

INTRODUCTION

On March 11, 2011, an earthquake of magnitude 9.0 occurred in the Pacific Ocean off the coast of Japan's Tohoku region. The quake, which became known as the Great East Japan earthquake (GEJE), shook the ground as far away as western Japan and lasted for several minutes. Half an hour later, a tsunami of unprecedented force broke over 650 kilometers of coastline, toppling sea walls and other defenses, flooding more than 500 km² of land, leveling 130,000 houses and severely damaging 260,000 more, and washing away entire towns and villages. The devastation left some 20,000 people

dead or missing. It's hard to imagine, but the loss of life and property could have been far greater if Japan's policies and practices had been less effective. In this regard, and as Japan has shown for the past 2,000 years, learning from the past is key. The disaster-prone country has used historical lessons to improve its policies, laws, regulations, investment patterns, and decision-making processes, as well as community and individual behaviors. Investing in preparedness and a strong culture of prevention ultimately made all the difference when the GEJE struck.

The Meiji-Sanriku Tsunami of 1896, an event of similar magnitude, killed 40 percent of the population in the affected zone, whereas the GEJE claimed only 4 percent. This drastic reduction in casualties was not due to happenstance, but rather was the result of a sustained effort to instill a culture of resilience and prevention based on continuous learning. During the GEJE, trains stopped operating immediately (thanks to an early earthquake detection system, which alerted 270 railway lines) and the majority of people in affected regions evacuated in an orderly fashion. In less than a week after the disaster, access to most cities and ports was restored and 470,000 people were housed in shelters. A system of pre-agreements with sister towns and the private sector ensured prompt interventions without bureaucratic delays. These life-saving responses were all products of Japan's advanced Disaster Risk Management (DRM) system, built up over nearly 2,000 years of coping with natural risks and hazards.



40% of the population has been killed by The Meiji-Sanriku Tsunami of 1896



4% of the population has been killed by the Great East Japan earthquake in 2011

The main elements of that DRM system are:

- investments in structural measures (such as reinforced buildings and seawalls), cutting-edge risk assessments, early-warning systems, and hazard mapping—all supported by sophisticated technology for data collection, simulation, information, and communication, and by scenario-building to assess risks and to plan responses (such as evacuations) to hazards;
- a culture of preparedness, where training and evacuation drills are systematically practiced at the local and community levels and in schools and workplaces;
- stakeholder involvement, where the national and local government, communities, NGOs, and the private sector all know their role;
- effective legislation, regulation, and enforcement—for example, of building codes that have been kept current;
- the use of sophisticated instrumentation to underpin planning and assessment operations.

These efforts don't stop tragedy from occurring. Despite its extensive preparations, Japan had not foreseen an event of this magnitude and complexity. The GEJE event was the most powerful earthquake ever known to have hit Japan and the costliest earthquake in world history—Japan's Cabinet Office has estimated the direct economic cost at ¥16.9 trillion (\$210 billion). Particularly catastrophic were the effects of the accident at the Fukushima Daiichi nuclear power plant, which compromised Japan's energy supply, imperiled its environment, and threatened public health. Additionally, the shock to major Japanese industries reverberated through supply chains around the world. But without a culture of preparedness and key investments in risk management, the effects would have been much, much worse.

\$210

billion is the estimated direct economic cost of the Great East Japan Earthquake (GEJE)

CONCLUSION

Japan's historical experience, can serve as a lesson for the rest of the world. The global cost of natural hazards in 2011 has been estimated at \$380 billion—resources that could have been used in productive activities to boost economies, reduce poverty, and raise the quality of life. No region or country is exempt from natural disasters, and no country can prevent them from occurring. But all can prepare by learning as much as possible about the risks and consequences of devastating events, and by making informed decisions to better manage both. Disaster management is increasingly important as the global economy becomes more interconnected, as environmental conditions shift, and as population densities rise in urban areas around the world. As the GEJE showed, proactive approaches to risk management can reduce the loss of human life and avert economic and financial setbacks. To be maximally effective, and to contribute to stability and growth over the long term, the management of risks from natural disasters should be mainstreamed into all aspects of development planning in all sectors of the economy and be informed by local experience, context, and risks. In an unexpected sort of way, learning from the past can inspire innovation.

1. Koinobori, traditionally flown on Children's Day (May 5) to celebrate children's happy growth



CREDITS AND LINKS

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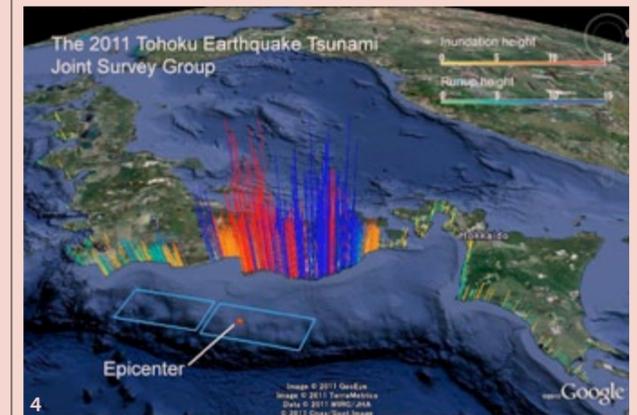
TOHOKU

AREA
25,826.20 sq mi
 POPULATION
9,335,636
 DENSITY
360/sq mi



20,000
 people dead
 or missing
 after the Great
 East Japan
 earthquake
 (GEJE)
 occurred
 in the Pacific
 Ocean off the
 coast
 of Japan's
 Tohoku region

The disaster-prone country has used historical lessons to improve its policies, laws, regulations, investment patterns, and decision-making processes, as well as community and individual responses



SOURCES

- 1 Kazujoshi Nomachi, 2011
- 2 Government of Japan 3 Ranghieri, F and Ishiwatari, M, World Bank, 2014
- 4 Google Maps

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TOHOKU, Japan

LEARNING FROM CRISES

In collaboration with MIT
 SA+P
 senseable city lab:::

