional agendas. Each of the main agreements comes with its own structures and systems of monitoring and reporting that not only creates burdens on governments but which tend to reinforce separation and fragmentation.

For example, the Sendai Framework has no reference to conflict and displacement, while making progress towards one SDG may negatively affect progress towards another. For example, large investments in the infrastructure of hazard-exposed coastal cities may be necessary to achieve SDG9 but may result in forced resettlement of low-income households negatively affecting the achievement of SDG1 and SDG11, as well as leading to increasing future disaster loss, contrary to Sendai Global Targets A – D.

In the New Urban Agenda disaster risk is still viewed as an independent and discrete problem, referred to in 17 of the 180 paragraphs of the agenda. But the nexus between disaster risk and its drivers in bad urban planning, resource depletion, land ownership patterns and others are never made explicit.

At the national level, most governments have also developed separate and competing policy frameworks and bureaucracies for addressing disaster risk and climate change, and in some cases issues such as migration or displacement, inhibiting a more holistic vision of the risk nexus. This fragmentation is further reinforced in the budgeting processes where separate budget lines are approved for each policy area or sector. The result is often competition for resources between competing bureaucracies which address overlapping issues and challenges. This is often further aggravated by financial mechanisms, such as under the Green Climate Fund for climate adaption and mitigation or the World Bank's IDA for refugee response, which each tend to foster off-budget funding streams and project-based approaches.

And despite calls for flexibility in order to manage risk in complex environments, and agreed DAC²⁹ policy, many donors have great difficulty to relinquish ear-marking and control, further reinforcing fragmentation. The entrenchment of fragmentation in many bilateral and multilateral institutions has itself become a major barrier to implementation of the 2030 Agenda and the need for a more holistic approach to managing risk.

Humanitarian action³⁰ to address the needs of those displaced by conflict, disaster or collapsing ecosystems, does not have means nor the mandate to deal with underlying risk. For example, between 2011 and 2018 the number of operations to deal with increasingly complex and prolonged emergencies by organisations such as the World Food Programme (WFP) has increased enormously while appeals for financial support rarely achieve more than 60 percent of their targets. The call by both the former and current Secretary Generals of the United Nations to transfer the

28 The Sendai Framework for Disaster Risk Reduction: 2015 – 2030, the Sustainable Development Goals, the Paris Climate Change Agreement the New Urban Agenda

29 OECD Development Assistance Committee

30 ALNAP's State of the Humanitarian System 2018, p 227, the chapter on Connectedness <https://www.alnap.org/help-library/the-state-of-the-humanitarian-system-2018-full-report>

focus of action from one dominated by ex post humanitarian assistance to a nexus approach where greater investment is made in sustainable livelihoods and prevention has yet to achieve traction.

For states with limited governance and institutional capacity, this makes a holistic and integrated approach to risk management difficult if not impossible. In the Caribbean, for example, governments are pursuing the different international agendas along separate institutional tracks despite the fact that they are all expected to deliver resilient and sustainable societies. Furthermore, decentralisation of responsibility for managing crises and risk more often than not does not come with the commensurate devolvement of resources to local levels. Limitations to resource flows from national to local governments and initiatives are a major gap, exacerbated by an almost complete absence of meaningful international multilateral or bilateral funding mechanisms to support capacity and investment directly to the local level.

EXOTIC APPROACHES TO MANAGING RISK

These fragmented and competing frameworks for addressing risk, however, do have an underlying commonality. The dominant narrative in contemporary development continues to be one of conceptualising risk as an exogenous variable or an external threat. Despite the evidence that risk is endogenous to development, the narrative remains one of protecting development against disasters or of adapting development to climate change. Conflict, displacement, disasters and the effects of climate change are still seen as externalities which affect normal development, rather than as indicators of “failed or skewed development, of unsustainable economic and social processes, and of ill-adapted societies”³¹.

Given this dominant narrative, approaches such as climate change adaptation and disaster risk reduction, should more properly be considered as *exotic*³² approaches, which partially address specific compartmentalised manifestations of risk, rather than the underlying drivers that configure the risk nexus. As such they only nibble around the edges of the growing and *extreme* accumulation of interdependent risk. These *exotic* approaches continue to be understood and practised as sets of instrumental and administrative mechanisms to protect development against tangible external threats. Logically, if risk is conceptualized as an exogenous threat, then instruments can be designed to protect against it. By definition, interpreting risk in this way weakens responsibility and accountability for risk generation.

The emergence and widespread adoption of resilience as a concept and goal may be making the transition to an integrated approach even more difficult. Countries are expected to be able to absorb the impact and *bounce* back from a growing number of *intractable* risks. This unfortunately can be understood as reinforcing the status quo rather than recognising the need for transformation of the conditions of underlying risk. Climate change adaptation is similarly a recognition and acceptance of the status quo.

