

STRENGTHENING RESILIENCE IN SOUTH ASIA WITH IMPROVED INFRASTRUCTURE

Supporting governments in establishing comprehensive disaster risk management in infrastructure projects

AT A GLANCE

Region: South Asia

Risks: Earthquakes and floods

Areas of Engagement: Promoting resilient infrastructure, Enabling resilient recovery

Deepening assistance to governments in South Asia to reduce disaster risks by convening not only the deep technical expertise required, but also addressing system-wide perspectives on the processes of resilience in the infrastructure sector.



Electrical lines, Kathmandu, Nepal. © Simone D. McCourtie | World Bank.

High seismic activity threatens resilience of infrastructure

Much of South Asia is located in one of the most seismically active regions in the world. More than 600 million people live along the fault-line across the Himalayan belt that runs through Afghanistan, Pakistan, India, Nepal, and Bhutan¹. On April 25, 2015, a 7.8 magnitude earthquake struck central Nepal followed less than one month later by 7.3 magnitude earthquake. Together, these earthquakes caused more than 8,700 deaths and some 25,000 injuries with physical losses totaling over US\$7 billion². South Asia is also highly prone to weather and water-related disasters such as flooding, drought, and cyclones. For example, floods on average are the largest source of annual losses in India; costing an estimated US\$7 billion every year.³

Continued urbanization and economic growth are resulting in more people and assets being exposed to natural hazards. In the past two decades, over 50 percent of South Asians (approximately 750 million people) have been affected by at

least one natural disaster. The social and economic costs of such hazards have been staggering with almost 230,000 people dead and US\$45 billion in damages between 1970 and 2008.

Infrastructure that lacks sufficient disaster resilience is a major threat to life and property and can delay recovery and interrupt economic activity. Infrastructure planned and designed without due consideration to disaster risks contributes to increased losses. In South Asia, infrastructure investment is likely to peak in the coming decades, which brings the question of appropriate design and planning sharply into focus.

Effective contingency planning for critical infrastructure can mitigate interruptions

To address these challenges, the Japan-World Bank Program for Mainstreaming Disaster Risk Management in Developing Countries (hereinafter referred to as the Japan Program) provided a US\$1.2 million grant in 2018 to the South Asia region

¹ <https://blogs.worldbank.org/endpovertyinsouthasia/south-asia-should-prepare-now-next-disaster-1>

² <https://www.worldbank.org/en/results/2020/09/29/post-earthquake-reconstruction-in-nepal-rebuilding-lives-one-home-at-a-time>

³ (UNISDR, 2014).



55 million
people living with
strengthened infrastructure
across South Asia

Srisailem Dam Reservoir, India. ©Fouzia Begum | istock.com

to enhance resilience of infrastructure to climate and disaster risks through knowledge exchanges, leveraging global best practices and improving capacity of governments. By engaging Japanese experts and sharing their experiences enhancing resilience of infrastructure, South Asian countries were able to develop tools and standards to improve planning, design, construction, and operation and maintenance of infrastructure, as well as to deepen emergency preparedness and response.

To that end, India was interested in enhancing operation and monitoring of dams and establishing disaster-resilient maintenance procedures. Dam conditions may affect the safety of the structures and pose risks to life and properties of people downstream. In response to this interest, the Indian government's Central Water Commission (CWC) with assistance from the World Bank, began the Dam Rehabilitation and Improvement Project (DRIP), a six-year, US\$350-million program, which identified building against seismic risk as a main priority. Large-scale earthquakes have been recorded in the region each year, and engineers and policymakers saw that inspection, reporting, and updates in this area are critical needs. To address these critical needs the Tokyo DRM Hub and the World Bank team coordinated a knowledge exchange between India and Japan where an Indian delegation made a technical exposure visit to Japan. Country experts shared knowledge of water resources engineering as well as reviewed the operations and maintenance methods employed by Japan Water Agencies (JWA). JWA in collaboration with the Indian Delegation from the CWC and the World Bank team worked together to prepare an Earthquake Emergency Inspection Manual for Dam Field Engineers after Seismic Event, which offers a detailed check list and manual for post-earthquake

dam inspection. In addition, this activity helped in developing a Rapid Risk Assessment Framework for dams across India. Both outputs contribute to strengthening resilience of critical infrastructure.

Similarly, in Nepal, which is vulnerable to floods and earthquakes, considerable challenges exist in providing adequate and reliable electricity supply. To address these energy challenges, the Government of Nepal (GoN) and other Nepali stakeholders, along with 18 Japanese experts from eight organizations including government institutions, the Japanese Embassy in Nepal, JICA, development partners, the private sector and academia, attended a two-day workshop, "Enhancing Climate/Disaster Resilient Renewable Energy Distributed Power System". This workshop was held in Kathmandu in September 2019 and focused on the key considerations necessary to establish a resilient mini-grid system. Nepali officials shared an overview of their mini-grid projects, which while they have been benefiting the households in the rural areas in Nepal, they have also been interrupted by the various disasters. During one of five sessions held with Japanese experts, participants then learned that the Sendai Micro-grid in Japan survived one of the foremost earthquakes in 2011, without any interruption. The success of the Sendai Micro-grid relied on the strict laws and regulations applied to electrical facilities, earthquake resistant design standards, combination of different types of energy sources, and most importantly, the contribution of well-trained engineers.

By learning about these best practices in Japan, key technical staff from the GoN and other stakeholders developed the capacity to establish their own resilient renewable energy

including building the institutional and regulatory frameworks necessary to support disaster resilient renewable energy distributed power systems. GoN also developed resilient technical designs and standards for its generation facilities.

This knowledge exchange prompted proactive discussions outside of the official engagement between the governments of Nepal and Japan leading to another technical assistance grant from the Japan Program—Disaster and Climate Resilient Renewable Energy Power Systems in Nepal-- which builds upon and furthers the work from this engagement.

▶ **STRONGER SYSTEMS ESTABLISHED**

To continue improving the safety and performance of existing dams and strengthening institutional capacity, the grant provided the collaboration necessary to create an Earthquake Emergency Inspection Manual for Dam Field Engineers after Seismic Events, which offers a detailed check list and manual for post-earthquake dam inspection across India, strengthening systems to operate and maintain dams.

▶ **CAPACITY INCREASED ACROSS SECTORS**

Across the region over 800 people involved in infrastructure sectors were trained including over 100 women. Knowledge exchanges and workshops held throughout the grant provided the opportunity to increase capacity around resilience. For example, there is significant demand for Emergency Preparedness and Response training across the region. To meet that demand, 58 participants from all eight South Asian countries attended a workshop in Bangkok in July 2019 where they learned from Japanese counterparts the planning and development processes involved in establishing an Emergency Operations Center.



LESSON LEARNED:

▶ **KNOWLEDGE EXCHANGES BRING RESILIENCE TO PRACTICE**

Ensuring that resilient systems are established and well operated, including procedures to manage and recover from shocks is a key take away from this engagement. Therefore, opportunities to learn and exchange with peers from around the world, such as the one facilitated by this grant, provide meaningful contributions to bringing resilience to practice.

“Nepal is one of the most vulnerable countries to disasters and the impact of global climate change. The workshop is a valuable opportunity to support both the public and private sector to provide resilient and sustainable energy services in Nepal, especially successful off-grid electricity supply,”

Faris H. Hadad-Zervos, the World Bank Country Director for Nepal and Sri Lanka.