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Climate change impacts and adaptation for coastal transport infrastructure in the Caribbean

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About the project

Small Island Developing States (SIDS) share a number of socio-economic and environmental vulnerabilities. Their climate, location and geomorphology, as well as their reliance on coastal transport infrastructure exacerbate these vulnerabilities, including their susceptibility to climate variability and change (CV&C). At the same time, however, SIDS have limited capacity to conduct targeted risk – and vulnerability assessments and identify, prioritize and implement requisite adaptation options. Against this background and drawing on earlier related work, UNCTAD has carried out a technical assistance project.

The main objective of the project has been to strengthen the capacity of policymakers, transport planners and transport infrastructure managers in SIDS to take appropriate adaptation response measures to climate change impacts on seaports and airports.

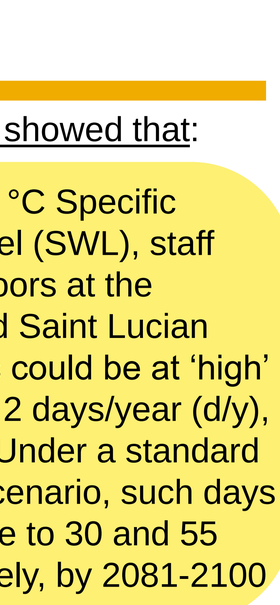
To this end the project included:

- ❑ The development/application of a methodology to assist transport infrastructure managers and other relevant entities
- ❑ Case studies to enhance the knowledge and understanding at the national level
- ❑ Workshops for training/demonstration and feedback by a wide range of stakeholders

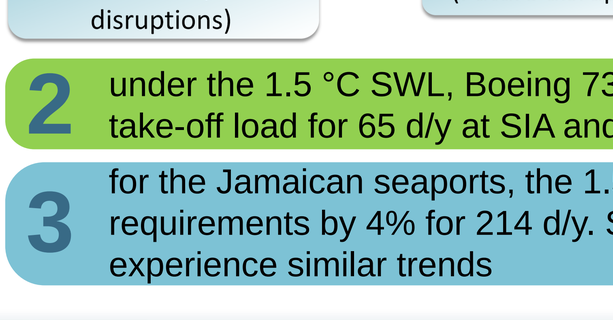
Case studies

Two vulnerable Caribbean islands: ***Jamaica*** and ***Saint Lucia*** were selected as case studies. Each case study sought to:

- ❑ assess the potential climate change impacts on main ports and airports; this includes the 1.5 °C global warming scenario (included as an aspirational goal in the Paris Agreement 2015), which may be reached as early as in the 2030s
- ❑ assess options for adaptation in response to the potential impacts
- ❑ support the development of the methodological framework



In ***Jamaica***, the assets selected for assessment are: the Sangster International Airport (***SIA***), the Norman Manley International Airport (***NMIA***), the Historic Falmouth Cruise Port (***HFCP***) and Kingston Freeport and Container Terminal (***KCT***)



In ***Saint Lucia***, the assessed critical assets are: the George Charles International Airport (***GCIA***), the Port Castries seaport (***CSP***), the Hewanorra International Airport (***HIA***) and the Vieux Fort Seaport (***VFSP***)

Operational thresholds method

The analysis showed that:

1 under the 1.5 °C Specific Warming Level (SWL), staff working outdoors at the Jamaican and Saint Lucian critical assets could be at 'high' risk for 5 and 2 days/year (d/y), respectively. Under a standard SRES A1B scenario, such days could increase to 30 and 55 d/y, respectively, by 2081-2100

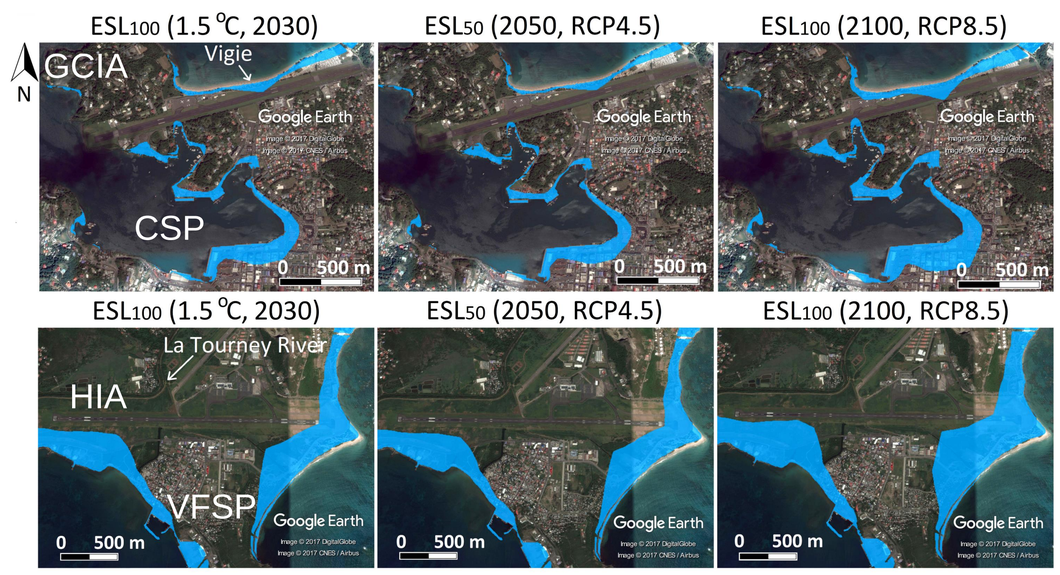
2 under the 1.5 °C SWL, Boeing 737-800 aircrafts will have to decrease their take-off load for 65 d/y at SIA and 24 d/y at NMIA

3 for the Jamaican seaports, the 1.5 °C SWL will increase the baseline energy requirements by 4% for 214 d/y. Saint Lucia seaports are projected to experience similar trends

Coastal flooding

Extreme coastal inundation is driven by extreme sea levels (***ESLs***), considered here as the sum of the mean sea level, the astronomical tide and the episodic coastal water level rise due to storm surges and wave set ups. Inundation maps for the critical transportation assets were obtained using the Lisflood-ACC (LFP) model.

In ***Jamaica***, even under the 1.5 °C SWL, the 100-year event will cause considerable flooding of the ***SIA*** runway. ***NMIA*** is less prone to coastal inundation. Under the 1.5 °C SWL, some areas of the ***KCT*** seaport are projected to be flooded under the 100-year event, whereas by 2100 extensive areas will be affected. The ***HFCP*** cruise port will be very moderately affected until the 2080s.



In ***Saint Lucia***, under the 1.5 °C SWL, ***GCIA*** appears vulnerable to the 100-year event mostly at its northern side (Vigie beach). ***HIA*** appears vulnerable at its eastern (seaward) edge. ***CSP*** is projected to be severely affected by the 100-year event under the 1.5 °C SWL. ***VFSP*** appears vulnerable to coastal flooding under all tested scenarios.

For technical details, see also Monioudi et.al, Climate change impacts on critical international transportation assets of Caribbean Small Island Developing States (SIDS): the case of Jamaica and Saint Lucia. Reg Environ Change (2018). https://doi.org/10.1007/s10113-018-1360-4

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