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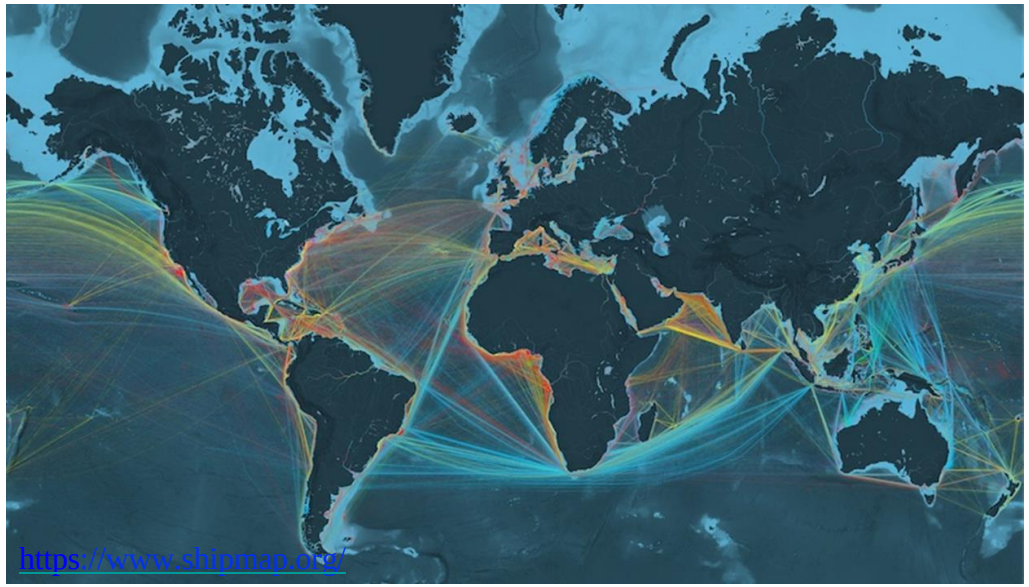
Zooming in on target-setting, metrics, methodologies and indicators

Climate change adaptation and resilience-building for seaports - key challenges and gaps from a global perspective

Regina Asariotis
Chief, Policy and Legislation Section, DTL, UNCTAD
unctad.org/ttl/legal
regina.asariotis@unctad.org

Seaports are critical for global trade & sustainable development but are at risk of climate change

- Over **80% of volume** of world trade carried by sea (port-port)
- **Ports: key nodes** in the network of closely interlinked international **supply chains** - **gateways to global markets and the blue economy – lifelines for SIDS**
- **Globalization: interconnectedness/interdependence**


