

Tokyo Statement 2023

“Transforming Society to Become Resilient and Sustainable beyond Catastrophic Disasters”

Preface:

The International Conference on Science and Technology for Sustainability 2023 - Transforming Society to Become Resilient and Sustainable beyond Catastrophic Disasters - was held on September 7-8, 2023. It was held in a hybrid manner, at the auditorium of the Science Council of Japan and online, with 81 in-person and 419 online participants from 12 countries and regions. To commemorate the 100th anniversary of the Great Kanto Earthquake, two goals were set for the conference.

The first was to reflect on what Japan has experienced and learned in the 100 years since the disaster, as well as what countries and regions devastated by huge earthquakes, tsunamis, and giant cyclones have experienced, and to share this information widely to provide hints for international cooperation.

The second was to propose measures to build up the capacity of the society as a whole to overcome a catastrophic disaster(s) that would cause major changes in the state of the nation and to transform it into a society that can better recover from it.

Theme 1 : Experiences of Catastrophic Disasters and Transformation

Catastrophic disasters occur infrequently, but when they do occur, they are devastating to the affected countries and regions. Through examining experiences of the Great Kanto Earthquake in 1923, the Ashgabat Earthquake of 1948, and the Cyclone Bhola of 1970, the participants gained the following insights.

Session1-1 : The Great Kanto Earthquake and Recovery

This session first detailed the 1923 Great Kanto Earthquake, which was a catastrophic disaster in modernized Japan after the Meiji Revolution started in 1868. The session discussed its restoration processes. Closely examining historical documents written in English, the session also looked at the messages for the international community. The importance of storytelling was emphasized. Then an overall picture of the centennial development of disaster risk reduction policy in Japan was reviewed. This included reconstruction from the World War II, which destroyed Tokyo and almost all other major cities in Japan. In the pursuit of economic growth, the infrastructural restoration and development during this period in some respects sacrificed the virtues of the original plan such as earthquake and fire resistance, integrated city planning, and the dignity as the capital city, though the policy development was comprehensively formed well to cope with various natural hazards. The sessions concluded by noting that we need to refine the methods of governance and investment for resilient and sustainable futures.

Session 1-2 : Catastrophic Disasters and International Cooperation

Catastrophic disasters are not frequent for individual countries. Such unfortunate events are always claimed as "unexpected & unprecedented." However, the history of humankind has taught us that such events happen from time to time on our earth and that people have Built Back Better afterward. The latest sciences can indicate where the risks are. Scenario-specific catastrophic planning is effective. An organizational assessment of the relevant localities and regions, focusing on human resources with a systems view, will be a good preparation. There is a definite need for countries to share and learn from these bitter experiences and join hands to prepare and overcome future events so that there will be less chances of catastrophic tragedies. International cooperation is a must. It is never too early to prepare.

Theme 2 : Pathways to Overcome Catastrophic Disasters

As science has advanced, future projections of catastrophic disasters are now shared with society. Nevertheless, it is impossible to completely deter the damage caused by catastrophic disasters. In terms of the direction of change that society needs to take and the role of science and technology in achieving this change, participants emphasized the followings:

Session 2-1 : Projected Catastrophic Disasters

Advances in science and technology make it possible to physically analyze hazards such as earthquakes, tsunamis, and extreme weather events that have occurred in the past, and to estimate hazards that will occur in the future with their potential impacts. However, estimating hazards that have never been experienced, such as giant earthquakes and climate change, contain uncertainty and error. It is also necessary for scientists to communicate such uncertainty to society and consider how to share risk-reduction technologies with countries newly experiencing climate threats.

Because public investment is limited, private sector investment needs to be encouraged. To facilitate this, Japan has implemented measures, including financial mechanisms that provide incentives, such as reduced interest rates on loans, for the private sector to increase investment in disaster risk reduction, including the development of solid business continuity plans. Scientists' contribution to the National Platform for Disaster Risk Reduction is a key for policy making process. Laws and regulations backed by science and technology, such as building codes and renovation regulations, are also effective instruments for disaster risk reduction by governments. However, they are ultimately implemented by the private sector. Individuals and organizations can cover remaining disaster risks through financial instruments such as insurance, bonds, loans, and microcredit, or appropriate combinations of these instruments.

Session 2-2 : Transforming Societies to Overcome Future Catastrophic Disasters: What to Protect and How to Recover and Rebuild

Our current and future challenges demonstrate the urgent need for greater investments in infrastructure. These include urban improvements such as developing smart cities, governance, leadership, coordination mechanisms, and digital transformation that enable effective disaster risk management and ensure no person is left behind. Social inequities, climate change, and other challenges require proactive, collective action by communities, governments, academia, industries, and civil society to remedy the determinants of risk and promote anticipatory action. These interdependencies are the foundation of societies' abilities to manage systemic risks. Protective health, education, and other systems build community resilience and improve community well-being. In this sense, we reaffirm national governments' efforts to achieve an innovative transition with multi-level governance strategies to build the capacity to leverage innovative technologies. Furthermore, since disasters know no borders, fostering transnational resilience and learning is critical.

