

COUNTRY RESEARCH ON NATURAL DISASTERS AND TRADE SUMMARY

INTRODUCTION

1.1. On 26 April 2018, World Trade Organization (WTO) Members approved research funded by the Permanent Mission of Australia to study the impact of natural disasters on trade. The first stage of this work involved examination of the effects of natural disasters on the trade of some recently disaster-affected countries, together with trade policy issues arising. The research looked at the experience of six WTO Members in three regions. Country study one examined Dominica and Saint Lucia in the Caribbean, country study two looked at Nepal in South Asia and country study three surveyed Fiji, Tonga and Vanuatu in the Pacific. The research work was undertaken through a mixture of consultations with government and non-governmental organizations, together with desk research from published sources, including Trade Policy Reviews.

1.2. This note summarises the main findings of the three country research papers. A first section discusses natural hazards faced by the six Members together with the macroeconomic and trade impacts of recent natural disasters. Further sections deal with trade issues arising in disaster response, recovery and resilience among the same six recently disaster-affected WTO Members.

NATURAL HAZARDS, MACROECONOMIC AND TRADE IMPACTS

1.3. Dominica, Fiji, Nepal, Saint Lucia, Tonga and Vanuatu face a range of hydro-meteorological hazards (e.g. drought, flooding, landslides and storms, including cyclones and hurricanes) and geo-physical risks (e.g. earthquakes, tsunami and volcanoes). To varying degrees, these events have curtailed economic growth, depressed exports and fuelled import growth, exerting pressure on the current account and debt levels. Climate change is predicted to make hydro-meteorological hazards more frequent and severe.

1.4. Table 1 in the overleaf highlights the major natural disaster events that have occurred since 2010 for each of the six surveyed Members. It presents data on the estimated impact of each event as a percentage of gross domestic product (GDP). On an annualized basis, losses as a percentage of GDP due to natural disasters are estimated in a range of 3.4% for Saint Lucia and up to 6.6% in Vanuatu.

1.5. In any given year, it is likely that the five island states surveyed (Dominica, Fiji, Saint Lucia, Tonga and Vanuatu) will be either hit by, or recovering from, a major natural disaster, most commonly hydro-meteorological in origin. Nepal must also contend with seasonal rains and flooding. Prior to the 2015 earthquake, flooding accounted for 53.2% of combined economic losses in Nepal from natural disasters over the period 1990-2014.

1.6. The recovery time between storm events can be short. As highlighted in Table 1, successive storms hit Dominica only two years apart (Tropical Storm Erika in 2015 and Hurricane Maria in 2017) causing damage estimated at 90% and 226% of GDP respectively. Records also show that Dominica suffered multiple storm strikes in the same season on 13 occasions between 1886-1996. The frequency of hydro-meteorological events is comparable in the Pacific. Since 1990, Vanuatu has experienced at least 20 damaging tropical cyclones.

1.7. Seismic hazard is an ever-present risk among most of the surveyed Members. Risk arises not only from direct damage caused by the earthquakes themselves, but also secondary hazards such as landslides and tsunamis. Nepal's topography and location in a high seismic risk area give rise to a propensity to flash floods and landslides due to steep, unstable slopes. Destructive earthquakes occur in Nepal with average return periods of some 80 years. Earthquakes tend to have graver consequences for life in Nepal than more frequent disasters such as floods, landslides and droughts.

1.8. The "mega events" surveyed in Table 1 tend to mask the burden of smaller, localized events. Droughts, flooding and minor earthquakes are examples of frequently under-reported events that cumulatively may have deleterious impacts on economic growth and trade in specific localities or regions. For example, some 240 earthquakes, ranging in magnitude between 3.3 and 7.1 on the Richter Scale, struck Vanuatu and its surrounding region in the first ten months of 2018. Volcanic eruptions also necessitated the evacuation of Vanuatu's Ambae island in the same year.

1.9. Natural disasters may also coalesce with other "man-made" factors to magnify their economic impact. In Nepal, the economic losses and dislocation from the 2015 earthquakes were exacerbated by the disruption to essential supplies on Nepal's southern border. The cumulative impact of these two events was a contraction in economic growth from a projected 4.6% down to just 0.4% in 2015. Nepal's experience underlines a broader point on the importance of transit for disaster resilience in landlocked countries.