https://www.shipmap.org/

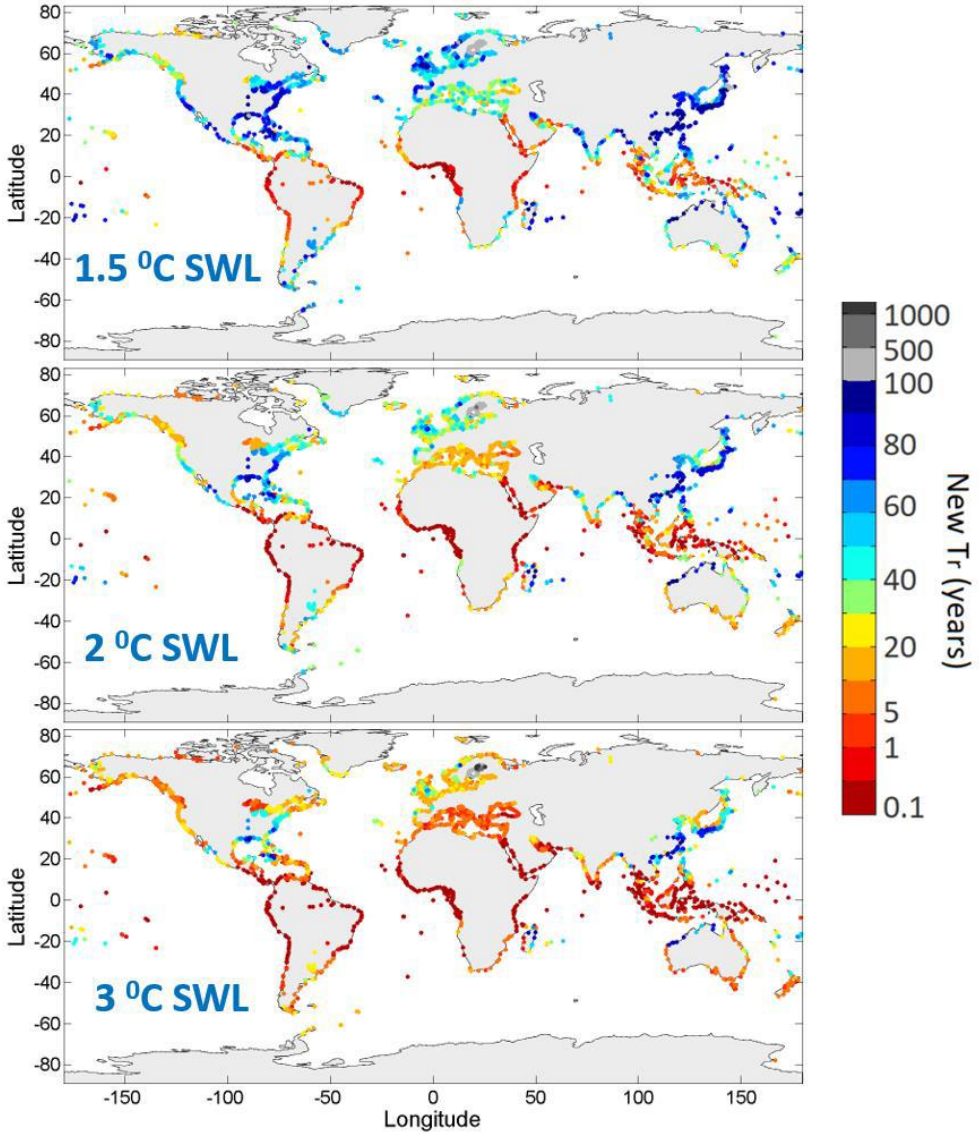
Climate change will have direct and indirect impacts:

Sea-level rise; changes in temperature, humidity, precipitation; extreme storms and floods under climate change likely to:

- affect port infrastructure and operations; hinterland transport; and the broader global supply-chain
  - significant potential for ***damage, disruption and delay*** **– extensive economic/trade related losses**
- exacerbate transport-related challenges, including for SIDS/vulnerable economies; increase energy needs and costs

Climate change adaptation and resilience building for ports is of strategic economic importance – especially in the light of growing risks (*Climate change impacts on seaports: a growing threat to sustainable trade and development*, 2021)

Hazard projections for global ports under CV & C: Extreme sea level (ESL)



