Session Rapporteur on the Science and Policy Forum for the Implementation of Sendai Framework for Disaster Risk Reduction, 13-14 May 2019

Session 1	**Presentation of the contextualized Global Science and Technology Road Map, for adoption by the participants [Example]**
Chair **Rapporteur**	Rajib Shaw <shaw@sfc.keio.ac.jp> Fang Lian <fang.lian@irdrinternational.org>
Summary	The Science & Technology Roadmap on DRR was launched by G-STAG in Jan 2016 at UNISDR S&T Conference and contextualized in Oct 2018 to promote S&T activities to realize the SFDRR Goals and Targets. The roadmap was designed as a living document to be implemented by the S&T community with a strong partnership with other stakeholders. The Voluntary Commitments of Sendai Monitoring system can be used to as the track and monitor tool. The core purposes for future development of the roadmap include: 1) Evidence-based policy and decision making; 2) Consolidation of science effort for collective impact; 3) Interlinkages and interconnection among stakeholders, including S&T community. IRDR, an international research programme cosponsored by ISC and UNDRR, made commitments to 17 actions of Priority 1, 6 actions of Priority 2, 5 actions of Priority 3 and 5 actions of Priority 4. For example, IRDR published working papers to disseminate the DRR knowledge for all actors. AP-STAG made their commitments to 12 actions of Priority 1, 13 actions of Priority 2, 16 actions of Priority 3 and 20 actions of Priority 4. AP-STAG emphasized the action of investment on developing young professionals in the field of multi-disciplinary DRR. Arab STAG made the short term commitments to 7 actions of Priority 1, 4 actions of Priority 2, 4 actions of Priority 3 and 1 action of Priority 4. They made the long term commitments to 5 actions of Priority 1, 1 action of Priority 2 and 1 action of Priority 3. Europe STAG's task is to tackle emerging challenges in DRR with focus on improving risk knowledge. E-STAG has conducted promotional work and empirical studies in two particular areas of urgency: Socioeconomic and Data Challenges of DRR in Europe. GADRI, Global Alliance of Disaster Research Institute, made their commitments to the S&T Roadmap Matrix and proposed to Engage in post-disaster reconnaissance activities; Maximize the regional alliances capacity for regionalization; Be more inclusive, improve access and the role the "do-ers" within the S&T agenda for evidence-based policy making, etc. GCRF, Global Challenges Research Fund, committed to Action 3.1.1 Funded research to encourage grant holders to undertake 7 actions of Priority 1, 4 actions of Priority 2, 1 action of Priority 3, and 1 action of Priority 4. Especially, they have funded 2019 – 2022 GCRF **Equitable Resilience: Ensuring Resilience Enhances the Sustainable Development Goals**, £9m for 10 projects (4.1.4).

Session 2	**Science and Policy dialogue: The case for better data**
Chair **Rapporteur** **Assistant Rapporteur**	Andrew Collins <andrew.collins@northumbria.ac.uk> Massimo Migliorini <massimo.migliorini@linksfoundation.com> Luisa Knoche <luisa.knoche@northumbria.ac.uk>
Summary	A number of key messages came out from the session: **1) Need for more actionable data** We must understand what data are needed, and transform them into concrete actions, and the use of more intuitive data diffusion interfaces (such as geo-referenced maps, visual models, etc.) can support this process. Data can empower local institutions and individuals to take decisions and responsibilities. **2) Need for better communication**

	Communication is a process, not a product. We have to listen to local people, and understand everything that influences their decisions. We have to understand each other's role, and how we can contribute to each other's tasks. Risk reduction initiatives must include assessment of communication from the very start of the process, and different actors must be involved including media, scientists, practitioners, governments, people, local leaders. We need more active public-private partnerships. We do need more consistent messages and terminology, actions-oriented alerts, and we need to target in particular unserved populations particularly where these are known to be the most vulnerable. 3) **Need for a better integration of existing and new data driven and data facilitating technologies and methodologies** This includes earth-observation, radars and grounded observations that are active and highly localized. All devices should be interconnected (pc, laptop, mobile, tablet) to create a participatory global cloud for data analysis and dissemination, though care is needed in the development, adhering to principles of 'do no harm'. We need to develop new methods for disaster mitigations based on collectable and usable data after and before events across these new technologies. **4) Need for more inter-sectorial cooperation** Involvement of local users is crucial, for example through the creation of collaborative maps and web open platforms. **5) Need for more resources and funding opportunities** Resources must be increased and more dedicated to local problems solving. **6) Need to increase local capacities** Academics and disaster experts must be involved to help preventing threats and reducing disaster impacts. We need more scientific and technical skills on DRR, supporting policy and decision makers. We need to understand which data can contribute to DRR, by whom they are collected, which role they can have, and which barriers can affect their usability and interoperability. Data quality, data accessibility, data disaggregation are key elements leading to data interoperability. Vulnerability to environmental hazards must be assessed, including territorial, socio-economic factors and capacities. **7) Need to define, spot and diffuse good practices.**

