Contribution by the UNCTAD secretariat to Part I of the 2017 report of the Secretary-General on Oceans and the Law of the Sea: "The effects of climate change on oceans"

1. *Effects of climate change on the oceans – environmental, social and economic*

International maritime transport, like other economic sectors, faces a dual challenge in respect of climate change: the need to reduce its carbon emissions and, at the same time, adapt to the potentially wide-ranging impacts of climatic changes.

A number of issues lie at the interface of maritime transport, climate change and the oceans given the role of shipping as the backbone of international trade and globalisation, its heavy reliance on fossil fuels for propulsion and related implications for oceans sustainability. Shipping is the most energy-efficient mode of transport when moving large volumes of cargo. In 2015, UNCTAD estimated that over 80 per cent of global merchandise trade by volume was carried by sea by about 89,500 marine vessels.[1] Despite the economic importance of this ocean-based sector, it is nevertheless an important contributor of carbon dioxide (CO2), nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM) emissions.[2] In this context, a better understanding of the effects of climate change on the oceans requires that the contribution of shipping to climate change and air pollution also be better understood. Clarifying the interaction between climate change, shipping and sustainable use of the oceans will enable informed decisions and adequate sustainability response measures that enhance the resilience of the oceans.

Much of the international debate and policy action in relation to climate change and international transport is with a focus on the issue of mitigation, i.e. on efforts to reduce carbon emissions. By comparison, much less emphasis has so far been placed on the other side of the "climate change coin", i.e. the assessment of potential climate change impacts on transport infrastructure and operations and the development of adaptation measures. At the same time, recent studies have shown that climate change – induced weather conditions may have very significant implications for transport, and, thus, for the sustainability of economies and livelihoods at the global, regional and national level. Ports for instance - key nodes in the global network of supply chains - are likely to be affected directly and indirectly by climatic changes, such as rising sea levels, extreme weather events and rising temperatures, with broader implications for international trade and development.

Given the strategic role of seaports and of other key transport infrastructure as part of the global trading system, enhancing their climate resilience is an important issue and one in respect of which UNCTAD's research and analytical work, as well as the outcomes of a series of UNCTAD expert meetings, since 2008, have helped to raise awareness and advance the international debate. Ongoing work includes a technical assistance project, with a particular focus on climate change impacts and adaptation for transport infrastructure in Caribbean SIDS.[3]

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[1] UNCTAD (2016). Review of Maritime Transport 2016. New York and Geneva.

[2] 3rd IMO GHG Study (2014).

[3] For further information about relevant activities and substantive outputs, see the UNCTAD website at http://unctad.org/ttl/legal.

For SIDS, often highly vulnerable to the impacts of climate variability and change, with limited adaptive capacity, addressing the impacts of climate variability and change on ports and coastal transport networks is particularly important. Ports and airports in coastal zones are critical lifelines for trade, food, energy and tourism. These, along with the facilitating transport infrastructure, including seaports, airports, coastal access roads, are all threatened by climate-driven coastal and beach erosion.

2. *Action undertaken to address the effects of climate change on the oceans and to foster climate resilient sustainable development of oceans and seas*

(i) UNCTAD actions to address the effects of climate change on the oceans and to foster climate resilient sustainable development of oceans and seas: focus on climate change impacts and adaptation for seaports and coastal transport infrastructure

UNCTAD has been working, 'ahead of the curve', on the implications of climate change for maritime transportation, since 2008.[4] The ***particular focus of this work is on impacts and adaptation needs of seaports and other coastal transport infrastructure*.** With an estimated 80 per cent of the volume of world trade carried by sea, international shipping and ports provide crucial linkages in closely interconnected global supply-chains and are essential for the ability of all countries, including those that are landlocked, to access global markets. Ports are likely to be affected directly and indirectly by climatic changes, such as rising sea levels, extreme weather events and rising temperatures, with broader implications for international trade and for the development prospects of the most vulnerable nations, in particular LDCs and SIDS. Relevant work contributes directly to implementation of SDG targets 1.5, 9.1, 9.a, 11.b, 13.1, 13.2 and 13.3, as well as to implementation of the AAAA and the SAMOA Pathway.