All global ports affected, with effects worsening as the SWL increases

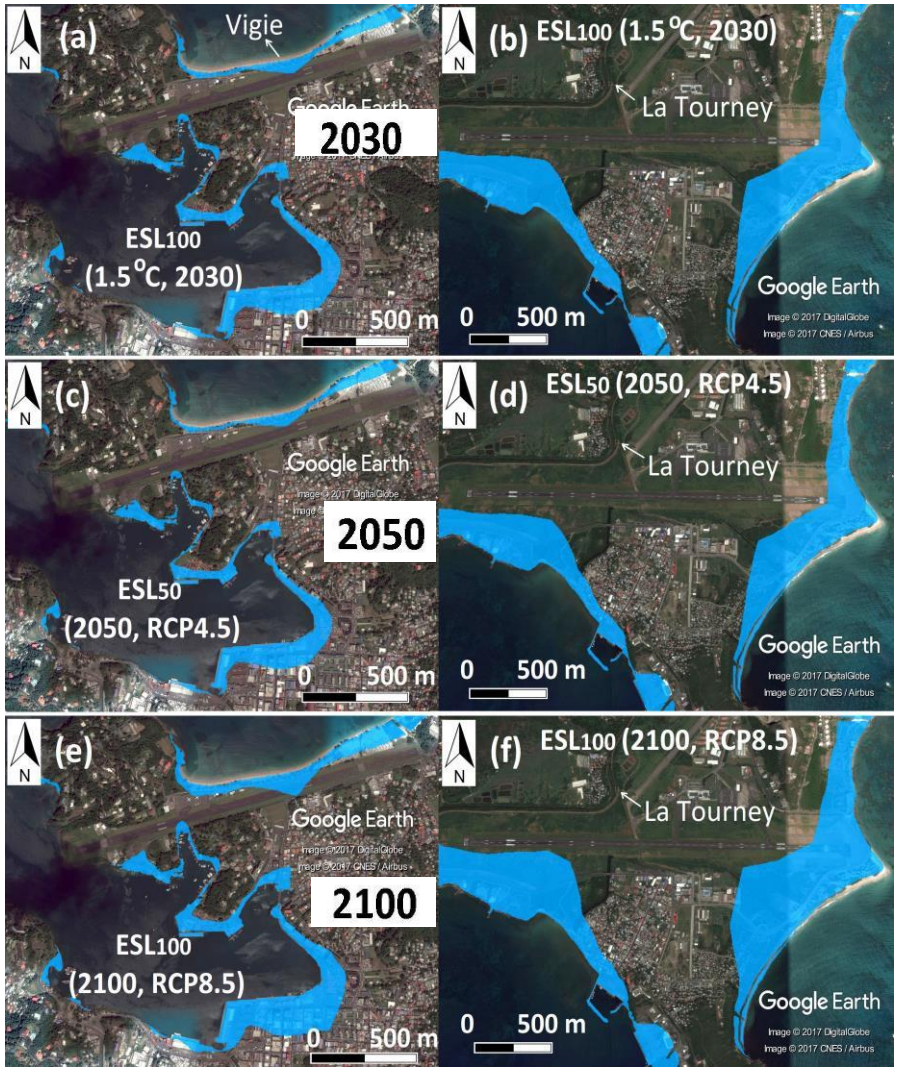
Even under a SWL of 1.5⁰ C, return period of the baseline 1-in-100 years ESL will decrease to every 1 to 10 years for ports in tropical /sub-tropical regions

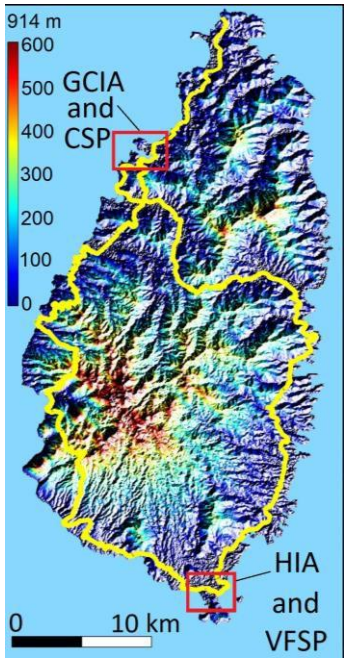
Under a SWL of 3⁰ C, many global ports will experience the baseline 1-in-100 years ESL several times per year

Projected changes in the return period of the baseline (mean of 1986- 2014) 1-in-100 years ESL under CV &C for about 3700 global ports. *Key: SWL (Specific Warming Level) in ⁰C above pre-industrial times. Tr (years) return period. Seaport location from World Port Index 2019. $ESLs_{100}$ projections for the global coastline from EC-JRC data collection (see also Vousdoukas et al. (2018). See Asariotis (2021)*

Exposure - Coastal flooding projections under CV & C:

SIDSport-ClimateAdapt.unctad.org – 8 Ports and Airports in Jamaica and Saint Lucia