Session 3	**Science and Policy dialogue: A review of Hazard Terminology and the need for enhancing interdisciplinary collaboration**
Chair **Rapporteur**	Alik Ismail-Zadeh, <alik.ismail-zadeh@kit.edu> Robert Verrecchia <Robert.Verrecchia@phe.gov.uk>
Summary	Since the publication of the Sendai framework there has been good progress moving towards its operationalization throughout the Disaster Risk Reduction Community but much more work is needed and collaborative multisectoral approach is essential. The community has identified the need for universal definitions for hazards. This work will be undertaken by a working group between UNDRR and the International Science Council, and chaired by Virginia Murray. This will be an inclusive endeavor engaging broad stakeholders through crowdsourcing definitions and the development of focused topic specific groups. This project was received well by those in the meeting. There was a suggestion that common metrics may also be of value and this will be considered in taking the project forward. Wenjian Zhang outlined the WMOs priorities and goals, demonstrating a commitment to reducing loss of human life, increasing resilience and adaption and reducing economic impacts from meteorological disasters. Experiences of monitoring and communicating risk of radioactivity following the Fukashima accident were outlined by Noboru Takamura of Nagasaki University

	Markus Reichstein of Risk-KAN outlined the complexity of systems and cascading risks. John Handmer of IRDR discussed the consideration of the business case and economic arguments relating to DRR and highlighted the importance of ensuring that the data we collect reflects what the users and decision makers want. Jonathan Abrahams of WHO highlighted the importance of ensuring phenomena monitored were relevant at the local level and of 'working globally but thinking locally' Ravi Sinha of The Indian Institute of Technology Bombay discussed 'hyper-local' data and the opportunity of data mining digital data. There was a general call for greater collaboration more generally and an appreciation of the interrelatedness of the broad range of hazards. An example was given of linking with ISO to define radio nuclear risks. This cascading risk subject will be the topic of the second phase of the Hazard Terminology project.

Session 4	**Technology for Disaster Risk Reduction**
Chair **Rapporteur**	Katja Samuel (director@gsdm.global) Lucy Jones (lucy.lu@irdrinternational.org)
Summary	The panel highlighted a number of critical messages from the session: **Understanding on Technology for DRR** First of all, it is imperative to focus on understanding risk -monitoring hazards and risk assessment, early warning systems, risk communication and technology solutions for DRR and disaster management. A better understanding on the possibilities and potential of disruptive technologies for DRR solutions - for instance, the Internet of things, artificial Intelligence, big data, drones and robots - should be priorities to enhance disaster prevention, preparedness, response, recovery, social behaviors and social impact. Good practices of technology for DRR should be shared widely. **Strengthening of Technologies for DRR Solutions, Applications and Services** Second, the broad spectrum of stakeholders should strengthen technologies for DRR solutions, applications and services. Opportunities for information and communication technologies for DRR solutions - for instance, monitoring disasters, setting up EWS and sharing alerting messages through multiple platforms - is critical. An increasing amount of DRR-related data, satellite data, products, technological and methodological approaches for monitoring, modelling and visualization on DRR for an acceleration of technology transfer in DRR applications and service is indispensable. **Need for DRR Technology** Third, policies, mechanisms and regulations should be discussed and be able to adapt to technological developments, e.g. appropriate regulation of data use and drones. There is the need for ongoing research, investment and skills development, underpinned by political will. Capacity building in societies and educational activities enable communities to better understand hazards exposure and possible impacts, which is to bridge the gap between technology, risk awareness and human knowledge on the potential and use of these technologies. Strong partnership among stakeholders is important, especially private-public partnership. **New Risks of Emerging Technology** Lastly, disruptive technologies are widely discussed and applied in megacities, autonomous transportation, digital supply chain, etc, but often not in an integrated way. The increased focus on technological risk and vulnerabilities, associated with existing and emerging technologies, is critical as an integral element of DRR solutions. These must

	take account of environmental related risks and their complexity, including on different temporal and spatial scales. Technological risk and disaster impacts can be prevented or mitigated through a comprehensive resilience approach.