To compound the situation, responsibilities for risk management and reduction have often been vested in organisations set up to respond to disasters, conflict, displacement and other crisis

31 Lavell, Maskrey, 2011, The Future of Disaster Risk Management, Environmental Hazards, Vol 10.

32 These disciplines are exotic not only in the sense that they view risk as exogenous to development but also in that they are themselves exogenous to mainstream development planning and investment and public administration.

rather than to address the underlying risks. These responsibilities were added on in syncretic fashion to the governance arrangements for emergency management. These organisations rarely have either the political authority or the technical capacity to engage with mainstream development sectors in government, such as planning and finance ministries. The concepts that guide the work of these organisations, is a major barrier to change and the emergence of more effective and modern frameworks for risk management.

In the Caribbean, for example, despite seventeen years of promoting Comprehensive Disaster Management, there has been little systematic investment in addressing the underlying risk drivers in the region, creating conditions that manifested in the impact Hurricanes Irma and Maria in 2017. While the post event political discourse acknowledged the devastating nature of the outcome, it did so in terms of the unprecedented nature of the events and expressed little understanding or appreciation of the fact that the risk drivers could have been at least partially addressed.

Many countries in the region have hinged their economic development on tourism seeking to maximize the revenues the sector is able to generate at all costs. However, investments in tourism infrastructure has potentially breached the carrying capacities of vital regulatory ecosystems thus contributing to increasing risk, ultimately to economic development itself. In Central America, despite the clear lessons from Hurricane Mitch, 20 years-ago, and the political statements on the social construction of risk and the need for transformation, risk continues to grow rapidly and losses also.

These contradictions can be seen when examining the increasingly accepted distinction between corrective, prospective and reactive disaster risk and climate change management³³. Corrective risk management, searching to reduce existing risk, can easily be incorporated by the disaster risk management sector, given that the risk already exists, likewise, reactive management, given that it addresses unresolved risk that will and does convert into disaster. Prospective risk management, however, is an uncomfortable bed-partner for the disaster risk management sector. Given that its objective is to avoid future risk construction, in other words to avoid disaster by avoiding risk, it should be an integral part of mainstream development planning and investment. The fact that an *exotic* sector like disaster risk management is expected to ensure prospective risk management, which is and should be part of quotidian development is therefore a guarantee more of failure than of success.

Ultimately, the objectives of these exotic approaches to managing risk are fundamentally contradictory: to protect the same development paradigm that generates the risk in the first place. If increased investments are made to protect development without addressing the underlying risk drivers, more and more effort leads to diminishing returns. Given the evidence of a qualitative transformation of the risk nexus and of a world on fire, there is now a very real possibility that unless risk management is transformed, a tipping point will be reached in which the debate will not be about the achievement of the SDG or the Sendai Framework targets, but rather about survival itself.

33 See United Nations General Assembly, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, December 2016 for official definitions of these concepts.

Fit to survive:

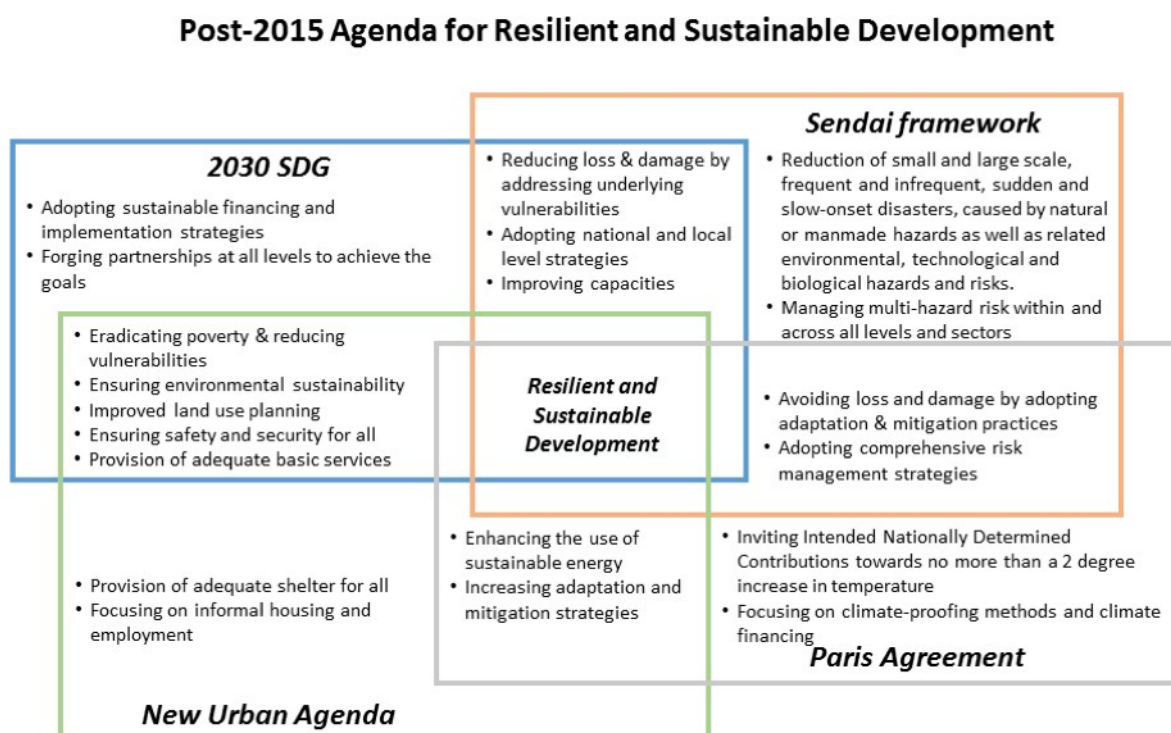
From exotic risk management to a quotidian approach to sustainable and resilient development