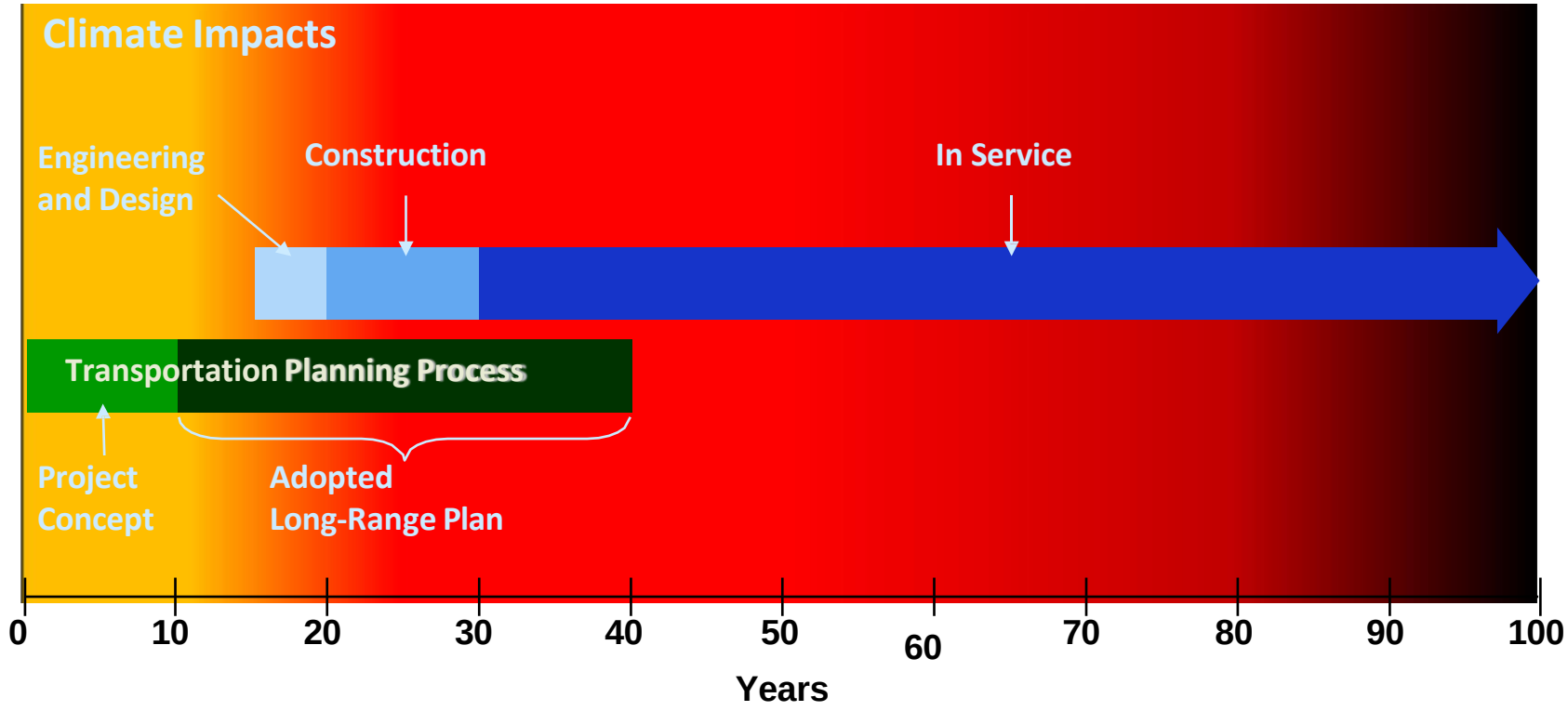
Exposure needs to be understood to adapt effectively

Requires assessment at local / facility level

All international transport assets (ports/airports) of Saint Lucia are **at high risk, under all scenarios, and from as early as 2030s**

Marine flood maps: *(a, c, e) George Charles Int. Airport; Castries seaport; (b, d, f) Hewanorra Int. Airport; Vieux Fort seaport for the: 1-100 year extreme sea level event, ESL100 (1.5C SWL, 2030); 1-50 year extreme sea level event, ESL50 (2050, RCP4.5); ESL100 (2100, RCP8.5). (Monioudi et al, 2018, Reg Env Change; see also IPCC 2018; IPCC SROCC 2019)*

Transportation Infrastructure: Timeframes vs. Climate Impacts



Source: Savonis, 2011

How prepared are we?

Huge potential costs associated with inaction:

- **Under current conditions global average annual storm damages to ports** estimated at **roughly US$ 3 billion. By 2100, additional annual damages/port disruption costs** projected to be **up to US$ 25.3 billion** (*EDF, 2022, Act Now or Pay Later: The Costs of Climate Inaction for Ports and Shipping*)
- **Hurricanes/Tropical Storms**: e.g. Sandy (2012): over US$ 60 billion in NY/NJ/Connecticut
- For SIDS, a single extreme event can cause L&D amounting to a significant share or multiple of GDP

- **By 2100 global flood damages due to SLR** (and related extreme events) may be **up to US$ 27 trillion/year – about 2.8% of global GDP** (*Jevrejeva et al 2018, Environ. Res. Lett*)