Session 2-3 : Science and Technology for Supporting Social Changes

We do not know exactly when a catastrophic disaster will strike or on what scale, but once it occurs, it will leave a huge losses and damages. It is a global challenge for science and technology to share knowledge on potential social impacts, to clarify what kinds of social issues may arise and to suggest how stakeholders should confront them by integrating scientific and indigenous knowledge. Here, Information and Communications Technology (ICT) can be a key. In particular, the cyber world of digital twin technology will simulate what would happen in case of real catastrophic disasters. Maximizing the use of information infrastructure is critical to strengthen public-private partnerships to make trans-border collaboration possible. This requires the development of an information supply

chain supported by a geospatial foundation that facilitates social transformation to overcome catastrophic disasters.

Research Working Group (Young and Middle Career Scientists)

The transformative capacity of resilience is a key concept for the academic community in disaster risk reduction research, but its structure and function are yet to be fully elucidated. Further research is needed to clarify the mechanism of resilience capacities, particularly how and under what conditions the social transformation can be promoted. For example, it is necessary to solve the possible dilemma that investment in disaster prevention would reduce the recovery and transformative capacities of society. A study on the governance system is also needed; one, that promotes social transformation and mitigates its negative impact, such as the forced migration of people at risk. The ex-ante social transformation through investment for future disaster risk reduction should also be explored. In addition, the conditions of 'well-being' under the disaster risk need to be identified for better transformation.

Recommendations - What Should We Do with the Remaining Time?

In order to acquire resilience to overcome catastrophic disasters of the scale estimated by the government of Japan, all stakeholders should continue their efforts not only to prevent damage but also to focus on scientific studies and practices promoting disaster response and recovery. Science Council of Japan issued a Recommendation entitled "Transforming Society to Become Resilient and Sustainable beyond Catastrophic Disasters" on August 29, 2023. We fully agree with the measures clearly described in the Recommendation, which are in line with the four priorities for actions in the Sendai Framework for Disaster Risk Reduction 2015-2030.

(1) Elucidating disaster risk

- To establish science and technology for improving disaster resilience and the sustainability of societies with three ultimate goals: 1) maintaining and improving the physical, mental, and social well-being of individuals, 2) reinforcing the capacity for mutual support in communities; and 3) the coherent realization of disaster risk reduction, climate change adaptation, and sustainable development in society.
- To develop a disaster management system with an all-hazards approach, conversing multi-disciplinary knowledge covering all phases of disaster management, including forecasting, prevention/mitigation, early warning, emergency response, and recovery/restoration.
- To realize the consilience of knowledge for disaster resilience using information infrastructure to disseminate to society according to the Recommendation titled "Developing an Online Synthesis System (OSS) and fostering Facilitators to realize consilience" from the Science Council of Japan in 2020.

(2) Establishing new governance to manage disasters

- To establish the governance contributing to the transition to an autonomous, decentralized, and cooperative society as suggested by the irreversible changes caused by the COVID-19 pandemic.
- To ensure transnational resilience, where multiple countries cooperate in addition to improving the national resilience of land and sea, sovereignty, and the people of each country.

- To stimulate risk communication on catastrophic disasters nationally and globally, starting with discussions at the Science Council of Japan.

(3) Ensuring investment in financial expenditure, capacity development, and technological development during disasters

- To establish the role of investment in reducing human activities and asset accumulation at risk exposed to disasters such as medium to long-term spatial reorganization plans and maintenance of critical social infrastructure.

- To promote the concentrated investment in (1) improvement of qualitative and quantitative enhancement of market services to improve self-help capacity and (2) enhancement and diversification of insurance and mutual aid programs to provide mutual assistance aid based on the system.

- To enhance individual and grassroots community resilience capabilities to deploy strategic capacity development programs to further respond to disasters more efficiently, and effectively utilize digital transformation (DX).

(4) Establishing proactive measures to enable "Build Back Better"

- To reinforce the transformative capacity to further build a new society after a disaster with the awareness that "in an emergency, we can only do what we normally do," as well as a system that promotes proactive measures using DX.

- To present a vision of society after a catastrophic disaster (sustainability, green energy/zero carbon, national spatial planning, transition to an autonomous decentralized and cooperative community in terms of finance, economy, industry, international cooperation, etc.)