Table 1: Overview of impact of recent natural disasters on six WTO Members

WTO Member	Event	Damage as a percentage of GDP
Dominica	Tropical Storm Erika (2015)	90%
	Hurricane Maria (2017)	225%
Fiji	Tropical Cyclone Evan (2012)	2.6%
	Tropical Cyclone Winston (2016)	31%
Nepal	Earthquakes (2015)	33%
	Monsoon trough (2017)	3%
Saint Lucia	Hurricane Tomas (2010)	43%
Tonga	Tropical Cyclone Ian (2014)	11%
	Tropical Cyclone Gita (2018)	38%
Vanuatu	Tropical Cyclone Vania (2011)	6.3%
	Tropical Cyclone Pam (2015)	64%

Source: Post Disaster Needs Assessments

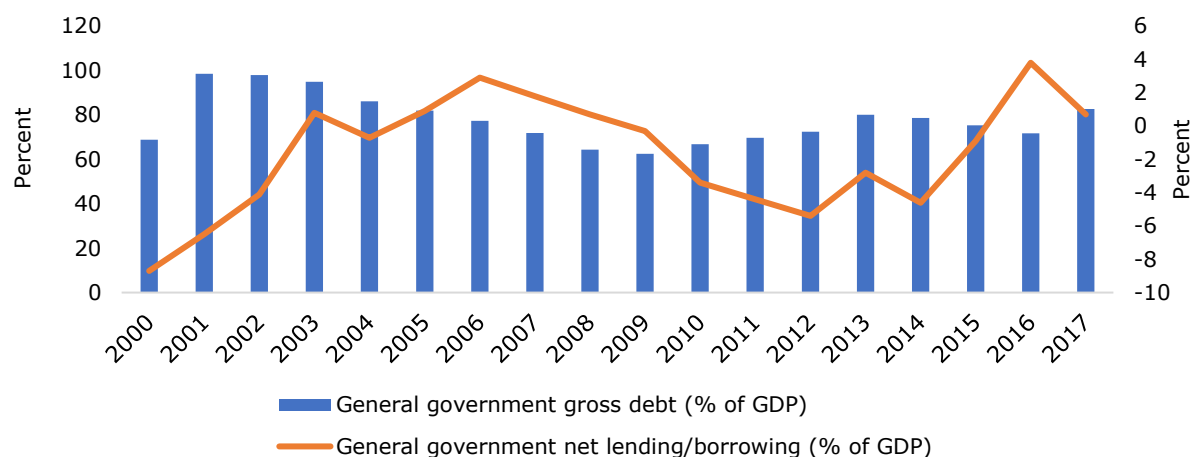
1.10. Tropical cyclones (TC) and hurricanes also exert downward pressure on economic growth. TC Gita knocked three percentage points off Tonga's GDP growth in 2018. Fiji's growth dropped 2.5% after TC Winston, and Vanuatu's economic growth contracted 2.8% percentage points after TC Pam. With trade to GDP ratios above 50% for all six surveyed economies (and closer to 100% in the case of some of the island economies), weather-induced falls in economic activity rapidly translate into slow-downs in trade flows.

1.11. Reconstruction activity can be an important economic stimulus in the aftermath of disasters, but also debt-creating in the absence of sufficient external aid or dedicated domestic reserves set aside to cover such eventualities. In Dominica, fiscal adjustment and restructuring had driven public debt down from a high of 100% of GDP in mid-2000s to around 63% in 2009. Reconstruction activity in the wake of tropical storm Erika and Hurricane Maria risks placing upward pressure on public debt and creating a significant risk of debt distress in the IMF's view - see Figure 1 below. In Vanuatu, the stock of public debt to GDP increased by 20 percentage points after Cyclone Pam.

1.12. IMF research highlights that reconstruction and recovery efforts after disasters reduce resources for productive investment, further tighten limited government budgets, and create higher debt risk. Furthermore, projections on future debt sustainability worsen if exposure to future natural disasters is included.

1.13. Without transfers of Official Development Assistance (ODA), external debt would be significantly higher among some of the surveyed countries. Aid accounted for just over 5% of gross national income for Nepal in 2017. Support totalling over US\$1.3 billion in pledges and \$1 billion in loans and debt relief was agreed for Caribbean islands affected by Hurricanes Maria and Irma.

Figure 1: Trends in Dominica's debt indicators



Source: WTO computation based on data from the World Bank and IMF

1.14. Defined as Upper Middle-Income Countries for the OECD Development Assistance Committee List of Official Development Assistance (ODA) Recipients, Dominica, Fiji, Saint Lucia and Tonga do not enjoy the same access to concessional ODA as their lower income peers. Consultations with national authorities in Saint Lucia highlighted serious concerns about the fiscal consequences of possible future hurricane strikes. In their view, current levels of public debt limit policy options for domestic disaster risk management, including reserving public funds as a buffer against future disaster needs.