Bringing risk management home

Given that these *exotic* approaches have proven ineffective to manage escalating global risk it is clear that if our *world on fire* is to be transformed into a world fit to survive then a new approach to risk management is required. If risk is an endogenous indicator of a flawed development paradigm, then the management of risks depends on the transformation of that paradigm.

Firstly, prospective risk management should now be considered as a quotidian mechanism for sustainable and resilient development, rather than a component of disaster risk reduction. Seen in such a light, it then becomes an agenda for development sectors rather than for the entrenched crisis and disaster management sector. Addressing risk within the broader framework of sustainable and resilient development can also help to bring coherence to 2030 Agenda.

Figure 1, highlights the existence of a common space around resilient and sustainable development where Agenda 2030, the Sendai Framework, the New Urban Agenda and the Paris Agreement converge and where the perspectives on risk and risk management in each framework can come together.



If that common space can be strengthened and reinforced, discussions on the mainstreaming of disaster risk reduction or climate change adaptation into sustainable development or into the new urban agenda become irrelevant. Mainstreaming, by definition, is still derived from the conception that disasters and climate change are external threats rather than endogenous or internal

characteristics of development and that exotic approaches need to be mainstreamed into the quotidian. Planning for extremes must now be closely integrated into planning for a new normality. The extreme levels of inequality, instability, environmental degradation, climate change, disaster, displacement and conflict that now characterise global development cannot be reduced to the status of an externality.

Managing risk as an internality inside development requires a very different approach to mainstreaming risk management into development to protect against externalities. It implies that risk management and resilience should become a normal and quotidian characteristic of sustainable development. Managing risks now has to become endogenous to the DNA of sustainable development, in the same way as gender or environment, instead of an *exotic* add-on that needs to be mainstreamed.

If risk management is allowed to weave and flow through normal, day-to-day development planning and decision-making across sectors and territories, then the differentiation between risk governance and development governance also becomes unnecessary. Instead of assigning responsibilities for disaster risk management or climate change adaptation to specialized sectors, these responsibilities would be vested in the sectors and territorial governments that plan, invest in and regulate development.

The paradigm shift required therefore is two-fold: to integrate existing fragmented approaches to managing risk into an integrated and holistic framework, while at the same time transforming the focus from the exotic to the quotidian, from the corrective and reactive to the prospective and from protecting development against exogenous threats to managing risk as an internality inside sustainable and resilient development.

The approach therefore becomes one of advancing sustainable and resilient development through a risk management lens, addressing the underlying risk drivers and draining energy out of risk accumulation processes. This includes the urgent need to start addressing displacement and conflict as endogenous risks rather than as an exclusively humanitarian issue. At the same time, shifting the paradigm will not happen overnight. As risk creation has deep historical roots, so managing risk creation in the future is a long-term societal process.

OPPORTUNITIES FOR TRANSFORMATION

All development decisions, whether they are related to capital investment, social expenditure or environmental protection, have the potential to either reduce or increase risks. As a first step, therefore, risk metrics need to be developed to inform such decisions and to ensure that the associated costs and benefits are fully encoded into public and private investment at all levels, into the financial system and integrated as a normal part of government, business planning and decision-making processes, including processes of joint planning with the international community³⁴

34 For example, the United Nations Common Country Assessments (CCA) and Development Assistance Frameworks (UNDAF)

Probabilistic global assessments of disaster risk already exist³⁵ but further work is required to fully integrate slow-onset hazards, such as drought, water stress and the effects of climate change and to address the non-stationarity of hazard, exposure and vulnerability. At the same time, it will be necessary to address displacement, conflict, food insecurity, environmental degradation both as underlying drivers and aggravating factors but also as risk outcomes and to model the effects that investments and policies can produce on each risk component.

