

## International Conference on Science and Technology for Sustainability 2023

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

#### Objective

Considering disasters in the past, and those in the years ahead, it is evident that societies across the world need to enhance their capacity to rebuild from catastrophic damage and transform themselves into societies better able to recover, even when this results in significant changes in the state of a nation. On the occasion of the 100th anniversary of the Great Kanto Earthquake, it is important to reflect on Japan’s experiences and its accumulated knowledge over the past century, alongside the lessons learned by the experiences of other countries and regions affected by massive earthquakes, violent tsunamis, and giant cyclones. Our goal is to share these valuable insights with the international community and transmit them efficaciously to the younger generation, with the aim of fostering international cooperation.

Societies are changing dynamically, and our experience of the past 100 years may not necessarily provide effective strategies for future disaster management. Furthermore, the COVID-19 pandemic and Russia's invasion of Ukraine have both exposed various latent risks that pose threats, spreading throughout the world driven by globalization. People’s health, food and energy supply are at stake, economies are weakened, and concerns have arisen regarding international peace and order. In the wake of such global conditions, the Turkey-Syria earthquake disaster that occurred in February 2023 claimed the lives of 57,658 people and resulted in losses estimated at US\$110 billion. Therefore, multi-sectoral support is needed.

In 2015, the international community set three goals for 2030: the *Sendai Framework for Disaster Risk Reduction*, the *2030 Agenda (Sustainable Development Goals)*, and the *Paris Climate Agreement*. We believe that achieving these goals, through close coordination to ensure coherence, and transforming our current societies to be sustainable, resilient, and inclusive are the key to more effective recovery after catastrophic disasters. The theme of this forum is to explore the role of science and technology in advancing this transformative process.

Based on the interim review of the *Sendai Framework for Disaster Risk Reduction* released in May 2023, this forum will discuss the following themes and consolidate the outcomes in the integrated session. Proceeding from this, we will produce the Tokyo Declaration 2023, and disseminate it to the world.

## **Theme 1: Experiences of Catastrophic Disasters and Transformation**

### **1. The Great Kanto Earthquake and recovery**

The Great Kanto Earthquake occurred on September 1st, 1923, caused the most devastating damage (105,000 people died) in Japan since the Meiji period (1868-1912). This earthquake was also the first major disaster hit the capital during the process of modernization of Japan after the Meiji period. The government at the time introduced new approaches and philosophies to reconstruct the capital and surrounding areas from the enormous damage. In addition, hereafter, September 1st was designated ‘Disaster Prevention Day’ in commemoration of the disaster and as a continuation of disaster prevention education from generation to generation. This session will discuss the achievements made in the past 100 years and challenges that still need to be addressed.

### **2. Catastrophic disasters and international cooperation**

Numerous cases provide evidence that catastrophic disasters, although infrequent, have a devastating impact on countries and regions when they occur. The challenge we face is how to connect our experience of such events with proactive disaster-risk reduction efforts for the future generations. In this session, we will explore this issue from two perspectives: scientists actively involved in enhancing catastrophic disaster preparedness and those who analyze the situation from a third-party standpoint.

## **Theme 2: Pathways to Overcome Catastrophic Disasters**

### **1. Projected catastrophic disasters**

The Earthquake Research Committee of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) has published long-term forecasts of earthquake occurrence in the form of probabilities for the next 30 years; seismic motion prediction maps have been produced based on these forecasts. In addition, the Cabinet Office and local authorities have prepared damage forecasts and hazard maps for possible earthquakes. Earthquake early warning and tsunami warning systems designed to operate upon receiving information about the occurrence of an earthquake have also been put to practical use. In recent years, the establishment of event attribution methods has shown that climate changes cause extreme rainfall events, further suggesting that other forms of extreme weather events, other than low-temperature hazards, have been more frequent. Large, ensemble climate simulation data have also predicted a future increase in

extreme rainfall events, which has brought about drastic changes in our approaches to river planning and flood control. This session aims to share knowledge on the potential catastrophic damage that could occur in the future.

## **2. Transforming societies to overcome future catastrophic disasters: what to protect and how to recover and rebuild**

It is impossible to prevent the damage caused by catastrophic disasters entirely. Therefore, we must enhance our "resilience," in addition to preparedness and predictability. Resilience is the ability to overcome damage from disaster. More effective recovery includes improving emergency response following the onset of a disaster and enhancing the recovery and reconstruction process. In this session, we will discuss the following topics, the aim being to enable our changing societies to overcome catastrophic disasters: activating risk communication, and transitioning to an autonomous, decentralized and cooperative society that reduces exposure and vulnerability to hazards. It is also essential to increase investment in the qualitative and quantitative upgrading of market services to improve self-help, mutual-help and mutual-help capability. It is essential to increase society's overall capacity to continue regular, uninterrupted activity and services (business continuity) even in the event of catastrophic damage and to prepare for recovery and reconstruction prior to such disasters (proactive recovery capacity).

## **3. Science and technology for supporting social changes**

Transformation into a resilient society that is able to overcome catastrophic disasters requires that each individual is aware that their own choices regarding risk may not always bring favorable consequences (awareness of the dignity of risk). With this recognition, all members should strive to comprehend the risks of catastrophic disasters accurately and respond appropriately. Academia must play its part in empowering and supporting this. Though at different temporal and spatial scales, catastrophic disaster, development and the environment, as well as climate change are closely interrelated, albeit in different spatio-temporal scales. This session will view this as systemic risk and discuss the integration of knowledge that links resilience and sustainability, climate change mitigation and adaptation.