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Note:

Learning from Megadisasters in Japan: Sharing Lessons with the World

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The experience of the Great East Japan Earthquake (GEJE) can provide indispensable lessons for countries vulnerable to disasters around the world on how to strengthen their capacities to reduce disaster risks. This note assesses how the lessons from the disaster have been shared with the world by examining programs implemented by the World Bank and the Japan International Cooperation Agency. These organizations have conducted knowledge management activities, which holistically cover related sectors. The World Bank recognized that lessons from the Great Hanshin-Awaji Earthquake had been lost from the international perspective and that ones from the GEJE needed to be collected and secured. A joint project between the World Bank and the Japanese government produced the report "Learning from megadisasters: Lessons from the Great East Japan Earthquake," which is widely used as a reference document for the disaster. This project shared lessons with policymakers, decisionmakers, practitioners, academia, and civil society organizations through knowledge exchange programs. The Japan International Cooperation Agency invited government practitioners and experts from developing countries to visit disaster-affected areas in the Tohoku region and learn lessons from the disaster. On the 10th anniversary of the disaster, reports on recovery experiences are being produced, including this special issue. It is expected that Japan will expand its efforts to share recovery lessons with the world.

Keywords: disaster risk reduction (DRR), Great East Japan Earthquake, Great Hanshin-Awaji (Kobe) Earthquake, Japan International Cooperation Agency (JICA), World Bank

1. Introduction

Disasters are unfortunate events, but they create an opportunity to promote disaster risk reduction (DRR) for future events. Central and local governments, local communities, civil society organizations, and the private sector can strengthen their capacities to reduce disaster risks by learning from disasters [1–6]. The Sendai Framework for DRR stresses that lessons from disasters are useful for improving response and recovery systems [7].

Due to its severity, complexity, and widespread nature, the Great East Japan Earthquake (GEJE) of March 11, 2011, can provide the world with indispensable lessons [8–11]. While we cannot change the fact that the GEJE caused unprecedented damage of 16.9 trillion JPY, or some 150 billion USD, and a death toll of over 20,000, we can change the future by learning from the disaster.

In April 2011, the Japanese government quickly established the Reconstruction Design Council, an advisory panel made up of intellectual figures, in response to the GEJE. In the Council's recommendation report submitted to the prime minister in June 2011, the first principle of reconstruction design stipulates "To record the experiences of the GEJE permanently, to analyze them scientifically by a wide range of academics, to transfer lessons to the next generation, and to disseminate the lessons domestically and internationally" [12].

Japanese organizations have implemented this council's recommendation. The country disseminated worldwide knowledge and expertise acquired through the GEJE at the Third International Conference on DRR, which was held in Sendai in 2015, and adopted the Sendai Framework for DRR [13]. Local governments in the Tohoku region established museums to share lessons and transfer their experiences to the next generations.

This note assesses how the lessons from the GEJE have been shared with the world by examining the programs implemented by the World Bank and the Japan International Cooperation Agency (JICA). Since Japan hosted the Annual Meetings of the World Bank and IMF in 2012, the Japanese government and the World Bank agreed to

cooperate on sharing the lessons learned from the GEJE. In accordance with this agreement, the World Bank and Japan have started collaborating on knowledge management activities that encompass various disciplines and sectors, such as DRR, infrastructure, urban, environment, finance, and health. A wide range of ministries, organizations, academics, private sector entities, and civil society organizations in Japan supported these activities. Also, the JICA, which is the agency that implements official development assistance in Japan, has shared lessons with developing countries, mainly through technical cooperation projects.[1]

2. The Process of Sharing Lessons from Disasters

2.1. Using Lessons from the Kobe Earthquake to Strengthen DRR Systems

This subsection examines how Japan used the lessons from the Great Hanshin-Awaji (Kobe) Earthquake in 1995 to prepare for disasters and reduce the damage from the GEJE. The earthquake, which caused the disaster in Kobe, measured magnitude 7.3, killed over 6,000 people, and damaged over 60,000 houses. The Kobe Earthquake disaster was the first one to claim more than 1,000 lives since the Isewan Typhoon disaster in 1959. This disaster showed that urbanization and development activities over the previous decades had changed the characteristics of disasters in Japan, and that the country needed to improve its DRR systems to respond to the evolving disasters.