1.15. For several of the disaster-affected countries surveyed, remittances act as a fiscal buffer. Remittances account for some 26% of GDP in both Nepal and Tonga. Income remitted by Nepalis living abroad jumped 14.3% in 2015 (the year of the earthquakes) to reach US\$6.7 billion. Temporary labour mobility (i.e. services mode 4) schemes play an important role in this regard.

1.16. Natural disasters have pushed back the graduation from Least Developed Country status of both Vanuatu and Nepal. In December 2017, the UN Committee on Development Policy (CDP) recommended that in the wake of Cyclone Pam, Vanuatu's smooth transition process should reduce the country's vulnerability to natural disasters and pushed back the planned LDC graduation by three years to December 2020. In March 2018, the UN CDP noted that Nepal's economic vulnerability index score had worsened due to the 2015 earthquakes. As such, the Committee deferred a decision on Nepal's graduation to the 2022 triennial review, when it will again assess the country's development progress and graduation readiness.

1.17. One particular insight which emerged from the research work in St. Lucia was that the economic impact of natural disasters can be keenly even when the Member concerned is not itself directly impacted. Saint Lucia was spared direct damage during the 2017 hurricane season, but still faced trade disruption and higher costs that affected its economic performance due to weather-related disruption of regional air and maritime shipping, rerouting of consignments and delays resulting in lost business and reduced profit margins.

TRADE ISSUES IN DISASTER RESPONSE

1.18. A range of trade facilitation issues emerged during the disaster response phase in the country research. Some of the issues can be attributed to the scale of the damage faced by relevant national authorities. Government respondents in Dominica highlighted how relief systems that had operated effectively in response to Tropical Storm Erika in 2015 were overwhelmed by the more powerful category five Hurricane Maria just two years later. The sudden onset of Hurricane Maria had also caught the authorities and population off-guard. Similarly, in Nepal, established relief systems that operated effectively in relieving distress caused by seasonal flooding were initially overwhelmed by the scale of the 2015 earthquakes.

1.19. In both Dominica and Nepal, damage to physical infrastructure, equipment and staffing shortages complicated the entry of relief goods. Another difficulty was that import systems even in normal times were not set up for the sudden surge in volumes of relief imports that arrived in the

immediate disaster response phase. Container traffic into the damaged port of Roseau jumped from an average of 80 containers per week to a peak of 300 containers in the aftermath of Hurricane Maria. Airport congestion due to landing load and plane size restrictions were a complicating factor limiting response at Tribhuvan International Airport in Nepal. Issues relating to airport runway management also arose in Port Villa, albeit after the passage of Cyclone Pam.

1.20. A non-exhaustive list of customs and border issues distilled from the country research is included in Box 1 below. Individually, and frequently in combination, these issues reduced the effectiveness and increased the cost of disaster response. In one example, private sector stakeholders reported wait times of six weeks or more before containers could be released from customs. Important to note is that Box 1 is neither exhaustive, nor specific to the experience or issues arising in any one of the six Members researched. It is an amalgam of the issues arising. These issues are set out more specifically in each country study.

Box 1: Customs and other border clearance issues arising in natural disasters

- Delays in triggering emergency legislation;
- Time lags in establishing effective coordination between national emergency management offices and customs and other border agencies;
- Uncertainty about the exemption of relief organizations and relief goods from customs duties;
- Doubt as to the scope and duration of exemptions from customs duties and other charges for regular "commercial" imports;
- Difficulties for customs and other border agencies in distinguishing between relief and commercial goods;
- Restrictive customs policies requiring payment in full of customs duties and other charges prior to release from customs control;
- Unfamiliarity with, and difficulties in, accessing relevant official documentation relating to customs and other border clearance formalities;
- Concern at relief actors working outside official channels and coordination mechanisms;
- Delays in securing visas and recognizing professional qualifications of relief personnel;
- Quarantine restrictions on the import of dogs that delay the deployment of search and rescue animals to disaster-affected zones;
- Cumbersome import license requirements, including for telecommunications equipment;
- Problems in securing temporary admission of relief equipment, at both entry and exit;
- Control, inspection and release procedures ill-adapted to emergency situations;
- Concerns on the part of plant and animal quarantine officials about the entry, establishment and spread of pests with relief consignments;
- Pressure on governmental revenue from prolonged, extensive customs duty and other charge exemptions; and
- Problems with the storage and disposal of unsolicited bilateral donations, including aid ill-adapted to the needs of the local population.

Source: WTO Secretariat

1.21. How lists of relief items are established, the charges that are exempted, the duration of exemptions and quantitative restrictions on waivers for some import items were issues raised by private sector actors during national consultations in one region. For example, some considered that relief exemptions should also encompass health and safety equipment so as to reduce the risks to workers in dangerous post-disaster working environments. Distinctions were also drawn between the needs of relief organizations and households on the one hand and commercial operators on the other hand. A concern expressed by many stakeholders was that commercial actors were given lesser priority even though they were essential to economic recovery.

