

THEMATIC BRIEF

CLIMATE RESILIENT INFRASTRUCTURE



The context

Infrastructure is key to many sectors including transportation, telecommunications, water, and energy, and it plays an important role within agriculture and health. Strong interdependencies mean that damages to a single infrastructure asset may cause a 'domino effect' of failures across systems. These damages have increasingly been caused by more extreme weather events linked to climate change – leading to billions of dollars of repair, loss of life and security for millions of people around the world. At the same time there is a growing investment gap for building new and resilient infrastructure in developing countries. One downside is that repairing existing infrastructure and building new infrastructure contribute to greenhouse gas emissions since infrastructure relies heavily on emissions-intensive industries – particularly production of cement and steel. To address these issues and challenges, climate-resilient infrastructure that withstands changing climate conditions and avoids contributing to further emissions is necessary. An integrated approach that considers climate risks to infrastructure is crucial, and a pre-requisite to avoid maladaptation and to preserve natural resources and biodiversity. Green infrastructure or nature-based solutions are among the solutions that can be employed to achieve these goals – providing social, economic, and environmental co-benefits. These solutions, however, are new asset classes and their risk and return profiles are perceived as risky by private sector investors.

GCF's unique role

The Green Climate Fund (GCF) is the world's largest dedicated climate fund helping developing countries to reduce their greenhouse gas emissions and to enhance their ability to respond to climate change, in line with the Paris Agreement. GCF helps developing countries to realise their climate ambitions through a country-driven approach. We achieve our goal by investing across four transition areas – (1) built environment; (2) energy & industry; (3) human security, livelihoods and wellbeing; and (4) land-use, forests and ecosystems. Under the built environment transition, GCF is defining the financial value-addition of climate-resilient infrastructure and its ability to replace traditional infrastructure. This includes working with governments and partners to inform transformational policy shifts for climate-resilient infrastructure and translating these to unlock public and private capital at scale. We follow six overarching principles to help projects implement climate-resilient infrastructure thereby helping to conserve natural resources, protect communities and invigorate local economic growth and security:

- 1) **Deploy an infrastructure systems approach** – a holistic approach reviewing investments that go beyond climate-proofing of assets by detecting potential for cascading failures affecting community resilience. GCF partners with international stakeholders to develop new methodologies informing countries and financiers about solutions to deploy climate-resilient infrastructure.
- 2) **Conduct climate risk assessments** – utilize robust available climate information to evaluate current and future resilience needs, allowing for better planning.
- 3) **Encompass mitigation as well as adaptation and resilience** – deploy crosscutting solutions to achieve results in reduced emissions and increased resilience to climate change.
- 4) **Integrate nature-based solutions** – employ ecosystems and ecosystems services to replace hard infrastructure to the widest extent possible.
- 5) **Conduct complex hydrological and/or geological studies for the projects' pipeline structuring** – enables reduction of single project preparation costs and ensures sustainability of proposed actions and avoidance of maladaptation.
- 6) **Capacity assessment of local institutions** – promotes country ownership to ensure that local institutions play a pivotal role in project development and have sufficient capacity to execute and finance climate-resilient endeavours.

Project examples



FP 133: Resilience to hurricanes in the building sector in Antigua and Barbuda

Antigua and Barbuda is a small island developing state that is one of the most vulnerable countries to extreme weather events such as hurricanes and tropical storms caused by climate change. GCF is providing support to build the country's resilience to hurricanes through climate-proofing critical public service and community buildings, mainstreaming climate resilience into the building sector and financial mechanisms and strengthening climate information services. **This project introduces a systemic approach to infrastructure as it includes a thorough selection of critical infrastructure and encompasses both adaptation and mitigation aspects into the design of structures.**

- **Total project value:** USD 46.2 million
- **GCF financing:** USD 32.7 million (grant)
- **Total number of beneficiaries:** 96,000 people



FP166: Light Rail Transit for the Greater Metropolitan Area in Costa Rica

The transport sector contributes around half of the total emissions of Costa Rica. GCF has partnered with the Central American Bank for Economic Integration to co-finance a modern, fast, convenient, safe, and environmentally sound electric Light Rail Transit (LRT). The LRT will be built within the larger urban zone of San José with 85 kilometres of double tracks on five lines benefitting around 2.7 million inhabitants. **The project encompasses adaptation benefits as it involves a detailed vulnerability analysis for climate hazards along different points of the LRT. It translates these findings to an LRT design that protects it from future climate risks and ensures sustainability of the LRT in the longterm.**

- **Total project value:** USD 1.87 billion
- **GCF financing:** USD 271 million (grant + loan)
- **Tonnes of emissions avoided:** 7.6 million

Development of innovative methodologies



Building systemic resilience of infrastructure in Jamaica with CCRI

GCF is developing an **innovative study to physically validate and financially value the capacity of nature-based solutions to complement hard infrastructure in Jamaica in partnership with the Government of Jamaica, the UK Government, Oxford University and the Coalition for Climate Resilient Investment.** GCF will then develop a new methodology for a step-by-step preparation of a pipeline of bankable projects, for future co-financing by GCF with other private and public partners. This approach will be transferred into a toolkit enabling GCF partners to prepare climate-resilient, sequenced, and interlinked projects that address communities' needs.



Enhancing resilience of Ghana's infrastructure systems with GCA

The Government of Ghana has identified infrastructure as a priority sector in both Ghana's Nationally Determined Contributions under the Paris Agreement and in its National Adaptation Plan Framework collaboration.

GCF, in collaboration with the Global Center on Adaptation, is actively working **to identify methodological options for deployment of nature based solutions and strengthening the project pipeline for resilient infrastructure,** that can be proposed for the consideration of the Ghanaian government.