Session 5	**Science and Technology for Resilience: Towards Sustainable and Inclusive Societies**
Chair **Rapporteur**	Chair: Shuaib Lwasa - shuaiblwasa@gmail.com Rapporteur: Michael Boyland - Michael.boyland@sei.org
Summary	H.E. América Santos Riveras, Vice-Minister of Science and Technology, Cuba demonstrated the importance of S&T in Cuba DRR and resilience policy and implementation. S&T collaboration enables the country to pursue an integrated approach to DRR, CCA and environmental sustainability thus moving from a reactive to a proactive focus in policy and planning across sectors. Cuba seeks STI that is based on new knowledge, state of art access to information, and the traditional and ancestral knowledge of communities. Toshio Koike, Science Council of Japan, presented the national synthesis model for S&T for DRR and resilience. The national platform is a multi-stakeholder, holistic mechanism for information sharing on S&T, reviewing the status of measures, and designing new measures for DRR. The 'facilitator' plays a key role to build trust and make sense between science/research, policy and practice, education and training actors for stronger collaboration. The platform has led to the 'online synthesis system' – a user-friendly, web-based system for data and information on DRR and resilience that considers all risks and DRR approaches, supporting activities to promote open science. Wenjian Zhang, Assistant Secretary-General, WMO, explained the earth system approach to resilience. The increased forecasting performance and model resolution in recent years, thanks to enhanced science and technology acceleration, was highlighted. Integrated, inter-disciplinary and inter-agency approaches are essential for early warning and other systems. Human losses from disasters are falling, but economic losses are sky-rocketing – this is occurring in parallel with growing urbanization trends. Extreme events increasingly have a domino, or cascading, risk effect. On-going and future S&T efforts include harnessing 'big data' (inc. social media) and 'end to end' R&D to build resilience and operationalize research. H.E. Mr. Mahdi Elyasi, Deputy-Vice President for Science and Technology, Iran, highlighted how Iran are pursuing integrated, systematic approaches towards enhanced performance for DRR and resilience. Specifically, linking DRR and innovation ecosystem systems. Technology plays many roles in DRR, including social media for disaster communication; robots and drones in disaster response (e.g. map impacts, locate people, disperse aid). Iran's approach promotes multi-stakeholder engagement and are enhancing collaboration e.g. with an MOU between V-P for S&T and DRR implementing bodies e.g. NDMO and the Iranian Red Crescent. New technology involves development, adoption, standards, and international collaboration. STI has a systematic role to play: to provide basic needs, to improve quality of life for vulnerable areas, and to empower vulnerable people. Zuzana Harmackova, Stockholm Resilience Centre/Global Resilience Partnership, introduced GRP, a multi-stakeholder network for science, policy, practice and business working for a resilient, sustainable and prosperous future for all. GRP focuses on innovative resilience programmes that influence policy along themes of peace and stability, disasters/DRR, food & water security. DRR and climate risk work focuses on LDCs, and coastal areas and deltas. S&T for DRR needs to tackling the underlying drivers of risk, and not just responding to symptoms. Resilience practice must be systemic, long-term and integrate equity, justice and inclusion principles. For S&T to work towards inclusive and sustainable societies resilience needs to be proactive, systemic and transformative.

	In summary, various models and approaches to S&T for DRR and resilience were highlighted and critiqued. The importance of S&T for resilience is only likely to increase in the future. Key principles that were common across presentations include taking systemic approaches to risk and resilience, including embodying multi-stakeholder engagement, inter-disciplinarity and integrated S&T. Resilience and DRR science, policy and practice must be systemic, long-term and integrate equity, justice and inclusion principles. For S&T to work towards inclusive and sustainable societies resilience needs to be proactive, systemic and transformative. An important aspect of this is the further integration of DRR, climate change and sustainable development approaches – S&T has a vital role to play in this for all goals towards 2030