Government organizations, civil societies, and the private sector could learn useful lessons from the disaster and strengthen DRR systems. The Japanese government created the position of disaster management minister and the leading body of disaster management in the Cabinet Office. Infrastructure and buildings were retrofitted in accordance with the latest building codes. Expert teams for rescue and response operations were established. Local governments agreed to support each other in the case of a disaster. Civil society organizations and volunteers began engaging in helping people affected by disasters. Meanwhile, the government enacted and revised legislation to support these evolutions.

During the GEJE, DRR system improvements were able to mitigate the damage [14]. Crucial transport structures could withstand the shaking and were reopened within a week. This was because infrastructure agencies had retrofitted all bridges on national highways and railways before the earthquake. The agencies recognized that retrofitting crucial transport facilities was one of the most important lessons from the Kobe Earthquake [15]. Collapsed highways took a long time to reconstruct and disturbed rescue and rehabilitation operations following the Kobe Earthquake.

The government authorities in charge of infrastructure, health, police, and fire management established expert teams in diverse sectors, such as engineering, medical rescue, and search and rescue, following the Kobe Earthquake [16]. These expert teams played crucial roles in emergency operations in the wake of the GEJE [17]. Ministries had prepared for disasters before the GEJE by conducting drills, establishing roster systems, and developing secretariats and chains of command. Once the disaster happened, engineer teams conducted damage assessments and supported local governments in rehabilitating damaged structures. In 1995, the health ministry established the Disaster Medical Assistance Team (DMAT), consisting of medical doctors, nurses, and coordinators. In the Kobe Earthquake, some 500 people could have been saved if medical treatment had been available more promptly. In response to the GEJE, about 380 DMATs provided medical treatment in the devastated areas.

Several organizations have produced datasets or records of the lessons learned from the Kobe Earthquake disaster and shared them on websites in Japanese. For example, the Disaster Management Office, Cabinet Office created the database "Report on lessons from the Great Hanshin-Awaji Earthquake" in 1999 [18]. The database aims at compiling actual disaster situations and response activities from over 10,000 documents and sharing useful information with central and local governments to strengthen their capacities to reduce disaster risks. This database covers 4 phases: (i) initial response up to 72 hours following the earthquake, (ii) emergency response from 4 days until 3 weeks, (iii) rehabilitation from 4 weeks until 6 months, and (iv) recovery from 6 months. The Hyogo Prefecture Government published a report consisting of 100 lessons on the recovery from the Kobe Earthquake [19]. It covers the four perspectives of "life," "living," "creation," and "support" and is expected to be used by ordinary people, local communities, private companies, and government organizations to improve DRR measures. The Great Hanshin-Awaji Earthquake Memorial Association recorded the recovery progress after the earthquake and produced 10 volumes of reports, 1 each year for 10 years [20]. The reports comprehensively record the long-term process of recovery. The Kobe City Government published records of the city's recovery efforts as well [21].

2.2. The Joint Project of the World Bank and Japan

The World Bank, in collaboration with the Government of Japan, launched the research project "Learning from Megadisasters: Lessons from the Great East Japan Earthquake" in October 2011 [22]. The project aims to compile lessons from the disaster and share them with the world. The World Bank collected and analyzed information, data, and evaluations on measures conducted by various organizations.

The World Bank staff recognized that the lessons from the Kobe Earthquake had been lost and planned to ensure the accessibility of crucial lessons from the GEJE [23]. For many people around the world, it was a missed opportunity, as they could have learned from the contents of

1. The views expressed in this paper are those of the authors and do not necessarily represent the official positions of their organizations.

these documents and reduced the damage from disasters. While various organizations and researchers have shared the lessons at international events, the papers, journals, and documents compiling lessons from the Kobe Earthquake were published in Japanese. Practitioners and experts in other countries were unable to easily consult the knowledge gained from the disaster.

The program of knowledge management enabled the sharing of lessons from the GEJE with the world. Some 800 experts, practitioners, and researchers in 8 developing countries participated in training programs. In addition, the disaster management minister and some 50 parliament members in Uganda and senior government staff joined these programs. Some 1,200 practitioners joined virtual discussions at the Community of Practice, which was established as a platform for knowledge exchange on the Internet [4].

The final report published in 2014 has been widely used as a reference document for the GEJE [22]. The report had been downloaded more than 23,000 times from the World Bank's website as of May 2021 and referred to in 148 documents, according to Google Scholar. The final report compiled 36 knowledge notes identifying 199 lessons in 7 thematic chapters: (i) structural measures; (ii) nonstructural measures; (iii) emergency response; (iv) reconstruction planning; (v) hazard and risk information and decision-making; (vi) economics of disaster risk, risk management, and risk financing; and (vii) recovery and relocation. The report covers diverse sectors, such as infrastructure, urban planning, logistics, health, gender, education, and energy. Some 50 experts from governments, academia, international organizations, civil society organizations, and the private sector prepared the knowledge notes.

