



## Addressing Climate Risk: The Sri Lanka Climate Resilience Program

### Overview

Located off the southern coast of the Indian subcontinent in South Asia, Sri Lanka is highly vulnerable to natural hazards. This was brought into sharp focus by the Indian Ocean tsunami in 2004, with a death toll of around 35,000. Despite the enormity of this event, routine flooding and drought are the natural hazards that present the most significant threats to the long-term growth and development of Sri Lanka. In addition, landslides and high winds frequently destroy or damage thousands of houses every year.

Sri Lanka has embarked on a comprehensive disaster risk management (DRM) program to reduce the adverse impacts of climate change and to adapt the stock of infrastructure to extreme climate shocks. To increase both short-term and long-term resilience, the government is engaged with the World Bank on several fronts.

Physical investments will be financed to address short-term infrastructure weaknesses, coupled with a contingent line of credit to safeguard against the immediate fiscal impacts of a disaster. The program comprises (i) the Climate Resilience Improvement

Project (CRIP) (US\$110 million) to reduce the immediate physical risks and improve the understanding of disaster risks so that future investments are targeted to their best use and (ii) a Development Policy Loan with a Catastrophe Deferred Draw Down Option (CAT-DDO) (US\$102 million) to strengthen the country's fiscal resilience to events.

To address long-term flood and drought problems, recommendations from risk modeling studies under CRIP will be used to inform US\$1 billion of investments in comprehensive and sustainable basin-wide flood and drought risk mitigation. This is expected to encompass both the mitigation of physical structures and the improvement of the country's water management system. Based on the results of this analysis, a third, much larger, project is envisioned to be financed within the next four years. This project is expected to improve the country's physical resilience to extreme climate events in the future by incorporating projected climate changes in modeling work to ensure long-term sustainability.

In parallel, a Fiscal Disaster Risk Assessment, supported by the Global Facility for Disaster Risk Reduction and Recovery (GFDRR), is under way. This assessment will develop a disaster risk financing and insurance (DRFI) program that will, in the long term,

**Photo above: People fleeing flood in Sri Lanka**

Photo by: Wikimedia Commons

help the government and private institutions to improve their ability to manage the financial risks posed by disaster.

Complementing these activities is an extensive Open Cities initiative in selected regions in Sri Lanka, which will develop data on risk exposure that will be integrated under the CRIP and used for a more detailed risk analysis. In its first phase, the Sri Lanka Open Cities engagement mapped the city of Batticaloa, to better understand and visualize multi-hazard risks in this highly vulnerable city on the eastern coast. Within three months, all 30,000 buildings were mapped and visualized on a Web-based geospatial platform that is well suited for understanding the risk of floods, tsunamis, and storm surges.

Figure 1 illustrates the comprehensive engagement between the World Bank and the government of Sri Lanka to increase the country's financial and physical resilience.

### Climate Change Risks

Climate-related hazards are a significant threat to economic and social development in Sri Lanka. Climate projections indicate trends of increasing rainfall in the wet zone and decreasing rainfall in the dry zone, meaning that the risks associated with water-related climate variability are likely to intensify and worsen.

A World Bank study published in June 2013 on the regional impacts of extreme climate events highlights how