1.22. Private sector representatives strongly underlined the criticality of port functions to business continuity. One example was given in relation to the import of spare parts to replace damaged refrigeration facilities for supermarkets and pharmacies. Without the rapid clearance and release of these imported parts the integrity of cold chain facilities for both drugs and food was compromised, with significant welfare consequences for the general population. A further example arising was power generation equipment urgently needed to replace damaged public and commercial electricity generation infrastructure. Similar conclusions could also be drawn for imports essential for the provision of public services e.g. water and sanitation, hospitals etc.

1.23. Measures taken by the Government of Tonga and its relief partners in both the preparation and response to TC Gita highlight the scope for positive peer learning. These measures included triggering state of emergency legislation *in advance* of the arrival of the cyclone; ensuring customs and other border agencies took measures to facilitate the entry of goods sent by the Tongan diaspora and applying a straightforward customs exemption policy. The example of Tonga also highlights the important role that social media can play in communicating need, raising relief funds and ensuring that appropriate goods are supplied.

1.24. Relief partners and governments recommended relief support in "cash, not goods". Problems with the suitability, storage, and subsequent disposal of "unsolicited bilateral donations" were reported by both Fiji and Vanuatu in the aftermath of earlier tropical cyclones. One insight that emerged from the research was that a move by relief organizations to cash, instead of delivering relief goods would not *per se* reduce imports. The import dependence of the six disaster-affected states suggests that commercial imports might substitute for imported relief. In either situation, the speed and efficiency of customs and other border clearance play a critical role in disaster response.

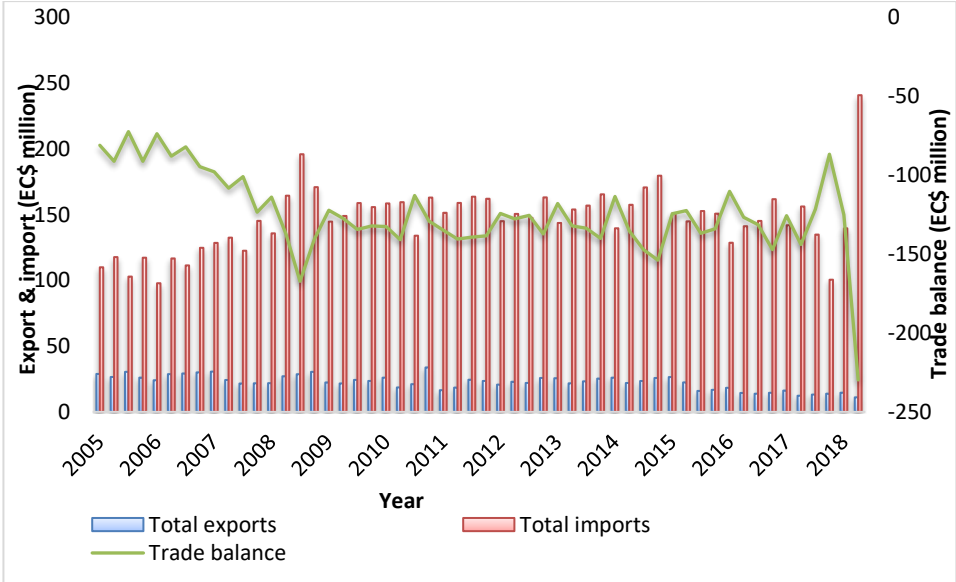
1.25. Reforms to improve the efficiency of customs and other border clearance procedures were reported by all six surveyed Members. Implementation of the WTO Trade Facilitation Agreement is acting as a catalyst for reforms and holds promise in addressing some of these issues outlined in Box 1. Investments for upgrading trade connectivity both in terms of hard infrastructure (e.g. ports and airports), and soft infrastructure (e.g. customs and other border clearance systems), are bringing economic returns for regular commercial operations, and supporting future resilience.

TRADE ISSUES IN DISASTER RECOVERY

1.26. A surge in imports, static or declining exports and pressure on the current account are common trends that emerge from the trade performance of the six disaster-affected countries surveyed. Furthermore, disaster events tend to accentuate underlying structural trends.