- **By 2100, total value of assets exposed to episodic coastal flooding** could increase to **12 – 20 % of global GDP**, if no adaptation measures are taken (*Kirezci et al 2020, Sci Rep 10, 11629*)

Action needed to adapt and build resilience

Accelerate action to ensure that by 2030 critical transport infrastructure is climate resilient to 2050 *(cf. MPGCA Milestones ('Transport' & 'Resiliency')* - will be key in achieving progress on many SDGs (incl. 1.5, 9, 13, 14), SFDRR, GGA

- **High-quality risk and vulnerability assessments**, based on the best available science/data needed to **improve understanding of impacts on ports,** guide effective **adaptation responses and prioritization of resources**
- **Improve data** collection/availability; **plan early** (asset lifespan); adopt **systems approach**; **avoid maladaptation** / over-engineering; integrate **ecosystem approaches**
- **Mainstream** CC considerations in port infrastructure planning/operations
- **Increase capacity building and (affordable) infrastructure adaptation finance for developing countries** (UNCTAD, 2022)
- Develop and implement strong **policy and legal frameworks**; as well as **standards** (eg ISO 14090; ISO 14091), technical **guidance** (eg PIANC 2020; 2022; EC, 2021), **methodological tools** (e.g UNCTAD)
- Integrate considerations into **NAPs, NDCs**, as well as Development, DRR and COVID-recovery policies / planning

Key messages

- Seaports are **essential for global trade and development** and **access to the blue economy** but are at high and growing **risk of climate change impacts.** Significant economic **costs of inaction and threat to sustainable development**, including for SIDS that depend on ports as lifelines
- Much is at stake - Failure to adapt is not an option and time is of the essence (infrastructure lifespans/projections).
- Enhancing and measuring progress on port adaptation is critical for implementation of 2030 Agenda and SFDRR but not covered by existing indicators.
- To avert and minimize potentially crippling L&D, GGA targets, metrics, methodologies, indicators should focus on **key outcomes** (including from a global commons perspective) and **promote, enhance and capture implementation of measures that are fit-for-purpose and effective** e.g.
    - *Major/critical ports climate-resilient to at least 2050?*
    - *NAPs/Policies/Legislation in place that require and facilitate high-quality risk and vulnerability assessments / climate proofing of ports and other critical infrastructure? [note e.g. EU approach; EU Climate Law, TEN-T]*
    - *Climate-finance for port infrastructure adaptation in developing countries is adequate and affordable?*

See also MPGCA Transport Action Pathway recommendations/milestones (impact area 3)

Many thanks!

Related work by UNCTAD

2009 Follow-up	**UNCTAD Multiyear Expert Meeting: "*Maritime Transport and the Climate Change Challenge*"** UNCTAD ed. multidisciplinary book: **Maritime Transport and the Climate Change Challenge** UN-Earthscan (2012)
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* 2013 EG Report - *Climate Change Impacts and Adaptation for International Transport Networks* 2020 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*"** 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 SIDS: Samoa Conference and Beyond*"** **UNCTAD Multiyear Expert Meeting: "*Small Island Developing States: Transport and Trade Logistics Challenges***
2017-18	**UNCTAD Port-Industry Survey on Climate Change Impacts and Adaptation**
2015-2017 Follow up	**UNCTAD DA Project - SIDSport-ClimateAdapt.unctad.org** ***"Climate change impacts on coastal transport infrastructure in the Caribbean: Enhancing the adaptive capacity of Small Island Developing States (SIDS)*** Monioudi et. al, **Climate change impacts on critical international transportation assets of Caribbean SIDS: the case of Jamaica and Saint Lucia**, Reg Environ Change 2018: 2211
2019-2020 **2021-2022**	**UNCTAD Ad Hoc Expert Meeting**: ***"Climate Change Adaptation for International Transport: Preparing for the Future"*** **UNCTAD – UNEP** ***"Climate-resilient transport infrastructure for sustainable trade, tourism and development in SIDS"*** *Climate Change Impacts and Adaptation for Coastal Transport Infrastructure: A Compilation of Policies and Practices* **UNCTAD Multiyear Expert Meeting**: *"Climate Change Adaptation for Seaports in Support of the 2030 Agenda"* **Climate change impacts on seaports: a growing threat to sustainable trade and development** (2021) **Climate-resilience of seaports: Adequate finance is critical for developing countries but remains a major challenge**