Multi-year Expert Meeting
on Transport, Trade Logistics and Trade Facilitation:

Trade Logistics and the 2030 Agenda for Sustainable Development

23-24 October 2017

by

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Multiyear Expert Meeting on Transport Trade Logistics and Trade Facilitation 2017

Geneva, 23-24 October 2017

Climate change impacts and adaptation for key coastal transport infrastructure and regulatory approaches to ship-source pollution control in support of the 2030 Sustainable Development Agenda

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Focus of the Session:
Diverse environmental challenges with reference to the SDGs

Presentations will

- highlight the importance of climate related risk assessment for seaports and airports in SIDS, including in the context of SDGs 1.5, 9 and 13
- provide an overview of regulatory developments in support of SDG 14, including in particular ship-source pollution control and C02 emissions from international shipping

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Relevance in the context of the SDG 2030 Sustainable Development Agenda

2030 Agenda adopted in September 2015, effective as of 1st January 2016

Consensus by international community on a 'plan of action' involving 17 sustainable development goals with 169 associated targets, which are '***integrated and indivisible, global in nature and universally applicable***'

Sustainable and resilient transport among the cross-cutting issues, of relevance for achievement of progress on several of the goals and targets, e.g.

SDG 13	Take urgent action to **combat Climate Change and its impacts**
SDG 9	**Build resilient infrastructure**, promote inclusive and sustainable industrialization and foster innovation
SDG 14	**Conserve and sustainably use the oceans**, seas and marine resources for sustainable development
SDG 1.5	By 2030, **build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events** and other economic, social and **environmental shocks and disasters**

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Relevant Sustainable Development Goals (SDGs) and targets

SDG	Target	Description
SDG 1	1.5	By 2030, build the resilience of the poor and those in vulnerable situations and ***reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters***
SDG 9	9.1	Develop quality, ***reliable, sustainable and resilient infrastructure,*** including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
	9a	***Facilitate sustainable and resilient infrastructure development in developing countries*** through enhanced financial, technological and technical support to African countries, LDCs, LLDCs and SIDS
SDG 11	11b	By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, ***mitigation and adaptation to climate change, resilience to disasters,*** and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels
SDG 13	13.1	***Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries***
	13.2	***Integrate climate change measures into national policies, strategies and planning***
	13.3	Improve ***education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning***
SDG 14	14.1	By 2025, prevent and ***significantly reduce marine pollution of all kinds***, in particular from land-based activities, including marine debris and nutrient pollution
	14.2	By 2020, ***sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts***, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans
	14c	***Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources***, as recalled in paragraph 158 of 'The future we want'

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Climate Variability and Change – CV & C

- A global challenge and "*defining issue of our era*" (UN SG Ban Ki Moon)
- Compelling scientific evidence (IPCC AR5, 2013)
- Huge potential costs associated with inaction (at least 5 % of the Global GDP, annually (STERN Review 2006))
- A development threat particularly for the Least Developed Countries (LDCs) and the Small Island Developing States (SIDS)
- Since 2008, integration of climate change considerations into UNCTAD's work on transportation

  See unctad.org/ttl/legal for further information

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CV & C implications for Transport

The Climate Change debate: two sides of the "coin": causes - effects

- **Mitigation**: action directed at addressing CC causes (long-term)
- **Adaptation**: action directed at coping with impacts of CV & C (short- and long- term); requires understanding of impacts, which vary considerably by physical setting, type of forcing, sector, mode, region etc.

In Transport:

- much of international debate/policy action focuses on CC mitigation (i.e. reduction / control of GHG emissions)
- comparatively little focus on study of impacts and development of adaptation policies/actions