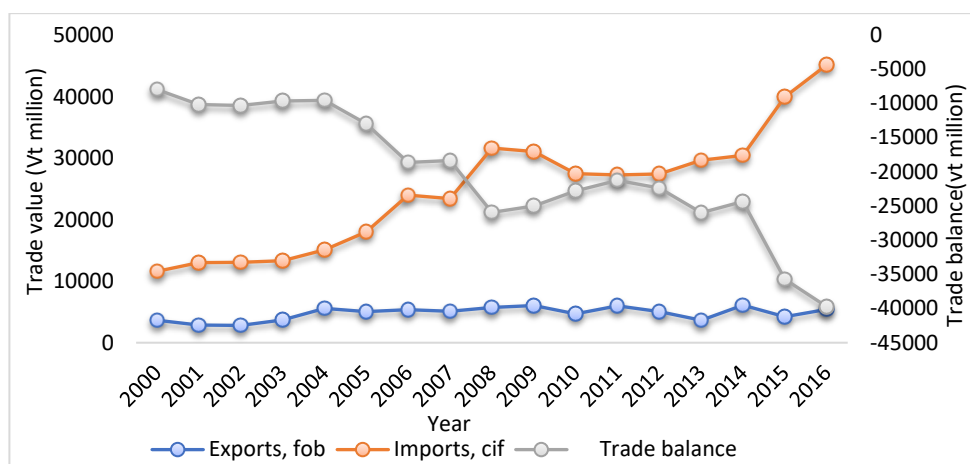
1.27. Figure 2 below highlights the merchandise trade performance of Dominica using quarterly trade statistics. Since 2005, merchandise good exports have been on a progressive downwards trajectory. Imports show an erratic pattern with surges at the time of the onset of the financial crisis in 2008 and latterly in response to Hurricane Maria. Final quarter data for 2018 show a record quarterly import high. The green line following the merchandise trade balance also shows a progressive downwards trajectory, followed by a steep negative increase from mid-2018.

Figure 2: Trends in Dominica's merchandise trade and trade balance



Source: WTO computation based on quarterly data from the Eastern Caribbean Central Bank.

Figure 3: Merchandise exports, imports and trade balance of Vanuatu



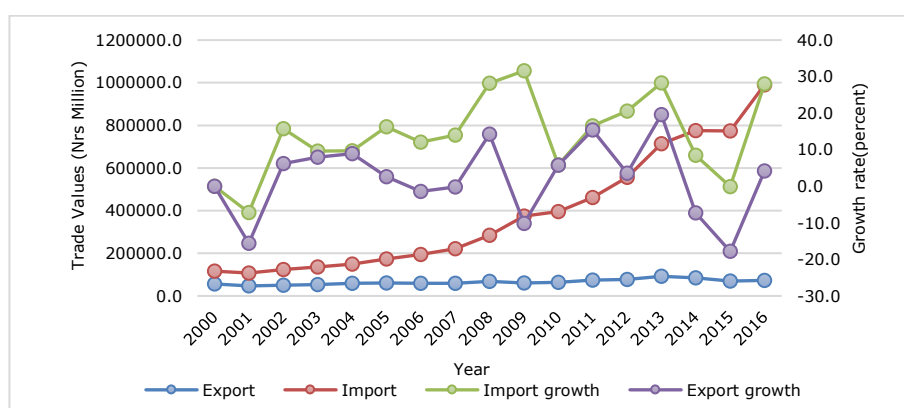
Source: WTO computation based on data from the Asian Development Bank

1.28. Figure 3 above highlights the merchandise trade performance of Vanuatu since 2000. Sluggish exports have been outpaced by imports as the merchandise trade balance widens. Important to note here is that the deterioration in the trade balance *precedes* Cyclone Pam in 2015. As such, Cyclone Pam appears to have accentuated an established underlying trend. One factor to highlight is higher infrastructure investment spending which has been a factor driving import growth, financed largely through concessional lending and donor support. Similar patterns can also be observed in Tonga. Some of the infrastructure investment in Tonga can be attributed to expansion of the services sector e.g. the construction of tourism infrastructure such as cruise ship wharfs.

1.29. Activity in the construction sector associated with infrastructure upgrading and post-disaster reconstruction acts as an important economic stimulus. It can also lead to sharp increases in the import of construction materials. In Nepal, buildings sustained about 50% of the losses and damage caused by the 2015 earthquakes. Close to 0.5 million houses either collapsed or were damaged beyond repair, and more than 0.25 million were partly damaged. Due to the limited availability and/or quality of local materials, a significant proportion of building materials are imported into Nepal, mainly from India and China. This includes an estimated 80% of all cement, as well as glass, aluminium, plaster, fixtures and fittings.

