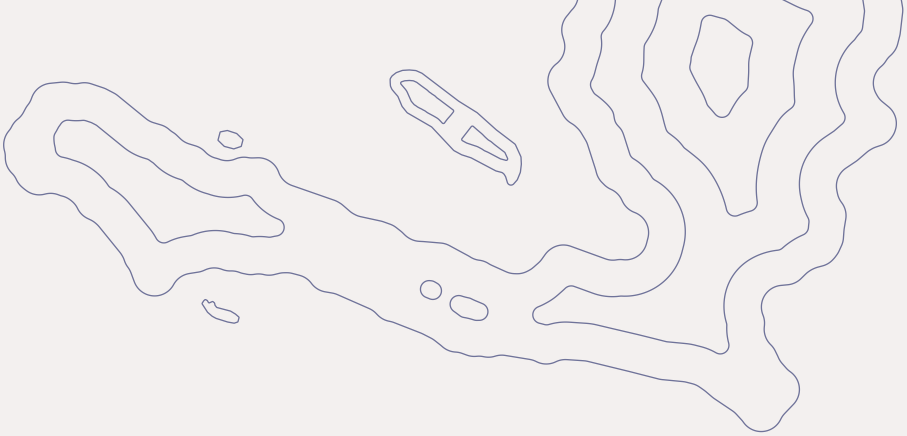
BRIEFING PAPER **JULY 2026**



CLIMATE CHANGE IS DRIVING UP LOSS AND DAMAGE IN SIDS

Emily Wilkinson and Vikrant Panwar

Key messages

- New analysis shows that climate change is an increasingly important driver of loss and damage in SIDS. Over the past 25 years, climate change has generated flood, storm and drought-related losses of an estimated US$57 billion.
- Between 2000 and 2024, more extreme weather events in SIDS were responsible for 190 deaths and more than 1 million people affected each year.
- SIDS experience significantly higher 'climate-attributable' loss and damage than non-SIDS with similar income levels. Among SIDS, most impacts are concentrated in the Caribbean.
- Hurricane Melissa (2025) demonstrates the scale of climate-attributable loss and damage in SIDS. In Jamaica, climate-attributable losses from the storm are estimated at $9.7 billion, equivalent to 42.3% of GDP.
- New projections suggest climate-attributable losses will continue to rise, with storms alone causing up to $49 billion in cumulative losses by 2050 under a 1.5°C warming scenario.
- As losses escalate, climate finance commitments from wealthier countries will need to increase, not decline. Wealthier nations need to deliver existing pledges, increase support to the Fund for Responding to Loss and Damage, and ensure COP31 produces real finance commitments for SIDS.

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How to cite: Wilkinson, E. and Panwar, V. (2026) *Climate change is driving up loss and damage in SIDS*. RESI Briefing Paper. London: ODI Global (https://doi.org/10.61755/AVYP3068)

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1 Introduction

Small Island Developing States (SIDS) have small, undiversified economies, heavily reliant on imports and highly exposed to climate shocks. They experience higher levels of loss and damage from extreme weather in relation to their gross domestic product (GDP) than any other group of countries. And new data suggests that an increasingly high proportion of these losses can be directly attributed to climate change.

This briefing paper presents the results of this analysis and looks at what this means for a small island nation that recently experienced one of the most powerful storms to ever make landfall.

Based on extreme event attribution (EEA) studies for the past 25 years, which estimate the degree to which anthropogenic greenhouse gas (GHG) emissions have changed the likelihood of specific extreme weather events, the Resilient and Sustainable Islands Initiative (RESI) has calculated the fraction of attributable risk (FAR) for extreme weather events (floods, storms and droughts) across SIDS. This was done following methodology set out in Panwar et al. (2023), which used EEA analysis and match attribution results with impact data (deaths, affected, economic damages) from the EM-DAT database[1] to calculate the climate-attributable share of loss and damage.

