



# Climate and Disaster Resilient Transport in Small Island Developing States: *A Call for Action*

Small Island Developing States (SIDS) are among the most exposed and vulnerable countries to natural disasters and the impacts of climate change in the world. SIDS have at their disposal several options to enhance resilience, including strengthening their transport asset management systems, a measure that has been found to significantly reduce asset and well-being losses resultant from natural disasters and climate change impacts. SIDS are already piloting best practices with the support of the World Bank, but further international cooperation is required to scale up resilient transport systems and in this way strengthen the resilience of economies and communities to the impacts of climate change.



## Small Island Developing States by Region

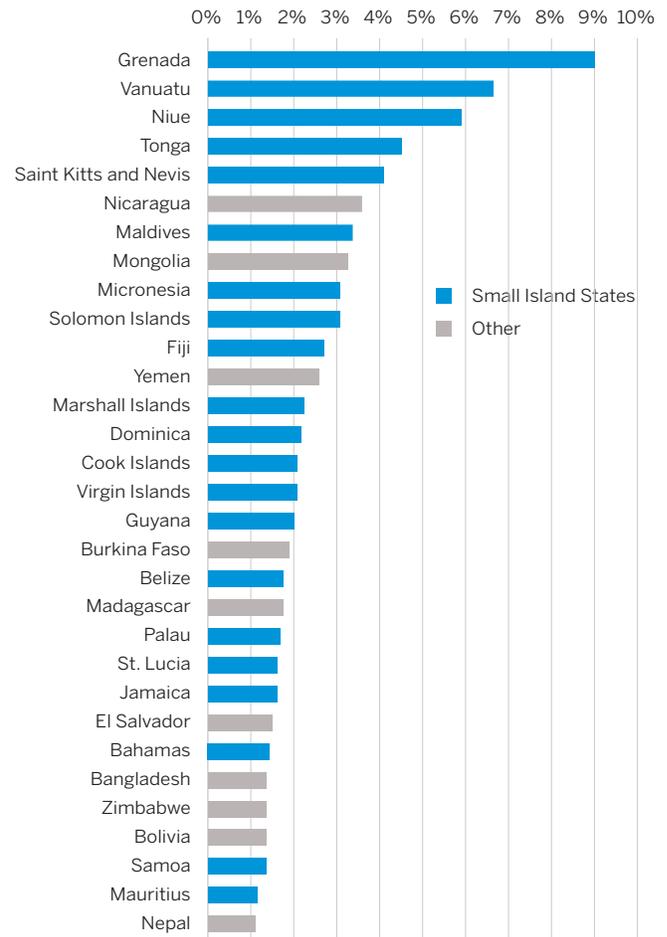


SIDS are a group of countries located across the Caribbean, Pacific, Africa, and Indian Ocean regions. SIDS are all small in size, sparsely populated, and geographically isolated, and their small economies are typically based on tourism, fisheries, and agriculture, sectors that rely on sensitive ecosystems.

The exposure of SIDS to natural hazards and Climate Change leads to significant economic losses. For instance, in the Caribbean, average annual loss from tropical cyclones is estimated at US\$835 million; in the Pacific, this number is US\$178 million. Of greater concern, a single event can have devastating impacts in the relative small economies of SIDS, such as recently occurred in Barbuda and Puerto Rico following Hurricane Irma. Another example is 2015 Cyclone Pam, which caused estimated damages and losses in Vanuatu of US\$450 million, the equivalent of 64 percent of GDP.

Aligned with the World Bank Twin Goals of ending extreme poverty and boosting shared prosperity, and recognizing the crucial role of transport for striving economies and communities, the transport and disaster risk management teams of the World Bank are proposing a holistic framework to integrate climate and disaster risk considerations into transport asset lifecycle management. Piloted best practices are used as examples for replication and scaling up resilient transport in SIDS.

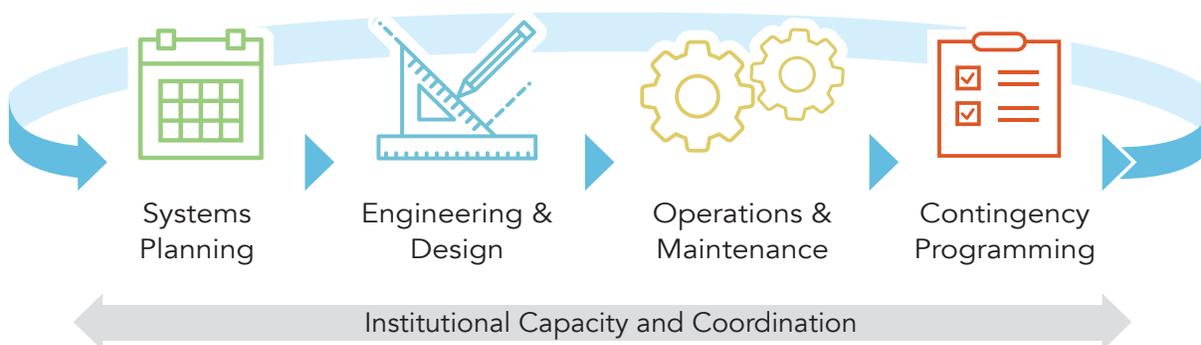
## Average Annual Loss from Disasters Relative to GDP



## Toward Disaster and Climate Resilient Transport Systems

To reduce income losses in post-disaster situations, several policies and measures are available. They include measures for re-building faster and better following the disaster, or limiting the dependency of the economy on vulnerable infrastructure. To reduce well-being losses, SIDS must implement measures to increase their socio-economic resilience, giving people the means to recover and rebuild their asset stocks through scalable social protection, increased access to the financial system, and access to insurance for natural disasters. To reduce losses in the transport sector, the Transport Lifecycle Framework can be of great help as priorities can be defined, budgets agreed, and processes established toward improved asset management.