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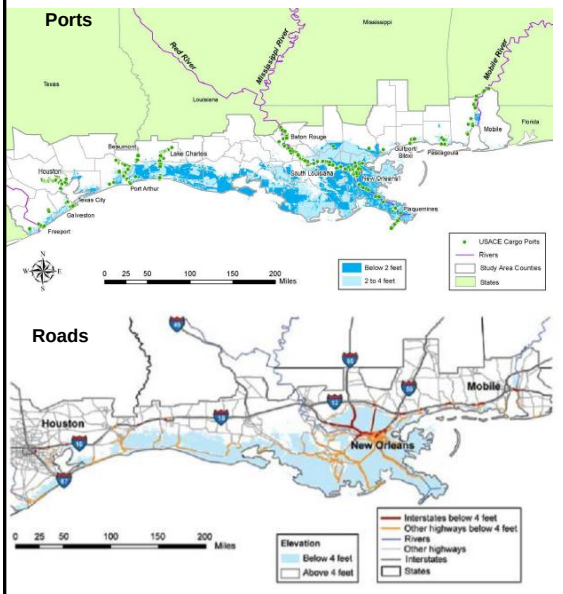
CV & C Impacts on Transport

Direct and *indirect* impacts on transport infrastructure and services

Sea-level rise, temperature and precipitation changes, extreme storms and floods and other climatic factors are likely to

- affect seaports, airports and other coastal transport infrastructure, and may cause delay and disruption along the broader supply-chain
- affect demand for shipping/air transport
- exacerbate other transport-related challenges

Enhanced climate resilience / climate change adaptation for transport infrastructure is key



US Gulf Coast study (US DOT)

Flood risk at US Gulf coast under sea level rise 0-6-1.2 m.

Relative sea level rise of about 1.2 m (4 feet) could permanently inundate:

- over 70% of existing port facilities
- 3 airports
- more than 2400 miles of roads, and
- 9% of the railway lines

Temporary flooding from storms can also be devastating

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Major climate change impacts on coastal transport infrastructure

Factor	Impacts
Sea level (mean and extreme)	**Coastal transport infrastructure**
• Mean sea level changes • Increased destructiveness of storms/storm surges • Changes in the wave energy and direction	Damages to seaport and airport infrastructure/cargo from incremental and/or catastrophic inundation and wave regime changes; higher infrastructure construction/maintenance costs; sedimentation/dredging issues in port/navigation channels; effects on key transit points; increased risks for coastal road links; relocation of people/businesses; insurance issues
Precipitation	
• Changes in the intensity and frequency of extremes (floods and droughts)	Seaport, airport, and road infrastructure inundation; damage to cargo/equipment; and vital node damage (e.g. bridges)
Temperature	
• Higher mean temperatures, • Heat waves and droughts • Increased variability in temperature extremes	Damage to infrastructure/equipment/cargo and asset lifetime reduction; higher energy consumption for cooling cargo; changes in transport demand; lower aircraft payloads allowed-need for runway extension

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The special case of the SIDS

Large dependency on imports (i.e. international transport)

Key concerns: connectivity and transport costs (accessibility and affordability)

High transport costs (e.g. transport costs in Caribbean trade at least 30 % higher than the world average, Pinnock and Ajagunna, 2012)

Coastal transport infrastructure (seaports and airports): critical lifelines for external trade, food, energy, tourism (cruise-ships and air transport)

These international transportation assets are threatened by sea level rise and extreme events (storms)

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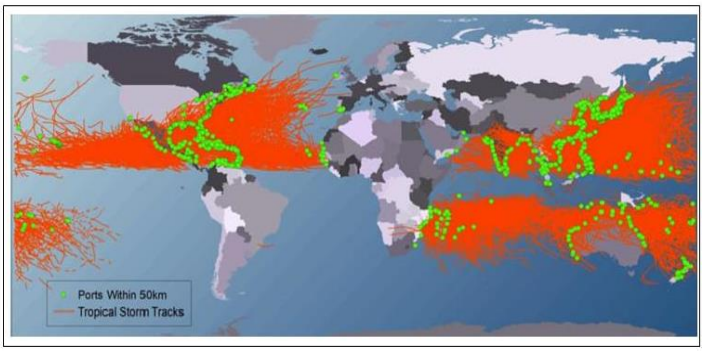
SIDS are vulnerable to storms



Seaports within 50 km of tropical sea storm tracks (1960–2010). Port and storm data from National Geospatial-Intelligence Agency (2011) and Knapp et al. (2010). (Becker et al., 2013)

N.B. Airports in SIDS are mostly located at low coastal elevations, due to physical constraints (volcanic islands with little level land)