This briefing paper presents the results of this analysis and looks at what this means for a small island nation that recently experienced one of the most powerful storms to ever make landfall. Hurricane Melissa hit Jamaica on 28 October 2025, with damage estimated at US$12.23 billion, representing about 57% of the nation's 2024 GDP (ECLAC, 2026). Such catastrophic events, which might once have been deemed 'unprecedented', are becoming more frequent in SIDS, and we now have a much better understanding of why that is the case.

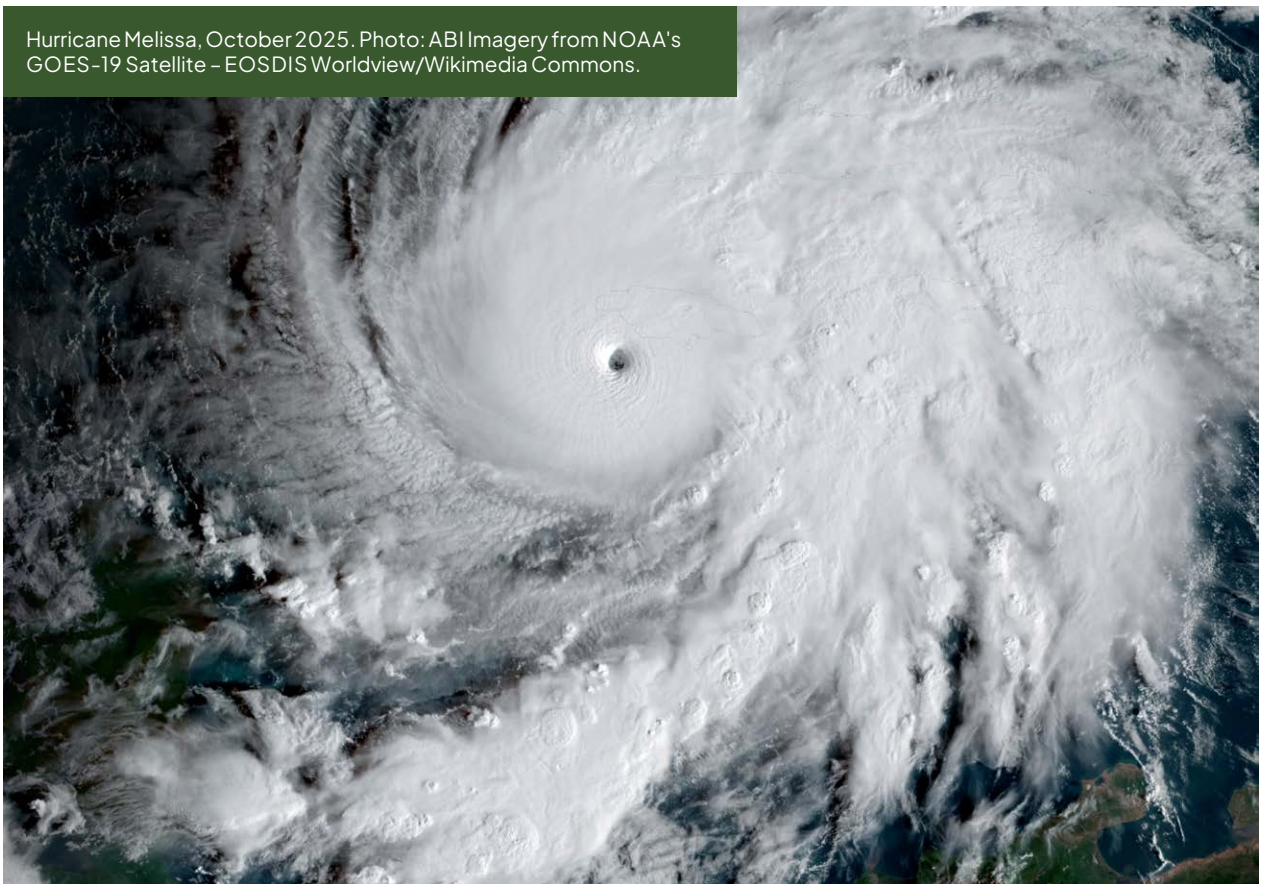
This briefing paper provides an update on estimates produced by Panwar et al. (2023), showing an increase in average FAR estimates over the last two years. This is largely driven by the inclusion of additional attribution studies and two more years of impact data, without any change in the methodology. As the evidence base expands, regional FAR averages adjust accordingly. The increase could also reflect the increasing role of climate change in shaping the intensity and frequency of extreme events and/or improved detection of the climate signal in extreme weather events.