The Japan-World Bank Program for Mainstreaming Disaster Risk Management was established in 2014 to connect Japanese and global expertise in DRR with developing countries. The program continues to produce sector-specific reports covering lessons from the GEJE and organize learning events for decision makers and practitioners by using these products. The program contributes to supporting developing countries mainstreaming DRR by including Japanese experience and technology in World Bank projects.

2.3. JICA Programs

The JICA started sharing lessons from the GEJE through training courses and technical cooperation projects in the immediate aftermath of the GEJE, and supporting recovery assistance through connecting the disaster-stricken areas in the Tohoku region with ones in developing countries. For example, in 2019, 341 trainees in 30 training courses from developing countries visited disaster areas in Tohoku [24]. The trainees received lectures from local government staff, visited damaged structures and museums commemorating the disaster, and heard directly from the affected people. These courses covered a wide range of sectors including disaster management, climate, infrastructure management, housing, urban planning, health, local government administration, etc. Most trainees were experts or practitioners in disaster management or public works agencies. In addition, experts who attended training courses in other sectors, such as health and education, visited the disaster-affected areas so that they could understand the importance of DRR in their sectors. The JICA uses the documents produced by the World Bank as training materials. The JICA programs promote the mainstreaming of DRR in development by promoting multi-sectoral efforts, such as conducting DRR education at schools and strengthening health facilities against disasters.

The JICA's technical cooperation is characterized by an emphasis on technology transfer in the field, while other assistance agencies tend to emphasize policy or institutional formulation [25]. The JICA invites over 10,000 trainees, mainly government experts and practitioners, to a wide range of training courses from a few weeks to a year in Japan every year. The trainees visit sites not only to study Japanese technology but also to understand the social contexts supporting technology.

The agency has supported assistance programs conducted by Higashi Matsushima City, which was one of the cities most devastated by the GEJE, with some 11,000 damaged houses, or 73% of all households. The city is supporting recovery efforts in Banda Aceh City in Indonesia, which was destroyed by the 2004 Indian Ocean Tsunami. Both cities are promoting reconstruction from tsunami disasters toward disaster-resistant societies. The programs aim at building capacities in DRR, local resource management, and climate change mitigation through exchanging knowledge. Also, the programs contribute to rehabilitating economic activities by local communities through promoting tourism and seafood processing.

The JICA technical cooperation projects in DRR, which are undertaken with 7 billion JPY (65 million USD) annually [26], have used GEJE lessons to transfer Japanese technology to developing countries. These projects have organized events or training courses around the world. For example, the JICA sent experts from Higashi Matsushima City to the Philippines to support the recovery efforts following the Typhoon Yolanda disaster in 2013 [27].

3. Conclusion and Considerations

Learning from disasters is crucial to strengthening DRR systems to mitigate damage. The Japanese experience shows that the country was able to strengthen its DRR systems by learning lessons from the Kobe Earthquake in 1995, leading to damage reduction during the GEJE. However, lessons from the Kobe Earthquake had been lost from the international perspective, because materials compiling knowledge and lessons from the disaster were produced only in Japanese.

The World Bank, in collaboration with the Government of Japan, conducted the research project "Learning

from Megadisasters: Lessons from the Great East Japan Earthquake" and succeeded in compiling lessons from the GEJE and sharing them with the world. The final report is used as the key reference document for the disaster [22]. Also, the JICA is sharing the lessons with developing countries through technology transfer programs. Hundreds of practitioners and experts are visiting disaster-affected areas in the Tohoku region annually to learn about Japanese DRR technology.

Collaborating with the World Bank, which has established mechanisms for managing knowledge through producing quality reports, organizing events, and using information and communications technology, is effective in sharing the lessons with the world. The bank can invite policymakers and decision-makers from developing countries to the program by using its convening power. This is crucial for mainstreaming DRR in development policies and projects in developing countries.

On the 10th anniversary of the disaster, various organizations are producing reports on recovery experiences, including this special issue. However, most of them are written in Japanese, not English. To avoid repeating the missteps of the Kobe Earthquake and to revitalize the spirit of sharing knowledge after the GEJE, Japan should expand the dissemination of the recovery lessons to countries that are vulnerable to disasters.

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