Chair's Summary[1]

World Bosai Forum, held in Sendai Japan, 25-28 November, 2017

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The concept for the World Bosai Forum emerged at the United Nations World Conference on Disaster Risk Reduction, held in Sendai in March 2015. The aim was for an open and broad forum for civil society, the private sector, academia, media, government and international organisations, to share knowledge and learn from one another, to help advance the goals of the Sendai Framework for Disaster Risk Reduction, which is the international agenda for action agreed at the World Conference, and last but not least, to capitalize on the experience so painfully gained as a result of the 2011 Great East Japan Earthquake and its massive tsunami over 6 years ago. The Japanese word "bosai" means the holistic approach to reducing losses and damage, encompassing all aspects of disaster management, from prevention to recovery. To strengthen international linkages, the Forum has partnered with the long-established International Disaster and Risk Conference Davos. It has also benefited from its co-location with Japan's national events on promoting disaster risk reduction, the Bosai Kokutai conference and the Bosai Industry Fair in 2017 which together were attended by 10,000 participants.

I am happy to report today that this first World Bosai Forum has amply succeeded in its aims. It has attracted over 900 participants including people from over 40 countries or regions. There were 50 specialized sessions spanning diverse aspects of disaster risk, so many in fact that numerous parallel sessions were required. In addition to these sessions, there was a one-day pre-forum festival, 12 technical exhibitions, dozens of poster presentations, 26 short "flash talks," and study tours and excursions to nearby tsunami-affected areas.

From highly motivated school children, leading experts and captains of industry and government we have heard how different factors must be linked and blended to properly protect our societies – including science, technology, culture, finance, education, leadership, and community action. And we have heard time and again the many positive messages of recovery, reconstruction and renewal, and the recognition that we can accept and manage Nature's wrath along with her bounties.

I was greatly impressed by the Pre-Forum Festival event on Saturday 25 November which was attended by almost 700 people. It sought to show the human ways we respond to, and interpret and learn from, disaster events and disaster risk, through personal initiatives and learning, courageous leadership, and cultural production by way of music and dance. The projects and insights of the students were illuminating and encouraging, and demonstrated that disaster policies should never forget the potential of young people to engage in and help advance the safety of our communities – as one

[1] The summary was drafted by Forum Rapporteur Dr Reid Basher, New Zealand-based Visiting Professor, International Research Institute of Disaster Science, Tohoku University, drawing on session reports prepared by session organisers and with the assistance of the Institute's Dr Yuichi Ono and Dr Daisuke Sasaki.

group said – for 1000 years into the future. The outspoken efforts of the Mayor of Kuroshio to dispel negativism and face up to new projections of 34-meter tsunamis for his town was a lesson in leadership. The Festival also demonstrated how music, song and dance remained accessible in the aftermath of disasters, providing essential and enduring support to individuals and communities at times of adversity, and sustaining values of normality, hope and practical action over long periods.

The opening sessions of the main events described the 2011 disaster and the enormous efforts to recover from it, and the many lessons learned. Collaboration mechanisms were stressed as critical for the effective use of financial and organizational capacities in both the public and private sectors, and to develop community commitment and acceptance. Collaboration, built on foundations of trust, is reflected in Japan's principle of "self help, mutual assistance, and public assistance", and it is critical for our preparedness to face future events. Constant interaction is needed to develop knowledge bases and to guide and communicate scientific research to help policymakers and managers in their work. This should include awareness that the next disaster may be completely different, such as a volcanic eruption.

The need for continued public awareness raising and education was frequently mentioned, along with the task of creatively recording and communicating the intensely-felt human experience of disasters. Japan has a long history of large-scale disasters and innovation in disaster risk reduction, while also recognising the many shortcomings still to be addressed. Globally, disaster risk is seen as a key issue to address in sustainable development agendas, as is elaborated in the Sendai Framework.

Among the lessons from the 2011 event were: the importance of volunteer coordination; the development of staged risk-zoning of coastal areas; proactive efforts to rebuild old industries and stimulate new ones; the use of business continuity plans as a tool to upgrade business resilience; the importance of community social capital and of activities to sustain it; and the substantial upgrading of early warning and evacuation capabilities that has been achieved. All of these things reflect the "build back better" principle. Lastly, it was argued that we need to more systematically develop a "risk culture" where risk is incorporated naturally as a consideration in all aspects of life and society, and where everyone accepts their responsibility to play a part, however small, in prevention and preparedness.

Many valuable contributions were made in the multiple specialized sessions; here I endeavour to summarise the highlights under three headings: science and technology; policy and finance; and society and culture. Successful disaster risk reduction requires all three operating together; like a three-legged stool, it falls down if one leg is missing.