1 See www.emdat.be.

2 Climate attribution and loss and damage

2.1 Increasing climate signal

In 2023, RESI conducted two separate studies of climate-related loss and damage for the period 2000–2022 for 37 of the 39 UN SIDS[2] (see Panwar et al., 2023; Panwar et al., 2024). The EEA research (referred to as 'attribution studies') measures the degree to which anthropogenic GHG emissions had changed the likelihood of specific extreme weather events occurring. Panwar et al. (2023) were able to produce estimates of the climate-change-induced component of economic loss and damage from extreme weather events experienced by SIDS by matching the attribution studies to loss and damage data (from the EM-DAT database) and calculating the FAR.[3]



Hurricane Melissa, October 2025. Photo: ABI Imagery from NOAA's GOES-19 Satellite - EOSDIS Worldview/Wikimedia Commons.

2 Nauru and Singapore were not included in the study.

3 The FAR describes the portion of the risk of a specific hydro-meteorological event that has already occurred that is a result of anthropogenic GHG emissions. FAR values lie between 0 and 1, where 1 means that the event would have been impossible without anthropogenic climate change. By contrast, a FAR value of 0 means that climate change had no discernible influence on the probability of occurrence of that specific event (Newman and Noy, 2023).

A reported US$1.7 billion in annual economic losses in SIDS can be attributed to climate change (Panwar et al., 2023). This represents about 1% of the collective GDP of SIDS every year from 2000 to 2022 (the highest being 9.5% of GDP in 2004). This is considerably higher than for other groups of countries, classified according to their income levels.

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New attribution studies and loss and damage data available for 2023–2024, however, suggests that attribution levels are going up. The FAR for floods, drought and storms in SIDS regions was higher over the last two years than for the previous 25. For storms, this is particularly striking (see Table 1). The main explanation is that 56 additional FAR estimates have been incorporated into the dataset for the years 2023 and 2024, taking the total of matched events from 216 to 272. Since FARs are calculated as averages of available estimates, the inclusion of new results naturally shifts these averages over time, without any change in methodology. Consequently, estimates of climate-attributable loss and damage also increased.

Table 1 Old and new FARs by extreme events for SIDS

Extreme event	Old FAR (average 2000–2022)	New and updated FAR (average 2000–2024)
Flood	0.3	0.31
Drought	0.49	0.52
Storm	0.43	0.57