### Transport Infrastructure Lifecycle



#### SYSTEMS PLANNING

Case Study 1 / Samoa :  
Enhanced Systems Planning to Better Prepare for and Respond to Natural Disasters and Climate Change Impacts

Case Study 2 / Mozambique:  
Prioritization of Road Interventions under Flood Risks and Uncertainty

#### ENGINEERING & DESIGN

Case Study 3 / Kiribati & Tuvalu:  
Climate and Disaster Resilient Roads Using Geocell Concrete Pavements

Case Study 4 / Coral atolls of the Pacific Islands:  
Local Materials for Climate Resilient Coastal Protection

Case Study 5 / Sri Lanka:  
Geosynthetic Reinforced Soils for Rapid and Low Cost Bridges

#### OPERATIONS & MAINTENANCE

Case Study 6 / Dominica:  
Development of a Risk-based Infrastructure Asset Management System

Case Study 7 / Saint Lucia:  
Using Smartphone Apps to Increase Resilience of Road System

Case Study 8 / Belize:  
Information Management Systems for Enhanced Resilience of Transport Assets

Case Study 9 / Vietnam:  
Empowering Women to Manage Rural Road Maintenance: Lessons from Vietnam

Case Study 10 / São Tomé and Príncipe:  
Building Resilience Through Communities Involvement in Road Maintenance

#### CONTINGENCY PROGRAMMING

Case Study 11 / Caribbean:  
Using the CERC in Limited Capacity Environments to Reduce Road Network Interruptions following a Disaster

Case Study 12 / Tonga:  
Emergency Response System and Procurement Regulations

Case Study 13 / Tuvalu:  
Climate and Natural Disaster Resilient Airport

Case Study 14 / Colombia:  
Climate Risk Assessment for Muelles el Bosque Port

## Scaling Up Resilient Transport Systems in SIDS

Providing resilient transport has many economic and social benefits. More resilient transport infrastructure helps avert asset and well-being losses from natural disasters and climate change impacts, reducing required investments in reconstruction and rehabilitation. This releases funds that can be invested back in transport asset management systems, thus improving maintenance, reducing disruptions in transport systems, and minimizing impacts from future events.

COMPONENT	DESCRIPTION	OBJECTIVES/OUTPUTS
<b>Needs Assessment and Transition Plan for Integrating Resilience into Decision Making in the Transport Sector</b>	Building the foundation for integrating climate and natural disaster resilience into decision making in SIDS through the use of needs assessments for asset management systems and developing country-specific transition plans to achieve transport resilience. Includes country specific transport vulnerability and risk assessment.	<ul style="list-style-type: none"> <li>- Characterization of the current situation, or "As Is" scenario.</li> <li>- Consensus on the desired situation, or "To Be" scenario, which integrates climate change and disaster resilience into the decision-making process.</li> <li>- Transition plan, to be defined in close consultation with government agencies and stakeholders.</li> </ul>
<b>Deployment of Solutions to Enhance Resilience of Transport Sector</b>	Focus on the actual implementation by SIDS of policies and measures to enhance resilience of the transport sector and upgrade their asset management system following the agreed strategies and transition plan.	<ul style="list-style-type: none"> <li>- Access to reliable information on existing assets.</li> <li>- Combined use of asset information with information about their vulnerability to natural disaster and climate change impacts to improve asset management and prioritize investments.</li> <li>- Development or upgrading of transport asset management system.</li> </ul>
<b>Capacity Building and Knowledge Exchange</b>	Acknowledging the importance of motivated and empowered human resources, this step focuses on building the necessary technical and institutional capacity in SIDS through training and knowledge exchange across countries and regions.	<ul style="list-style-type: none"> <li>- Organizational development.</li> <li>- Regional trainings and workshops.</li> <li>- Knowledge platform.</li> </ul>
<b>Fundraising and Reassessing Capital Needs</b>	Strengthening and complementing existing efforts with additional financial resources to support the integration of climate and disaster risk consideration along the transport asset lifecycle.	<ul style="list-style-type: none"> <li>- Exploration and potential establishment of Transport Resilience Funds and Transport Asset Management Endowments for SIDS.</li> </ul>

### A Call for Action

From across the SIDS, ample experience is already available on how to move toward more resilient transport within and across all components of the transport infrastructure lifecycle framework, and country governments are ready to take action. What is needed now is the right support from multiple countries and donors, to provide SIDS with the opportunity to take their next steps on a resilient transport path that fits their country, context, and population specific needs. Enhancing the resilience of transport systems generates many economic and social benefits, and doing so is a priority to deliver on sustainable development goals and climate nationally determined contributions of SIDS.



The full report can be downloaded from:  
<https://openknowledge.worldbank.org/>