UNCTAD's research and analytical work in the field as well as relevant consensus-building activities have significantly helped to raise awareness and advance the international debate; important synergies are created through excellent inter-agency cooperation and through the establishment of a committed multidisciplinary network of experts. UNCTAD's work has been cited in several chapters of the 5th Assessment Report of the IPCC WG II Report on Impacts and Adaptation (2014), as well as in the *Climate Change Policy Framework for Jamaica* (2015).

- Academic publications include an **UNCTAD edited book on "*Maritime Transport and the Climate Change challenge*"**, co-published in 2012 by the UN and Earthscan, and providing detailed insight on a range of the potential implications of climate change for this key sector of global trade; as well as a **multidisciplinary academic paper**, published in 2013 and co-authored by experts following an UNCTAD Expert Meeting. See Becker et. al, "*A Note on Climate change adaptation for seaports: A challenge for global ports, a challenge for global society*". Climatic Change (2013) doi:10.1007/s10584-013-0843-z.

- Other relevant initiatives by the UNCTAD secretariat include a number of **intergovernmental meetings** which have focused on the implications of climate change for maritime transport, highlighting in particular the need to adapt to the impacts of climate change. They include an Ad-Hoc Expert Meeting on "*Climate Change Impacts and Adaptation: A Challenge for Global Ports*", held in September 2011, a Joint UNECE-UNCTAD Workshop on "*Climate Change Impacts on International Transport Networks*", held in September 2010, and a Multi-year Expert Meeting on

[4] See http://unctad.org/en/Pages/DTL/TTL/Legal/Climate-Change-and-Maritime-Transport.aspx for further information and documentation.

Transport and Trade Facilitation with a focus on "*Maritime Transport and the Climate Change Challenge*", held in February 2009. Full background documentation relating to these meetings is available on the relevant meetings webpages. The implications of climate change for coastal transport systems were also considered at two Expert Meetings with a focus on the transport-related challenges facing Small Island Developing States (SIDS), namely the third session of the Multi-year Expert Meeting on Transport, Trade Logistics and Trade Facilitation, "*Small Island Developing States: Transport and Trade Logistics Challenges*", held on 24-26 November 2014, and the Ad Hoc Expert Meeting on "*Addressing the Transport and Trade Logistics Challenges of the Small Island Developing States (SIDS): Samoa Conference and Beyond*", held on 11 July 2014.

- Ongoing work with a particular focus on SIDS includes a **technical assistance** project on "***Climate change impacts on coastal transport infrastructure in the Caribbean: enhancing the adaptive capacity of SIDS***" (UNDA 9th tranche), which is being implemented over the period 2015-17. A case-study focusing on two vulnerable SIDS in the Caribbean region (Jamaica and St. Lucia) is being carried out to enhance the knowledge and understanding at the national level and to develop a methodology for assessing climate-related impacts and adaptation options. The methodology will, subject to location-specific modifications, be available for use in other SIDS within the Caribbean region as well as in other geographical regions. A *Technical Expert Group Meeting on Climate change impacts and adaptation for coastal transport infrastructure in Caribbean SIDS* was convened on 29 June-1 July 2016 in Geneva, to discuss and refine the draft case-study reports and draft methodology. Work under the project has been selected as one of the case-studies included in the report of the *UN Secretary-General's High Level Advisory Board on Sustainable Transport "Mobilizing Sustainable Transport for Development"*, published in October 2016.

- Also worth noting is a joint ***International Seminar on Oceans Economy and Trade: Sustainable Fisheries, Transport and Tourism***, co-organized by UNCTAD, the Commonwealth Secretariat and the International Oceans Institute and held on 10-12 May 2016 in Geneva. The event focused on SDG 14 as well as on other Sustainable Development Goals and targets and considered, *inter alia*, a range of interconnected issues related to sustainable transport, ship-source pollution prevention and control and climate change adaptation for ports and other critical transport infrastructure.