1.30. A message which strongly emerges from Nepal's 2019 Trade Policy Review is how the earthquakes put additional pressure on Nepal's already struggling manufacturing sector. Damage to premises, stocks and machinery, together with labour shortages all disrupted operations. Growth in construction sector wage rates further squeezed manufacturing firms' margins. Figure 4 highlights how the 2015 earthquakes accelerated import growth, but only after a solution had been found to the supply disruption at Nepal's southern border. Figure 4 also highlights the static trend in merchandise exports.

Figure 4: Trends of Export and Import in Nepal (2000-2016)



Source: WTO Secretariat computation based on data from Nepal Rastra Bank

1.31. Nepal is a beneficiary under the generalised system of preferences (GSP) schemes of Australia, Canada, the European Union, the Eurasian Economic Union, Iceland, Japan, Kazakhstan, New Zealand, Norway, Switzerland, Turkey, and the United States. One way in which the US sought to support Nepal's manufacturing sector was through the extension of unilateral, time limited market access preferences to its existing GSP schemes for Nepal. A WTO waiver was granted in July 2016 for these measures that cover additional duty-free treatment for 77 products, including textiles, leather, footwear, clothing and "other manufacturing products". This unilateral preferential agreement entered into force on 30 December 2016 and will end on 31 December 2025. Another element of the trade preferences was establishment of a trade facilitation and capacity-building program for Nepal.

1.32. This theme of natural disasters adding to existing pressure on the manufacturing sector was repeated in other surveyed Members. Sustained power outages, restricted access to credit and slow pay-outs of insurance claims were all reported as factors aggravating recovery in manufacturing and services including tourism.

1.33. Two firm-level examples cited in the Caribbean research work highlight this trend:

- A long-established soap and manufacturing plant in Dominica was taken into public ownership after Hurricane Maria. The firm had just finished repairing damage sustained in Tropical Storm Erika (2015) and restarted manufacturing operations when Hurricane Maria (2017) struck. The owners decided to close the facility rather than reinvest a second time to repair machinery and facilities. The government took the plant into public ownership until a new investor was found. The firm has subsequently recommenced operations.
- Another example from Dominica concerns a coconut oil processing firm. Hurricane Maria downed many thousands of coconut trees and interrupted the domestic supply of fresh nuts. The processor had to shutter operations as it was unable to source local supply or import coconuts. The national phytosanitary authorities decided that the potential risk of entry of coconut plant diseases was too high and would set back efforts to rehabilitate the tree crop. Diseases such as lethal yellowing disease can be spread through coconut trade.

1.34. A sector that emerges from the research as *directly* negatively impacted is the agriculture sector. Research from the Pacific highlights that natural disasters have proven a set-back in efforts to diversify merchandise exports, notably in the agriculture sector. Much the same conclusion can be drawn also from the Caribbean research. With a high proportion of merchandise exports originating in the agriculture sector, drops in agricultural exports have been precipitous (37% in Vanuatu after Cyclone Pam) and slow to recover, particularly for market segments with long production cycles e.g. tree crops. In addition to production losses, often in niche fresh products with narrow export windows, tropical cyclones have broken critical links in fresh produce value chains. These links are critical to gain and maintain market access to high value regional markets with stringent biosafety controls.

1.35. Fiji's balance of payment difficulties in the wake of Tropical Cyclone Winston (2016) are a case in point. High winds, flooding and storm surges imposed substantial damage to commercial plantations. Sugar cane production fell by 25% - a decline that in turn translated into a fall of 44% in exports of refined sugar. Tropical Cyclone Winston inflicted further damage to a sector still recovering from Tropical Cyclone Evan in 2012. After this first event, the post-disaster needs assessment estimated that it would take between five to ten years for production to return to pre-cyclone levels.

1.36. A further example of a disaster "*double-whammy*" emerged from the St. Lucia research. Banana farmers there were still struggling with the after-effects of Hurricane Tomas (2010) when an outbreak of the soil-borne fungus black sigatoka further compounded their efforts to recover from hurricane damage. Changes in phytosanitary status were noted as a risk factor after disaster events and as a complicating factor in the recovery of fresh produce exports – see Box 2 below.

Box 2: Natural disasters and the spread of pests and diseases

Large scale disturbance events such as hurricanes, cyclones and typhoons have long been associated with the establishment and spread of invasive pests and diseases. Alterations of habitat characteristics (e.g. by natural disturbances), can be associated with invasion success. Disturbances benefit invasive species by reducing competition with resident species and increasing resource availability. Not only may invasive species be injurious to agricultural production, they may expose affected countries to sanitary and phytosanitary measures taken by trading partners to restrict the entry, establishment and spread of these alien pests through international trade. Examples include that of damage to citrus cultivation from invasive insects in the wake of the 2017 hurricane strikes and spread of fungi spores through flooding or even volcanic events. The presence of established plant pests may also act as an impediment to the sale of commercially valuable tree species downed by storm winds – reducing in turn incentives for clearance of damaged forest.

