

DEVELOPMENT OF RAINFALL INTENSITY-DURATION-FREQUENCY CURVES PROJECT

BACKGROUND

The Caribbean is one of the most hazard-prone regions in the world, regularly facing floods, tropical storms, and hurricanes. Between 1960 and 2013, the number of hydrometeorological disasters in the region increased more than sixfold. Flooding, in particular, has left deep scars, between 1990 and 2018 alone, at least 119 flood events were recorded. These events disrupted communities, destroyed homes and infrastructure, affected an estimated six million people, and caused over USD 1.4 billion in damage (Climate Studies Group, Mona, 2014; Economic Commission for Latin America and the Caribbean [ECLAC], 2019).

One of the most effective strategies for reducing flood risk is the proper design of stormwater drainage systems. Engineers and planners need accurate and reliable information on expected rainfall intensity to design these systems. Rainfall Intensity-Duration-Frequency (IDF) curves provide practitioners with a tool that estimates the likelihood of extreme rainfall events by making a connection between: how much rain is expected, over what durations (intensity), and the probability that the event will occur (frequency). Without IDF curves, infrastructure may be designed using proxy data from other countries that likely do not accurately reflect local rainfall characteristics.

With climate change projections suggesting a change in rainfall occurrence and intensity, causing both drier spells and more extreme downpours in some jurisdictions, and with rapid urbanisation reducing natural drainage, the need for accurate, reliable, climate-sensitive information is greater than ever.

PROJECT OVERVIEW

The Caribbean Development Bank (CDB), through its Strategic Plan Update (2022-2024), identified building resilience in infrastructure systems as a key priority area. To support this endeavour, the CDB has engaged the Caribbean Institute for Meteorology and Hydrology (CIMH) to develop rainfall IDF curves for all CDB Borrowing Member Countries (BMCs).

This project is designed to strengthen flood risk management and climate-resilient infrastructure planning across the Caribbean. The development and availability of accurate, climate-informed rainfall IDF curves will enhance the design of drainage infrastructure, thereby improving flood mitigation measures and supporting safer, more resilient communities.

The project will:

- Develop rainfall IDF curves for each CDB BMC;
- Incorporate climate change projections into the design so the curves consider future risks, not only past records;
- Create a user-friendly online portal where practitioners can easily access the newly developed rainfall IDF curves for the 19 CDB BMCs.

EXPECTED IMPACT

By developing and publishing reliable and climate-informed rainfall IDF curves, this project will enhance the design of roads, bridges, culverts, and other drainage systems. It will help protect critical assets and communities from the impacts of extreme rainfall, reduce damage and economic losses associated with flooding, and enhance risk assessments. Most importantly, it will give practitioners additional tools required to build safer, more resilient communities in a changing climate.

CDB Borrowing Member Countries