- As part of its collaboration with intergovernmental and non-governmental organizations, UNCTAD participates in a ***Working Group on climate change adaptation for maritime and inland port and navigation infrastructure***, which was established in 2015 by **PIANC**, the key NGO representing global waterborne transport infrastructure, to prepare some industry guidelines for adaptation planning; UNCTAD has also participated in the ***Advisory Panel for the peer-review of the Regional Framework for Adaptation to Climate Change in coastal and marine areas in the Mediterranean***. The Framework has been developed by UNEP/MAP, and was endorsed by the Contracting Parties to the *Barcelona Convention for the Protection Of The Mediterranean Sea Against Pollution*, at their 19th meeting in 2016.

- UNCTAD continues to collaborate closely with the ***UNECE Expert Group on Climate Change Impacts and Adaptation for International Transport Networks and Nodes***, which had been established in 2011, following a joint UNCTAD-UNECE workshop on the issue (**"*Climate change impacts and adaptation for international transport networks*"** (2010)) and whose mandate was extended in 2015.

- UNCTAD contributes actively to relevant inter-agency work under the auspices of **UN-OCEANS**, and the ***Technical Working Group to support the UN Secretary-General's High Level Advisory Board on Sustainable Transport***. To this end, UNCTAD has contributed to several technical documents prepared by the TWG, as well as to the final report of the Secretary-General's High-Level Advisory Group on Sustainable Transport and the program of the ***Global Sustainable Transport Conference***, initiated by the UN Secretary-General and held in Ashgabat, in November 2016.

- Following the entry into force of the historic Paris Agreement, UNCTAD co-organized and contributed to several UN system side-events held at UNFCCC **COP 22 in Marrakech**, in November 2016 highlighting UNCTAD's work on climate change impacts and adaptation for transport infrastructure and drawing attention to issues arising for the most vulnerable countries, including SIDS. This includes a joint ***ICAO-IMO-UNCTAD side event on 'SDG 9: Sustainable Industrialisation and International Transport- International maritime and air transport'*** (8 November 2016), as well as a ***UN-OCEANS side-event with a focus on SDG 14: "Oceans: Science based solutions for achieving adaptation and mitigation goals***" (9 November 2016).

- UNCTAD also contributed a presentation on ***Small Island Developing States (SIDS): Challenges for Sustainable Transport*** to an ***Expert Group Meeting on "Special Needs and Challenges in Developing Countries for Achieving Sustainable Transport"***, organized by UNDESA on 10-11 May 2016 in New York; as well as contributed to a presentation on "***Connectivity for Small Island Developing Countries***" by the Director of the Air Transport Bureau of ICAO, at the ***2016 World Aviation Forum***, 26 September 2016.

- Most recently, as part of its contribution to the first ***UN Global Sustainable Transport Conference***, held in Ashgabat, Turkmenistan on 26-27 November 2016,[5] UNCTAD co-led and participated in a high-level thematic panel on "***Sustainable Transport Solutions to the Climate Crisis***", highlighting key challenges in respect of climate change adaptation and resilience building for transport infrastructure. UNCTAD also made a presentation with a focus on "***Climate Change Impacts and Adaptation for Transport Infrastructure in SIDS***" at a side event on "*Aviation partnerships for sustainable development*", jointly organized by ICAO and UN-OHRLLS. The Ashgabat Statement,[6] issued at the end of the Conference, highlights the importance of effective climate change adaptation and DRR for critical coastal transport infrastructure, in particular in SIDS, as well as the related urgent need for capacity-building and financing.

[5] https://sustainabledevelopment.un.org/Global-Sustainable-Transport-Conference-2016

[6] See the *Ashgabat Statement on Commitments and Policy Recommendations of the Global Sustainable Transport Conference*, paras. 7, 16, 20, https://sustainabledevelopment.un.org/content/documents/11987Ashgabatstatement.pdf. The importance of climate change adaptation for transport infrastructure has also been reflected in the *Ashgabat Transport Business Summit Declaration*, agreed at a parallel event by the non-governmental Global Platform on Sustainable Transport GPST.