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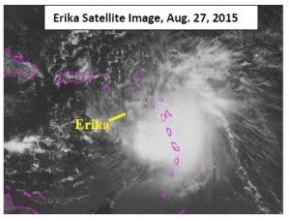
Storm impacts on SIDS: Tropical storm Erika impacts on Dominica



Rainfall on 27th August: 434 mm

Transport infrastructure damages: (a) bridge and (b) airport apron

An initial assessment of impacts:

- Erika resulted in total damage/loss of EC$1.30 billion (US$483 million), (90 % of GDP)
- The majority (60 %) of damages and losses were sustained in the transport sector

(Source: Rapid Damage and Impact Assessment, Tropical Storm Erika – August 27, 2015 Report by the Government of the Commonwealth of Dominica September 25, 2015)

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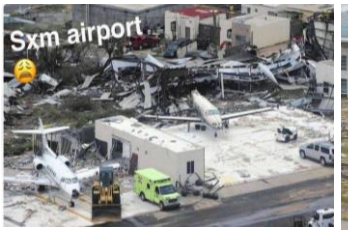
Storm impacts on SIDS: Recent hurricanes 2017

- Hurricanes Irma and Maria have had major impacts on coastal transport infrastructure across the Caribbean region
- Too recent events for detailed assessments

St Maarten



Source: https://sxmgovernment.files.wordpress.com/2017/09/hurricane-irma-destroys-st-maarten-princess-juliana-airport-photo.jpg

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Climate change impacts on coastal transport infrastructure in the Caribbean: Enhancing the adaptive capacity of Small Island Developing States

DRR and adaptation of coastal transport infrastructure to CV & C critical for the sustainable development of SIDS

- Focus on key coastal transport infrastructure (i.e. airports and ports) in SIDS
- Case-study approach involving 2 Caribbean SIDS (Jamaica and St Lucia)
- Objectives:
  - To enhance the adaptive capacity at the national level (case-study countries)
  - To develop a transferable methodology for assessing climate-related risk and vulnerability, with a view to effective adaptation planning for coastal transport infrastructure in Caribbean SIDS
- Technical expert group meeting (2016) to review, discuss and provide substantive inputs
- 2 national and 1 regional capacity building workshops in 2017

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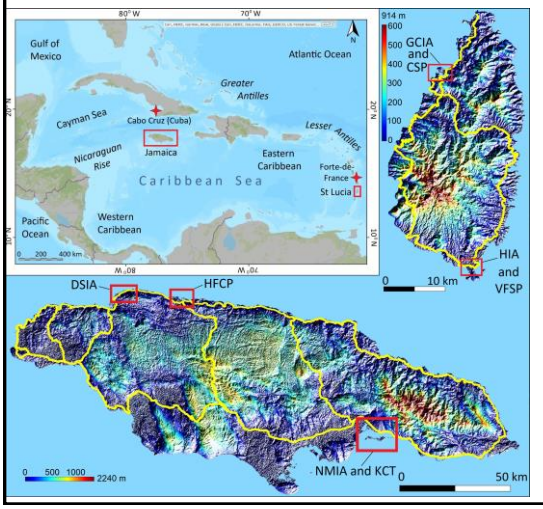

Some findings:

High risk of marine flooding for key international transport assets under extreme events and different Climate Change scenarios

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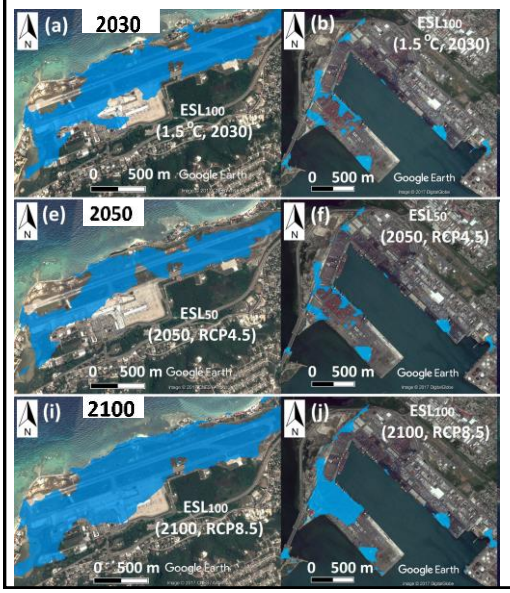
Marine flooding projections for coastal transportation assets under CV & C: Jamaica