Source: WTO Secretariat research

1.37. Direct damage has also been reported to fisheries. In Fiji, tropical cyclone damage to coral reefs forced fish to migrate so reducing local catches. Similar effects were reported in Tonga where Tropical Cyclone Ian caused damage to the fisheries sector on Ha'apai island. Material losses included fishing boats, outboard motors, fishing gear, diving equipment, lines and other equipment. Tropical Cyclone Gita also caused damage to artisanal and commercial snapper boats.

1.38. World Bank research suggests that the fisheries sector in Dominica is "extremely vulnerable to hurricanes and storms" since there are no naturally secure harbours, and fisheries infrastructure is squeezed in between the coasts and the sea. Consequently, capital losses tend to be high in every major storm. Hurricane Maria was no exception. Approximately 128 vessels (or 40% of the total fishing fleet) were lost, fisheries cooperatives suffered damage to ice-making machines, fuel pumps and supplies for market vendors, and fishers lost a large percentage of their fishing gear.

1.39. Among the different sectors surveyed, services fared the best in terms of its speed of recovery, albeit with some important caveats. (Box 3 highlights issues that arose with a foreign investor in Dominica). One of the fastest service sectors to recover was tourism – and important and growing area of economic activity for all six Members surveyed.

Box 3: Hurricane Maria's impact on foreign education service providers in Dominica

A services provider that decided to shutter operations in Dominica in the aftermath of extreme weather was Ross University School of Medicine. Hurricane Maria inflicted significant damage to the campus buildings forcing the evacuation of students and faculty off the island. Since then, the University had been obliged to operate from temporary locations in St Kitts and Nevis and Tennessee in the US while damage assessment, repair and rebuilding took place. On 3 August 2018 (i.e. some 11 months after the passage of Hurricane Maria), the medical school announced plans to relocate to a new campus in Barbados.

Ross Medical School (RMS) first established its Dominica operations in 1978 and was one of only four Caribbean schools to be recognized by the US Department of Education as providing medical education equivalent to US medical universities. Stakeholders at the national consultation suggested that RMS contributed somewhere between 15-20% of GDP when indirect economic benefits were included. Such benefits included: taxes paid by the medical universities and their enrolled students; income tax paid by local faculty; tariffs charged on imported products; expenditure by students and faculty including accommodation, living expenses, and entertainment; job opportunities for local citizens; and provision of consumer services to students.

In October 2018, the government reported that it was in preliminary discussions with potential investors to take over the site. Before a new lease can be agreed, an agreement needs to be reached with RMS on transfer of ownership of land and buildings it leased from the government.

Source: WTO Secretariat research

1.40. Among island states surveyed, the recovery of cruise tourism was quicker than overnight stays. The provision of accommodation as an integral part of the cruise offering seems to be an important factor in this regard. Factors holding back recovery in the overnight sector mirrored those constraining recovery more generally e.g. ability to refinance debt, access to credit, availability of and tariffs on building materials. Anecdotally, one eco-lodge owner remonstrated with the survey team at having had to pay a 60% tariff on imported paint delivered after a tariff waiver on that item had expired.

1.41. The resilience of services, particularly tourism is positive, not least given the scope for diversification in outbound source markets among the six surveyed Members. For all of them, investment in upgrading trade connectivity (e.g. runway, port and airport upgrading) would both boost tourist arrivals, and also increase critical airlift capacity for future disasters.

1.42. Some *ex ante* planning may be required to ensure that expansion in tourist arrivals is managed with forethought given to future disaster risks. Here one concern voiced by some interlocutors in Saint Lucia was that the increasingly decentralized nature of tourism due to shared economy booking apps made coordination challenging. In the past, foreign embassies needed to only contact the major hotels to reach their nationals. Freedom of movement meant that keeping track of hospitality workers from other OECS countries was also potentially challenging.

TRADE ISSUES IN DISASTER RESILIENCE

1.43. *Ex ante* planning speaks to the impetus being given to disaster risk management and resilience by the Sendai Framework for Disaster Risk Reduction – see Box 4. The Framework seeks to achieve the following outcome by 2030: "substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries." The preceding analysis suggests an important trade, and trade policy, dimension to achievement of this global target.