(ii) UNCTAD actions to address the effects of climate change on the oceans and to foster climate resilient sustainable development of oceans and seas: focus on energy efficiency and mitigation

- UNCTAD **technical assistance** programme on Sustainable freight transport (maritime, ports, rail, road, waterways) which focuses on building capacities and providing advisory services to developing countries, including Caribbean SIDS, to enable a reorientation towards sustainable freight transport through sound transport policy measures and financing mechanisms. The activities of the programme includes a training toolkit on sustainable freight transport and its financing (modules, handbooks, best practices, visual material, simulation models and presentations); 2) a web platform portal - http://unctadsftportal.org/ - which includes on-line toolkit, reports, case studies, programmes and a case study on sustainable shipping for the pacific Islands States; 3) a Reference Generic Framework on Sustainable Freight Transport that provide guidance and a step-by-step methodology and a sustainable freight rating scale for use by all interested parties and countries; and, 4) capacity building activities (workshops, training, advisory services, etc.).[7]

- UNCTAD, in collaboration with the SLoCaT (Partnership on Sustainable, Low Carbon Transport), organized, under the framework of the UNCTAD XIV Conference, a Ministerial Round Table on ***"Sustainable Transportation for Agenda 2030: Boosting the Arteries of Global Trade".*** A high-level panel of stakeholders from the public and the private sector, government, transport industry including the shipping industry, the United Nations system, academia and regional development banks considered the concept of sustainable freight transport, shared its experiences in this field and reflected on the need for a reference international framework to guide and orient the development and implementation of sustainable freight transport strategies, plans and programmes. Discussions reiterated the critical role of freight transport, including ocean-based maritime transport as an enabling factor of trade and development and the pressing need for an integrated treatment of the three dimensions of sustainability. http://unctadsftportal.org/unctad/unctad14/.

- UNCTAD contributed actively to transport-related activities carried out under the framework of the 22nd Conference of the Parties **(COP22) of the United Nations Framework Convention on Climate Change (UNFCCC) held on 7-18 November 2016 in Marrakesh**, Morocco. In addition to participation in various relevant COP22 side events (e.g. transport, energy, climate and sustainability), UNCTAD 1) organized a side event themed "***Strengthening the Focus on Freight Transport in the Climate Agenda***" (11 November 2016) and, 2) organized in collaboration with the UNEP/Climate & Clean Air Coalition (CCAC) and under the framework of the Transport Day organized by the Partnership on Sustainable Low Carbon Transport (SLoCaT), a breakout session on "***Making Freight Transport Fit for a Low Carbon Future***" (13 November 2016). The two events sought to help translate the political consensus of COP21 into tangible steps toward implementation of the Paris Agreement as well as enhance the visibility of the freight transport sector, including ocean-based maritime transport and strengthen its position as a key thematic area requiring action for an effective implementation of the Paris Agreement. Panelists and speakers from wide-ranging backgrounds such as representatives from government, the International Maritime Organization (IMO) and the International Civil Aviation Organization

[7] Additional information about UNCTAD's work in the field of transport and trade logistics, including sustainable and freight transport is available at: http://unctad.org/en/Pages/DTL/TTL/Infrastructure-and-Services.aspx.

(ICAO), industry, IGOs, NGOs, financing institutions, academia, civil society. http://unctadsftportal.org/unctad/cop22sideevent/ .

(iii) Some examples of actions undertaken by the maritime transport sector to address sustainability and climate change

- Many advances have been made possible as a result of the industry initiatives and technological developments. Relevant initiatives include building fuel-saving and environment-friendly ships, switching to cleaner fuels and increasingly adopting slow steaming, and promoting green ports development.

- Many shipping companies have been investing in and ordering eco-ships that are generally referred to as a new generation of vessels that are eco-friendly and at the same time fuel efficient. Example: Maersk triple E vessels, United Arab Shipping Company M.V. Barzan containership.

- Charterers representing 20 per cent of global shipped tonnage are adopting policies to avoid using inefficient ships based on their GHG emissions performance.[8]

- The Clean Cargo Working Group has developed tools and methodologies to help understand and manage sustainability impacts. Relevant measures include the average trade lane emissions data that can be used for a benchmarking of carrier's performance based on their carbon emissions as well as for more informed decisions by both carriers and shippers.[9]

- The Sustainable Shipping Initiative (SSI) that brings together leading companies from across the industry and around the world with the view to a sustainable future. Relevant activities include the launch of the Case for Action report in 2011 and efforts to promote greater uptake of sustainable shipping rating schemes to provide transparency and comparability and to enable cargo owners, charters and shipowners to integrate sustainability into commercial decisions.[10]