While expanding existing global models in this way is a significant technical challenge, it is a necessary bedrock for underpinning the paradigm shift towards sustainable and resilient development. The identification and assessment of risk, including the inter-linkages and knock-on effects facilitates a better understanding of risk and allow for better budgeting and resource allocation that can be measured, monitored, evaluated and adjusted as required.

Once such metrics are developed, they will become a critical tool to inform national planning processes, for example, revealing risks to sustainability and to the achievement of the SDG, that are currently not being taken into account and enabling an appropriate layering of risk.

Such expanded and country-specific risk metrics can be used by and with governments to examine the risk implications of different future development pathways, for example, through periodic risk audits, the agreement of national resilience targets, and the measurement of how different development pathways impact on the achievement of each SDG. This can lead to an improved understanding of how different drivers contribute to multidimensional risk and to the planning of investments in key development sectors such as infrastructure, education or employment in a way that they contribute to resilience and sustainability. In the same way they can also be used to address risk in UN system planning instruments such as the Common Country Assessment (CCA) and the United Nations Development Assistance Framework (UNDAF). Currently risk is not systematically considered in these instruments.

Future infrastructure development can be seen both as a challenge as well as an opportunity. By 2030, an estimated US\$25 trillion to US\$30 trillion will be invested globally in new infrastructure, including urban road construction, water and sanitation, energy and transport systems, and buildings. Most of this investment will occur in regions with weak capacities for territorial planning and governance. Whether or not this investment is sustainable and resilient will have a determining influence on the future of risk. Risk metrics therefore are also vital to develop appropriate standards and to create tangible incentives to both governments and the private sector to invest in sustainable and resilient infrastructure.

Similarly, risk metrics can and should also be fully encoded into the financial system and available to institutional investors, including pension and sovereign wealth funds. Currently, capital flows are managed and regulated largely by considerations of profitable returns rather than by the risk they may be accumulating. Financial managers and regulators have to move from measuring the potential risks inherent in portfolios of assets, which can represent a risk to those investing in these instruments, to considering the broader risks posed by the investments.

35 See for example, United Nations, 2017, GAR Atlas, UNISDR, Geneva

Direct, indirect and downstream risks generated by increased exposure and vulnerability have to become a key parameter of credit and debt ratings, and in indices that measure the attractiveness of sectors and countries for investment in performance forecasts and in statutory reporting. Encoding risk metrics into broader investment metrics is critical to changing investor behaviour in a way that encourages investment to flow into asset classes such as resilient infrastructure, that contribute to taking the energy out of risk accumulation.

A key challenge to addressing the risk nexus remains the configuration of appropriate governance arrangements at the national and local levels. In many of those countries with the highest risks, limited institutional capacity remains fragmented in silos and with little space to engage new and unforeseen risks. Available human and financial resources are thinly spread across multiple agendas. And even when cross-ministerial councils and similar mechanisms have been created to address risk, budgets are often still locked into sector-based silos. The burden of responsibility currently vested in specialised disaster management and climate change adaptation offices needs to be shifted to mainstream government sectors. To get traction and action, the same actors currently involved risk configuration and accumulation should be those that take a lead role in risk management. The incentives for rewarding those institutions that engage in cross-cutting, inter-sectoral prospective planning also need to be aligned.

Paradoxically, disasters and crisis often create opportunities for reviewing governance mechanisms and, through increasing media attention, offer opportunities to identify accountability and responsibility for past failures to regulate development. But such windows of opportunity are transient, pointing to the need for the legislation, staffing and budgeting plans, implementing procedures and identified champions to be pre-positioned to take advantage of propitious circumstances when they arise.

In particular, territorial governance needs to be strengthened. Territories, at different scales, internalize all the risks, drivers and outcomes in a holistic manner. National policies, strategies, plans and budgets in different sectors need to be integrated at the local level, which is where the different risk drivers literally come to ground and where localities need to manage risks in a way that is appropriate to their own needs and challenges. Currently, even those countries that have adopted innovative national level policy frameworks, for example risk-informed public investment, experienced problems in implementation due to weak or ineffective territorial planning and governance. Along with risk-informed territorial planning and investment, mechanisms for compliance also need to be strengthened, whether through risk ombudsman, periodic risk audits or incorporating risk into the remit of national controller or audit offices.

CODA

If a *world on fire* is iconic of a qualitative transformation in global risk, a concept that is iconic of the paradigm shift required in risk management is that of *kintsukuroi* a Japanese word that refers to repairing broken ceramics with seams of gold.

The underlying philosophy of *kintsukuroi* is an understanding that the new piece of ceramic is more beautiful for having been broken. The relevance of *kintsukuroi* to contemporary development is that in crisis lies an opportunity if the future of the planet and society can be made more sustainable precisely for having once been broken.