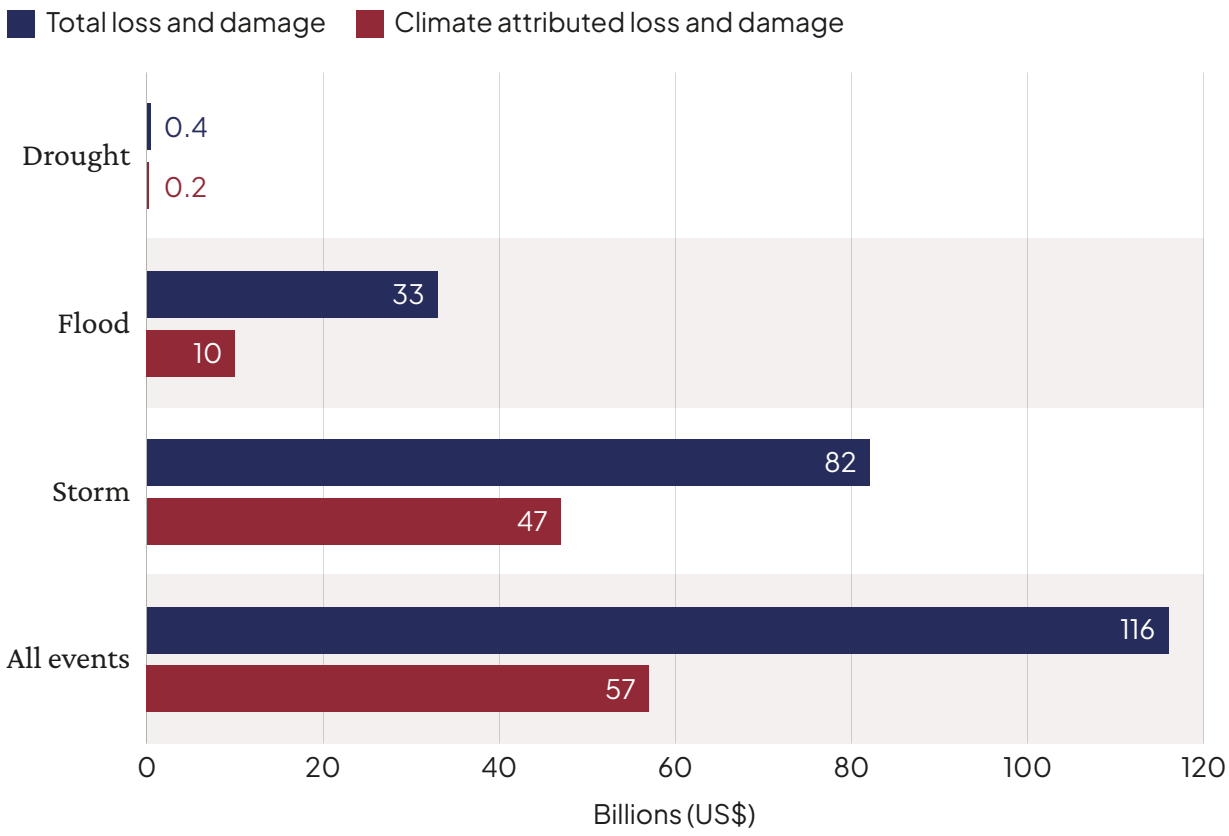
Note: The FARs for SIDS are an average of regions: Americas and Oceania

2.2 Updated climate attributable loss and damage

With 25 years of data (2000–2024) on hundreds of extreme weather events, RESI's latest analysis finds that 46% of human deaths and 54% of those people affected could be attributed to climate change over the same period. On an average annual basis, this translates to 190 deaths and just over 1 million people affected every year by extreme weather events in SIDS because of climate change.

Climate change could also be responsible for about US$57 billion of a total of $116 billion in cumulative economic loss and damage – or $2.28 billion per year.[4] Storms contribute 82% and floods 17.8% to total losses, while drought impacts are low and underrepresented in the EM-DAT data (Figure 1) (see Panwar et al., 2023).

Figure 1 Climate-attributable loss and damage in SIDS by event type (2000–2024)