Science and technology

Scientific knowledge is the foundation for understanding and action. Technology provides the tools to monitor, respond to, and mitigate risk. Exciting new science and technology included major advances in dynamic modelling of tsunami flows and inundation including: the transport of debris and sediments and the resulting damage impacts, partly as a result of very high speed computing capabilities and the availability of extensive data such as that generated by Japan's land-sea monitoring network of

seismometers, ocean buoys and ocean floor pressure sensors; a new concept for potentially predicting earthquakes an hour ahead; the use of drones for different aspects of disaster risk reduction; and big-data analysis of social media activity and surveillance camera imagery. Some of these technologies will require the development of appropriate regulation for effective application.

Applications of space-based technologies continue to progress and can be directly integrated into systems modelling, for example in water hazards management. Increasingly, scientific and technological advances are being forged through multi-disciplinary, multi-institute collaborations, including close cooperative work with the private sector and the application of the principle of client participation to clarify the purpose and design of the research. These approaches are also valuable to risk communication, early warning systems and multi-hazard assessment. An interesting field under development is the integration of ecosystem principles to disaster risk reduction; this is termed eco-DRR.

Policy and finance

Coordinated effort on disaster risk requires sound policies to guide action and sufficient finance to support action. Here, we mainly considered two settings, firstly, developing country integration of risk reduction into sustainable development, and secondly, the 2011 Great East Japan Earthquake recovery. The value of disaster risk reduction investment is well recognised, as shown by significant and continuing investments in resilient infrastructure by countries and major donors, yet economics modelling of disaster impacts and ex-ante disaster risk reduction investment remains a work in progress, with results affected by the model choice and availability of input data. Studies are underway to develop investment strategies that are appropriate to the particular circumstances, of the country, the hazard, the sector and the risk-reducing intervention. Regional cooperation plays an important role in information sharing and support of high-risk low-capacity countries, as in typhoon warning for example. A key concept is that disaster risk reduction is an investment and not merely an expenditure.

Risk transfer and insurance can play an important role in recovering from the impacts of disasters, for governments, firms and households. Efficient risk transfer and insurance is highly dependent on quality science for the modelling and assessment of risks. International collaboration has facilitated the development of cooperative catastrophe insurance schemes at regional levels, for example for Caribbean country governments. A potent tool developed for the Tohoku recovery has been to link credit availability for firms to their adoption of well-structured business continuity plans; this incentivising approach enhances firm performance as well as community resilience. Regular systematic surveys of firms' status has been valuable to monitor and guide the recovery process. The build-back-better concept has been an important overall principle in the Tohoku recovery, for example underpinning the staged coastal protection approach, the raising of roads and embankments and the relocation of housing areas, as well as being central to the process of engagement with communities and other stakeholders.

Technological hazards are generally increasing and can pose significant problems of complexity, as illustrated by the nuclear plant failure in 2011, but there is plenty of past

experience of technological hazards to draw upon to guide disaster risk reduction efforts. Improvement in risk management and risk reduction for nuclear plants require a combination of high technological capacity and strong involvement of external stakeholders such as universities and particularly local communities, and the availability of objective information on risks.

Society and culture

Disaster risk and its reduction are always mediated through the actions of individuals and groups operating in social organization and under prevailing culture and belief systems. I have already noted the insights of the Pre-Forum Festival in this respect. A central issue for many sessions was the differentiated interests and needs of groups, and the impact of exclusion from decision-making processes. To ensure that disaster risk reduction is effective and equitable, all relevant constituencies should be represented in decision-making and leadership. Failure to do so was seen as a potential risk driver. Special measures are needed to overcome widespread cultural practices that exclude women or discourage their participation. Careful consideration needs to be given to the needs of poor people, the elderly, people with disabilities, those with psychiatric illness, foreigners, and any others disadvantaged through any systemic reason.

Another perspective proposed was to present citizen involvement in bosai activities as a positive and effective practice to be encouraged in normal times as an ongoing mechanism for communication and implementation, for example for neighbourhood and school-based activities, and for fostering the participation of children and young people. Existing structures of social capital, such as university and school groups, volunteer organisations, and faith-based organisations, can play valuable roles in expanding community-based efforts in risk reduction and in response and recovery phases. The education sector needs to stress the role of risk in sustainable development and to integrate risk reduction into curricula. In the health sector, specific techniques are being developed to address the needs of mental health support in disaster preparedness and response, and discussions on improved approaches in nursing are underway. A number of points were made for communicating people's experience of disasters, such as through dialogue with disaster-affected people, a strong will and passion in conveying our lessons, and the proactive use of traditional and new forms of the media to communicate underlying risk reduction messages at times when public interest or concern in disasters is high.

To conclude, let me recall the words of Professor Torahiko Terada after the Great Kanto Earthquake of 1923: "Disasters strike when we forget them". This saying is well known to us Japanese. Now the World Bosai Forum has said, instead, "We can handle disasters because we do not forget them."

I thank you.