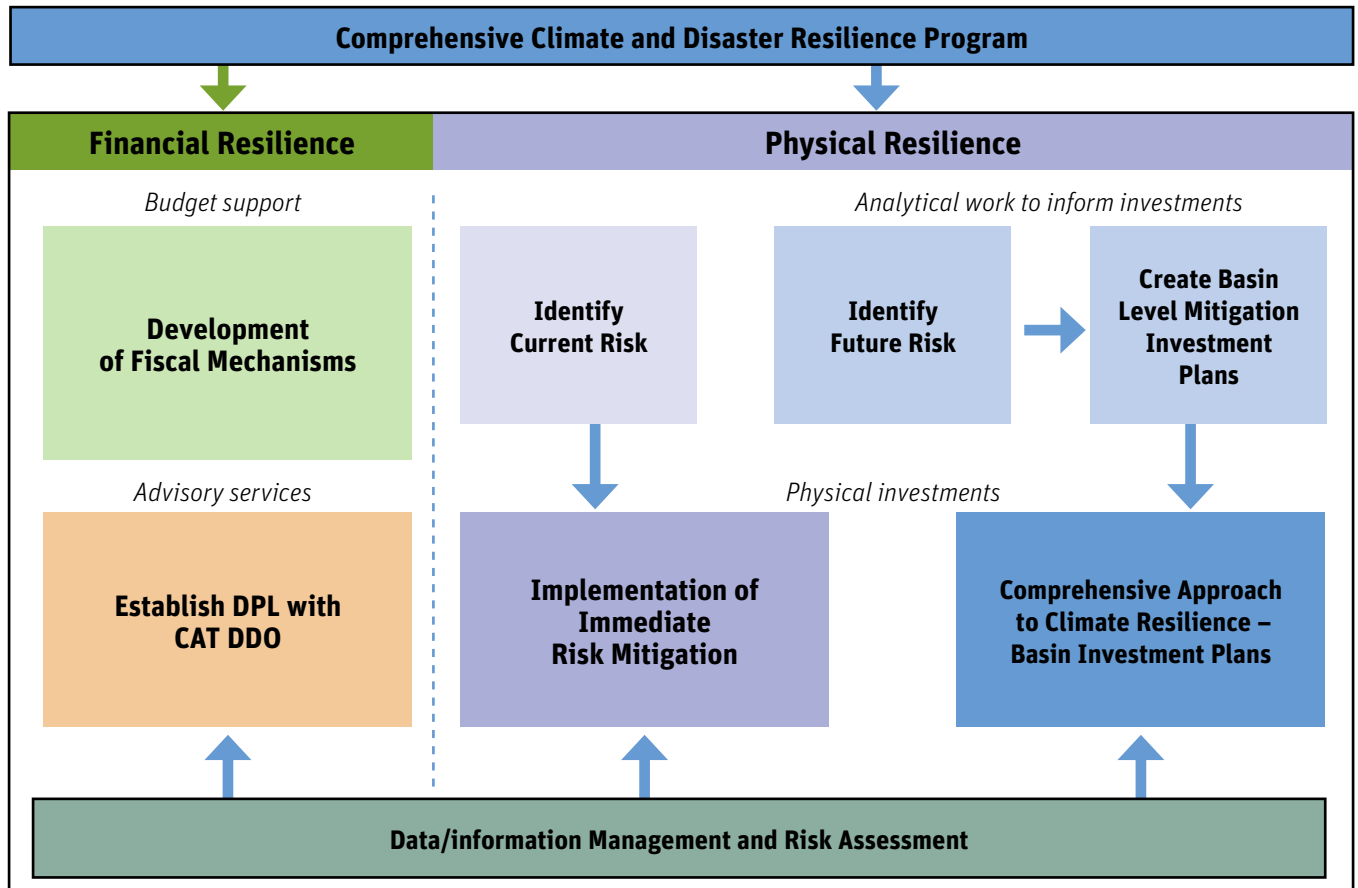
a 4°C (degree centigrade) increase in temperature would adversely affect the South Asia region. The major impacts of climate change in the region are expected to be extremes of water scarcity and excess. The region is highly vulnerable, even at warming of less than 2°C, given the significant areas affected by droughts and flooding at present temperatures.

In Sri Lanka, where water is used by various sectors, including the energy sector, projected increases in variability and long-term decreases in river flow are expected to heighten the competition for water across sectors. For example, the uncertainty in precipitation in the central highlands of Sri Lanka may affect water use in the Mahaweli Scheme, which provides 15 percent of national power generation and 23 percent of irrigation water. Going forward, this uncertainty is expected to pose a major challenge for the design and operation of hydropower plants and irrigation schemes.

### Physical Resilience

The CRIP will benefit approximately 11.5 million people living and working in districts where these projects will be implemented. The project has two main components. The first component is a US\$13 million analytical activity and long-term basin development planning. The second component is a US\$90 million urgent rehabilitation investment to increase resilience to climate risks. It also has two additional components: US\$5 million to support project implementation

Figure 1.



and US\$2 million to provide flexible funding to help the country to recover from a flood event that occurs during project implementation.

### Basin-Wide Investment Plan

The analytical component involves a detailed modeling of flood and drought risk in nine major river basins. The purpose of the modeling is to develop comprehensive basin-wide investment plans that incorporate the competing risks of both flood and drought. The objective is to identify up to US\$1 billion of investments in the form of basin investment plans. These models will take into account climate risks such as expected extremes of water scarcity and excess, increased inter-annual and intra-seasonal variability of monsoons, and longer-duration droughts. These impacts are all expected to affect livelihoods and human lives adversely in the near future.

