CLIMATE AND DISASTER RESILIENT TRANSPORT IN SMALL ISLAND DEVELOPING STATES

Resilient transport providing a lifeline against disasters

AT A GLANCE

Region: Global

Risks: Floods, earthquakes, landslides

Area of Engagement: Promoting access to risk information, Promoting resilient infrastructure

An integrated approach to enhance the climate and disaster resilience of transport systems.

Common features that add to vulnerabilty

Though located in various oceans, many Small Island Developing States (SIDS) share a major common feature: they are among the most exposed nations to natural hazards and climate change. SIDS are also characterized by insularity and geographic remoteness, as well as small geographic area, economies, and population, all of which increase their social and economic vulnerability. Natural hazards across SIDS incur high average annual losses relative to national GDPs and climate change is expected to significantly exacerbate current risks. Moreover, a single event can have devastating impacts on the relatively small economies of SIDS leading to development achieved over many years of work and investments to retrocede.

The transport sector, critical to the economy and society of SIDS, is often the main infrastructure sector in these countries. Strengthening the resilience of the transport sector will have multiplier effects in building the resilience in SIDS. Therefore, there is an urgent need to increase the resilience of the transport sector in the face of a changing climate and increasing frequency and intensity of extreme weather events.

Working toward disaster and climate resilient transport systems

With support from the Japan-World Bank Program for Mainstreaming Disaster Risk Management in Developing

Aerial view of the industrial part of Honiara town, Solomon Islands.

Countries, four SIDS countries: Vanuatu and Solomon Islands (Pacific Region); Saint Vincent and the Grenadines (SVG, Caribbean Region); and Cape Verde (Africa Region) have advanced their understanding of and developed tools to assess the specific climate and natural hazard vulnerabilities of their transport assets. Leveraging Japan's extensive expertise and knowledge on climate change and natural hazard management in transport systems focusing on methods, techniques, and frameworks used in Japan that integrate disaster risk considerations into transport asset management, each government was able to develop strategies and transition plans, among others, to strengthen the resilience of their transport asset management systems while also building capacity of government officials to ensure their efforts to strengthen resilience are compatible with local capacity, available financing, and engineering standards.

A key first step for the technical teams was to improve understanding of asset management practices and processes through the development of diagnostic assessments of transport asset management systems across all four countries.

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RESULTS IN RESILIENCE SERIES

A bridge on South Santo Road, Vanuatu. © Dung Anh Hoang/World Bank

This diagnostic considered all stages of the Asset Lifecycle Framework including climate and natural hazard risk considerations into the management of transport assets. Using this framework helped countries design a desired system, define priorities, agree on budgets, and establish processes to improve asset management: (i) systems planning; (ii) engineering and design; (iii) operations and maintenance; (iv) contingency planning; and (v) institutional capacity and coordination. This lifecycle approach aims to minimize disaster losses on transport infrastructure and improve emergency planning by having a systemic perspective on the overlaps between physical assets and exposure to hazards.

A detailed diagnostic of the road and bridge asset management system was conducted in Vanuatu, Solomon Islands and SVG, analyzing current climate and disaster risks, and identifying opportunities for enhancement of those systems and recommendations to strengthen institutional capacity and coordination. Transition Plans were then developed to guide the integration of climate resilience considerations into the transport asset lifecycle. It also helps provide a clear implementation roadmap in the short- (0 – 12 months), medium- (12 – 24 months) and long-term (beyond 24 months) to enhance the system toward resilience against climate change and disaster risks. Consequently, an IT-based application for resilient road and bridge AMS was created, increasing access to data and information, and building capacity on the asset data collection and management. This enhanced road and bridge asset management system enables transport officials to better understand the full extent of the network they manage, how it performs over time and the exact investment requirements needed in the medium to long term to optimize the efficiency of resources while strengthening the overall performance of road asset networks.

In Cape Verde, officials have worked toward understanding how they can better cope with climate and disaster risks by considering supply chain logistic vulnerabilities through maritime and air transportation. The case study conducted on the supply chain disruption in Cape Verde was inspired by the Japanese experience and lessons learned from the 1995 Great Hanshin earthquake in Kobe and the Great East Japan Earthquake and Tsunami in 2011, as well as the results of extensive research conducted in the Human Security Engineering Program at Kyoto University.

These experiences and research enabled the team to construct a methodological approach for assessing exposure of Cape Verde's airports and ports to natural hazards. By modeling different kinds of disaster events using simulation techniques to understand the dynamics of each disruption scenario, another well-established procedure used by Japanese authorities for improved disaster risk management planning and disaster risk evaluation, Cape Verde officials were able to better understand potential impacts at particular airports and ports and are now armed with state-of-the-art tools to prepare their logistics systems to handle similar impacts in the future. The case study also developed a Serious Game Simulation approach to emulate some of the complexities in resource allocation to promote resilience in Cape Verde's ports and airports. The simulation of real-life events was critical to develop collaboration and cooperation among subjects in the competing priority environment of public allocation of resources to promote resilience.

With the aim at building capacity for government transport authorities, the grant activities included the development of a World Bank Open Learning Campus (OLC) e-learning course, "Climate Resilient Transport in Small Island Developing States". The course aims to provide strategic, experiential, and practical knowledge on how to integrate climate and disaster risk considerations in the management of transport assets in Small Island Developing States. As such, Japanese experts from the University of Kyoto and World Bank specialists with global experience were engaged to leverage extensive expertise and knowledge on the topics of climate change and natural hazard management in transport networks, systems, and assets; and on methods, techniques, and frameworks to integrate disaster

risk considerations in transport asset management to improve climate resilience.

The expertise provided was vital to enhance the online training course and build the capacity of transport authorities while also facilitating the identification of opportunities to enhance project design through quality engineering, asset management protocols and financing. This course is open and available to all thus contributing to capacity building of transport authorities across the globe.

In an effort to promote open access to resilient transport information for both government officials and other interested stakeholders, a website built exclusively for resilient transport in SIDS (i-Knowledge) is being disseminated at the Global Facility for Disaster Reduction and Recovery website, where publications, reports, videos, and links to useful sources of knowledge will be posted.

This grant informed the preparation of over US$250 million in other World Bank investments across SIDS which are aimed at strengthening the resilience of their transport networks and transport asset management systems.

- **Diagnostic Process and Transition Plans help build a Resilient Transport Asset Management System:** Going through a diagnostic process and developing a Transition Plan help transport authorities understand their current system, design a desired system and develop an implementation plan to enhance the system toward resilience against climate change and disasters.

- **E-Course offers holistic overview of a Resilient Transport Asset Management System:** Transport specialists around the globe can access this World Bank OLC e-course and gain valuable insight into Transport Asset Management Systems within a framework for integrating climate and disaster risk considerations.

- **Informed the preparation of over US$250 million in other World Bank investments**

- **Over 1.5 million people from SIDS will have access to safer and more resilient transport systems**

LESSON LEARNED

Engagement and activities undertaken in each SIDS generated the following lessons:

- **Leveraging modern tools to fill critical data and information gaps is critical for resilient transport asset management.** Up-to-date data and information on transport assets, their conditions, and their exposure to current and future climate risks must be collected and incorporated into planning processes. Current processes to collect these data are ineffective and costly. Introducing new tools such as cellphone-based data collection makes regular asset condition monitoring possible. For climate and disaster data, inter-ministerial collaboration is critical to ensure that transport authorities have access to relevant data and necessary support from relevant line ministries.

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