- The World Ports Climate Initiative (WPCI) under the International Association of Ports and Harbors (IAPH). The 50 participating ports in the WCPI are engaged in reducing GHG emissions from their activities, including by influencing the sustainability of supply chains.[11]

- IAPH Air quality and Greenhouse Gas Tool Box. [12]

- The initiative taken by the University of the South Pacific to promote energy efficiency and sustainable shipping via various research and pilot projects in collaboration with a network of

[8] International Transport Journal (2015). Charterers to exclude inefficient vessels. 29 May.
[9] Business for Social Responsibility (2014). Clean Cargo Working Group. Global Maritime Tradelane Emissions Factor. August.
[10] Sustainable Shipping Initiative. http://ssi2040.org/ .
[11] International Association of Port and Harbors World Ports Climate Initiative. http://wpci.iaphworldports.org.
[12] IAPH. IAPH Tool Box for Port Clean Air Program.

stakeholders and knowledge partners since 2012 to advance this agenda through a vast programme of research and technical assistance programmes.[13]

3. Further action necessary to address the effects of climate change on the oceans

Bearing in mind the potential for climate-related delays and disruptions across global supply-chains, enhancing the climate-resilience of transport infrastructure is going to be crucial for the implementation of many of the Sustainable Development Goals and targets. This is also recognized implicitly in the Addis Ababa Action Plan for Financing for Development and in the very recent Marrakech Action Proclamation for our Climate and Sustainable Development.

In view of the long service life of transport infrastructure, effective adaptation requires re-thinking established approaches and practices early. Moreover, a good understanding of risks and vulnerabilities is required for the development of well-designed adaptation measures that minimize the adverse effects of climatic factors. This, however, constitutes a major challenge. The potential adverse impacts of climate variability and change may be wide-ranging, but they vary considerably by physical setting, climate forcing and mode of transport, as well as other factors. Thus, for instance, ports in river deltas face different challenges from open-sea ports; and extreme events and flooding may affect transport infrastructure in some parts of the world, whereas melting permafrost could become a major problem in others.

Assessing the risks of climate change impacts on maritime transport infrastructure is, therefore, both complex and important. Losses associated with climate-related damage, delay and disruption may be extensive, as recent studies, including in the United States, Japan and at European level indicate. For the purposes of risk-assessment and with a view to developing effective adaptation measures, dissemination of more tailored data and information is important, as are targeted case studies and effective multi-disciplinary and multi-stakeholder collaboration. Guidance, best practices, checklists, methodologies and other tools in support of adaptation are urgently required, and targeted capacity building is going to be critical, especially for the most vulnerable countries. This includes SIDS, which depend on their ports and airports for food and energy needs, external trade and – crucially – tourism, which typically accounts for a major share of GDP. It also includes LLDCs, and transport infrastructure along international transport and transit corridors on which these countries depend for their external trade. In this context it is important for to explore ways to generate the necessary financial resources, especially for developing countries.

Ecosystem-based approaches to adaptation can enhance the resilience of coastal transport infrastructure against disaster risks by reducing local pressures resulting from unsustainable practices in fishing, tourism and other natural resource exploitation; they can provide no-regret options, that are cost effective and easy to implement, offering multiple services such as carbon storage, water filtration, support for biodiversity and recreational value.

Legal/regulatory approaches aimed at ensuring the climate resilience of infrastructure, including transport infrastructure, will also be important in the longer run. In this context, collaborative

[13] Closing the Distance: Partnerships for Sustainable and Resilient Transport Systems in SIDS, UNCTAD (2014). (http://unctad.org/en/PublicationsLibrary/dtltlb2014d2_en.pdf), based on Alison Newell, Peter Nuttall, Elisabeth Holland, Joeli Veitayaki and Biman Prasad (2014). Turning the Tide: the need for sustainable sea transport in the Pacific. (http://www.lowcarbonshipping.co.uk/files/ucl_admin/SCC/Turning-the-tide--the-need-for-sustainable-sea-transport-in-the-Pacific.pdf).

initiatives should be promoted and pursued to assist in the development of relevant guidance, tools and potential best practices.