The analytical work will be undertaken by government engineers, guided by international experts as required, to build capacity and to promote a similar approach across the country in the coming years. In particular, the growing Special Projects Unit (SPU) inside the Ministry of Irrigation and Water Resources Management will benefit from technology transfer and technical assistance. In the medium term, the SPU will bring in additional sectoral experts and evolve to become a Climate Resilience Planning Unit. Investments to be financed include (i) acquiring a digital elevation model; (ii) conducting flood and drought risk modeling; and (iii) identifying feasible basin investment programs.

### Immediate Rehabilitation and Strengthening

The rehabilitation component provides resources to reduce short-term risks in three sectors. The first subcomponent rehabilitates and strengthens hydraulic structures in irrigation systems that have been identified as highly vulnerable to floods. The second strengthens the transport network to ensure connectivity during rainy seasons. The third stabilizes 18 landslide-prone schools that have been identified as high risk.

The flood risk mitigation component (US\$47 million) aims to rehabilitate irrigation and drainage infrastructure damaged by recent floods or particularly at risk of future

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floods. These interventions have been determined based on historical losses and field survey assessment by the Irrigation Department (ID) and the Mahaweli Authority of Sri Lanka (MASL). Investments will not involve the construction of new infrastructure, but instead will reinforce critical structures to help them to withstand future floods. The interventions will improve the carrying capacity of canals and reduce flooding due to overtopping of flood bunds.

The transport continuity investment (US\$36 million) aims to reduce direct loss to transport infrastructure, reduce indirect economic losses due to detours, and increase the effectiveness of post-disaster response. Rapid expansion of the road network has led to greater road failures due to landslides, while low bridges or causeways constructed in flood plains are flooded on a regular basis. A total of about 3 kilometers of unstable, high-risk roadside slopes will be stabilized to improve the corridor’s resilience. To mitigate the flood risk to low-lying bridges, 12 key vulnerable river or canal crossings with a combined span of approximately 260 meters will also be strengthened. This will include raising and lengthening narrow bridges and causeways to ensure that they are capable of handling sufficient water flow.

The school protection investment (US\$7 million) aims to improve slope stability around 18 schools serving about 30,000 students and identified as highly vulnerable to landslides. Given the high risk of landslides, these schools have to close during periods of heavy rainfall, shortening the school year by two to four weeks annually. Improvements in slope stability will promote education continuity as schools will not need to close.



Weak bridge to be reconstructed, Batticaloa, Sri Lanka  
Photo by: Suranga Kahandawa



Slope stabilization in schools, Kandy, Sri Lanka  
Photo by: Suranga Kahandawa



Online Data Sharing Disaster Management Center, Sri Lanka

is particularly well placed to provide bridge financing while other sources of funding (for example, bilateral aid and reconstruction loans) are being mobilized following a state of emergency. The financial features are similar to those available for the Deferred Drawdown Option for Development Policy Loans (DDO DPLs), with one exception: the DPL with a CAT-DDO will have a revolving feature; that is, amounts repaid prior to the closing date will be available for subsequent drawdown.

This DPL with a CAT-DDO will facilitate three key prior actions needed to operationalize a comprehensive DRM program in Sri Lanka: (i) adopt a national policy and program on disaster management, which will improve institutional capacity for managing disaster risks and DRFI, (ii) approve the

### Financial Resilience

The CAT-DDO seeks to enhance the capacity of the government to manage the impacts of natural disasters, in order to build physical and financial resilience. This will be achieved by providing immediate liquidity to the government in the event of a disaster. The funds will be delivered within a policy framework designed to improve the overall capacity of the government to implement its DRM program.

The government will be able to access funds from the facility upon declaring a state of emergency following an adverse natural event. The funds may be drawn down over a three-year period, which may be renewed up to four times for a total of 15 years. The signing of the CAT-DDO was contingent upon Sri Lanka developing a comprehensive disaster management program.

The DPL with a CAT-DDO instrument is designed to be a quick and flexible source of financing. The instrument

National Disaster Management Plan (NDMP) to increase the government's capacity to manage disasters efficiently and ensure climate-resilient development, and (iii) approve the establishment of a steering committee to monitor the national program for the common use and sharing of spatial data and information and to ensure that disaster information is used to inform policy making.

Based on the results of the ongoing fiscal disaster risk assessment, recommendations will be made to strengthen the fiscal resilience of the country. These may include (i) improving the administration and execution of budgets; (ii) developing an annual disaster fund to finance rehabilitation following small and medium events; (iii) managing the implicit fiscal liability to support vulnerable populations; (iv) developing sovereign risk transfer instruments; and (v) supporting the development of a private catastrophe risk insurance market. ■

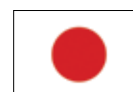
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