Box 4: The Sendai Seven: Global Disaster Risk Reduction Targets

- a) Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020–2030 compared to the period 2005–2015;
- b) Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015;
- c) Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030;
- d) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;
- e) Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;
- f) Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030; and
- g) Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

Source: Sendai Framework for Disaster Risk Reduction 2015-2030

1.44. The research analysis identified areas where action is already being taken by the six Members to build resilience. Prominent is the topic of reform of customs and other border clearance systems where implementation of the WTO Trade Facilitation Agreement is acting as a catalyst for reform. Further action here could also be envisaged, and not just in relation to implementation of the TFA disciplines. For example, there is further scope to work with regional partners e.g. the Caribbean Disaster and Emergency Management Agency and the Caribbean Customs Law Enforcement Council to promote coordination and mutual cooperation in the event of disasters. Similar action could be envisaged in other regions.

1.45. Another key principle found in the Sendai Framework is that of "Build Back Better" (i.e. in a way that is risk-informed and resilient). Building codes and standards underpin this approach. Here the experience of Nepal is instructive. The housing reconstruction programme sought to rebuild through grants for housing reconstruction that required usage of earthquake-proof building techniques and materials. With much of these building materials used coming from imported sources, there is an interplay also with standards in international trade.

1.46. Discussion in Dominica on how to ensure that building material imports meet local building codes (e.g. for corrugated sheet roofing) is indicative of a broader debate on the role of standards for resilience. Such standards also cover issues such as business continuity planning and involves a broad range of international and national standard-setting bodies.

1.47. Import tariff policy can also influence resilience. Where the hardening of infrastructure is the option pursued to improve resilience, so care is needed so that steel and cement tariffs do not act as a disincentive by pushing up prices and reducing usage of these materials. Import data from one of the regional reports indicates higher volumes of imports after tariffs were unilaterally reduced.

1.48. Government procurement is another avenue to pursue resilience, and one with an obvious trade dimension given the high trade to GDP ratios of the economies surveyed. In addition to the import of goods to promote resilient infrastructure, services are also an important dimension that emerges from the research. A particular services category where island Members struggled was in environmental services, notably the clearance of debris caused by hydro-meteorological events. The clearance efforts needed surpassed the capacity of local service suppliers to manage. *Ex ante* international tendering of such services could help bring down costs rather than reliance on *ex post* clean up. (None of the six surveyed Members is a party to the Government Procurement Agreement.)

1.49. Expanding renewable sources of electricity generation was another action identified as both boosting resilience and economic performance. The import of liquid fuels is a major drain on the balance of payments among the Members surveyed. Further development of hydro-electrical (Nepal), geothermal (Dominica) and other renewable energy sources were considered actions that could improve both the current account situation and also economic resilience.

1.50. All six States surveyed demonstrate a significant insurance protection gap. Otherwise stated, the amount of insurance coverage purchased is well below what is economically beneficial. Coverage is low among all six disaster-affected Members surveyed. For example, Nepal's insurance market remains small, with a limited range of products and a ratio of total assets/liabilities to GDP of 7% for insurance companies and 0.3% for re-insurance companies. In short, this means that liabilities end up with the government as the final guarantor or with family members through remittances.

1.51. Expansion of insurance coverage would support resilience but could require action to improve market access conditions for global reinsurance providers. Innovation in sovereign insurance products through vehicles through the Caribbean Catastrophe Risk Insurance Facility and its Pacific equivalent has pioneered the use of quick-disbursing parametric insurance schemes (i.e. schemes that pay out when certain pre-defined parameters are met, not on the basis of actual damage). Expansion of such innovations, including with backing from development partners, is one way that insurance coverage is being expanded. MSMEs are a priority group for expanded protection.

1.52. Parametric insurance schemes depend on hydro-meteorological observations. The role that the "weather enterprise" (including weather forecasting services) can play in disaster resilience and reduction emerged strongly. The Caribbean research highlighted not just the potential of such services for disaster resilience, but also for economic efficiency gains. For example, forecasting services are being for targeted marketing campaigns in tourism markets and also for predictions that affect the ability to offer tourism services (e.g. the likelihood of sargassum blooms). Domestic regulations for services and data regimes that permit private actors to operate in this emerging services market, traditionally the monopoly preserve of public bodies, was referenced. Improved physical protection of data and cloud storage services could also support resilience.

1.53. The stated intention of the Dominican Government to become the first climate-resilient nation is recognition of the need to break the cycle of periodic disasters and debt distress. IMF research suggests that a do-nothing policy will deliver dramatic negative economic outcomes, with large permanent losses of capital, output, and growth. The same is true for others surveyed Members.

1.54. The three country research papers suggest that trade, and trade policy, can play a role in achieving the objective of furthering disaster resilience – both in a positive sense and a negative one. The research has borne out how the economic impact of disasters can be magnified by trade policy measures, but also how trade measures can improve disaster response, recovery and resilience.