- Dynamic modeling inundation projections for coastal assets
- Many scenarios were tested
- DSIA (70% of international tourist arrivals) and Kingston seaport (KCT) appear vulnerable under all scenarios

Inundation maps for: (a, e, i) Donald Sangster International Airport (DSIA, Montego Bay, Jamaica); (b, f, and i) of Kingston Container Terminal (Kingston, Jamaica) under the 1-100 year extreme sea level event- ESL100 (for 1.5 ˚C temperature increase, 2030), 1-50 year extreme sea level event -ESL50 (2050, RCP4.5) and ESL100 (2100, RCP8.5)

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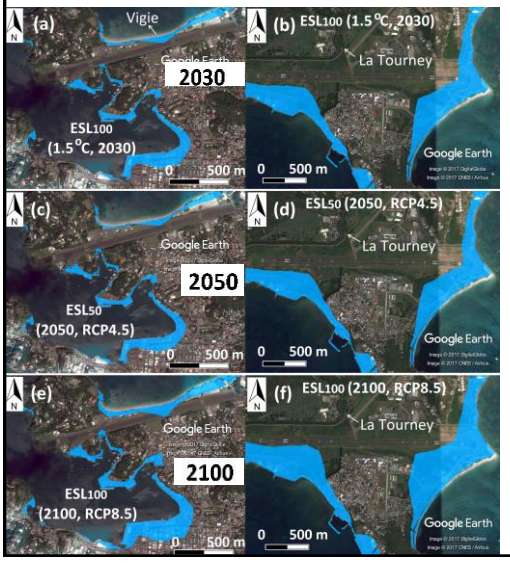
Marine flooding projections for coastal transportation assets under CV & C: Saint Lucia



All international transportation assets (seaports and airports) appear vulnerable under all scenarios

Flooding of (a, c, e) George Charles international airport and Castries seaport and (b, d, f) Hewanorra international airport and Vieux Fort seaport under the 1-100 year extreme sea level event- ESL100 (for 1.5 ˚C temperature increase, 2030), 1-50 year extreme sea level event -ESL50 (2050, RCP4.5) and ESL100 (2100, RCP8.5).

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Thank you!

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UNCTAD's work on climate change impacts and adaptation for coastal transport infrastructure and follow-up

(see further http://unctad.org/en/Pages/DTL/TTL/Legal/Climate-Change-and-Maritime-Transport.aspx)

2009 Follow-up	**UNCTAD Multiyear Expert Meeting: "*Maritime Transport and the Climate Change Challenge*"** UNCTAD edited multidisciplinary book: **Maritime Transport and the Climate Change Challenge** UN-Earthscan (Routledge/Taylor&Francis) (2012) 327 pp
2010 Follow-up	**Joint UNECE-UNCTAD Workshop:** **"*Climate change impacts and adaptation for international transport networks*"** UNECE *Group of Experts on Climate Change Impacts and Adaptation for International Transport Networks* (2011-2014); mandate extended in 2015; 2012 International Conference - including session on SIDS 2013 EG Report - *Climate Change Impacts and Adaptation for International Transport Networks*
2011 Follow-up	**UNCTAD Ad Hoc Expert Meeting**: **"*Climate Change Impacts and Adaptation: a Challenge for Global Ports*"** Academic paper co-published by Experts (2013) Becker et. al, **A note on climate change adaptation for seaports**, Climatic Change, 2013
2014	**UNCTAD Ad Hoc Expert Meeting: "Addressing the Transport and Trade Logistics Challenges of the Small Island Developing States (SIDS): Samoa Conference and Beyond"** **UNCTAD Multiyear Expert Meeting: "*Small Island Developing States: Transport and Trade Logistics Challenges***
Ongoing	**UNCTAD Port-Industry Survey on Climate Variability and Change**
Ongoing	**UNCTAD DA Project *"Climate change impacts on coastal transport infrastructure in the Caribbean: Enhancing the adaptive capacity of Small Island Developing States (SIDS)"***