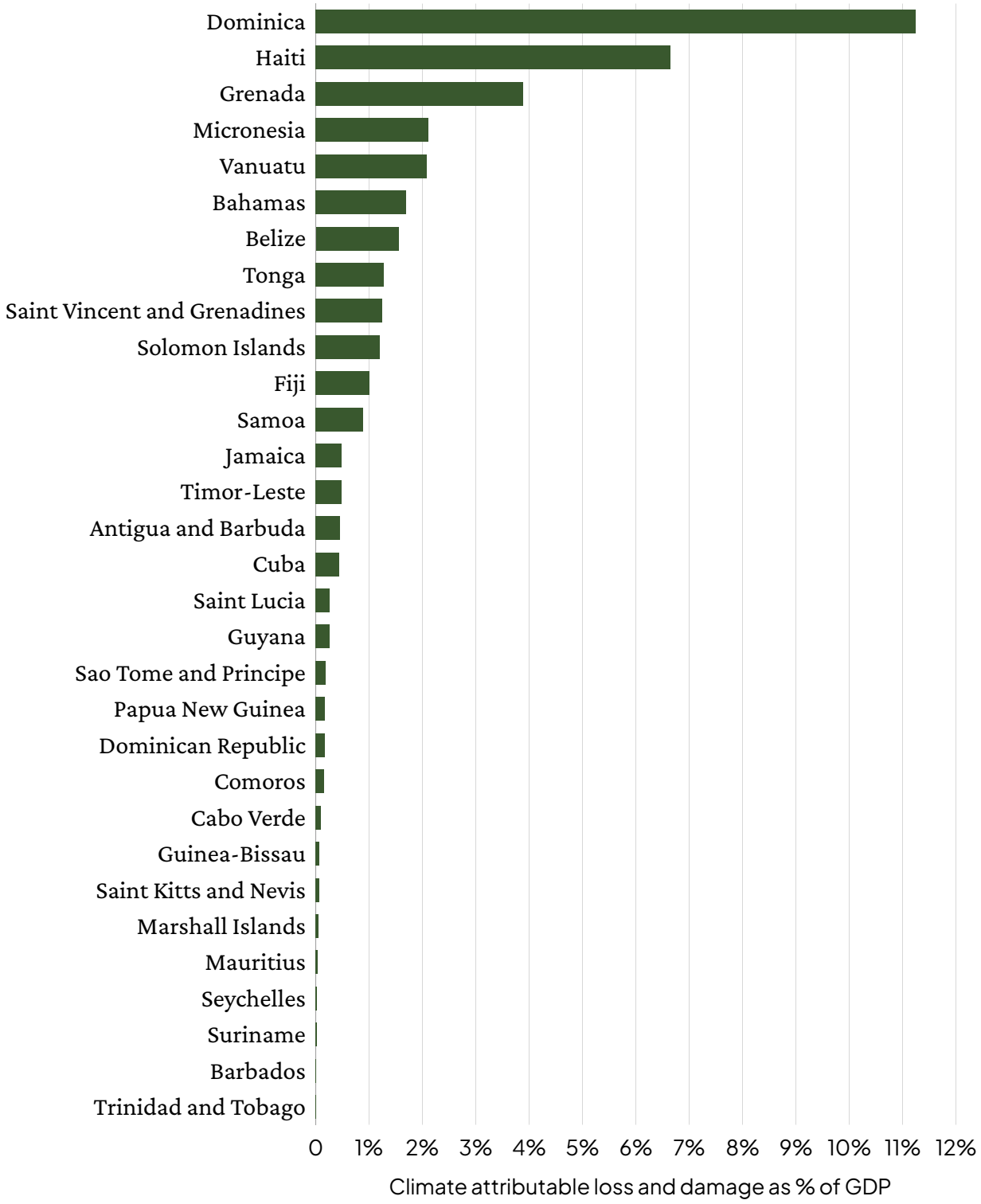


Note: Analysis is based on the disaster damage records of EM-DAT, using regional average FARs for SIDS. Analysis includes 37 UN Member SIDS, excluding Singapore and Nauru. All figures are in 2023 US$.

Most of the impact of extreme events is observed in Caribbean SIDS: this region accounts for 92% of attributable deaths, 85% of attributable people affected and 93% of attributable economic losses. Most of the events recorded in the EM-DAT database come from this region, with a few (notably Dominica and Haiti) accounting for a higher loss of life estimates and pushing up the average (Figure 2).

4 Economic losses and damages are composed of two parts: economic damages reported in EM-DAT + Statistical Loss of Life (SLOL) estimated at 7.0837 million. Total climate attributable economic loss and damage over 25 years is 57.3 billion: 23.7 in economic damages; and 33.6 in SLOL.

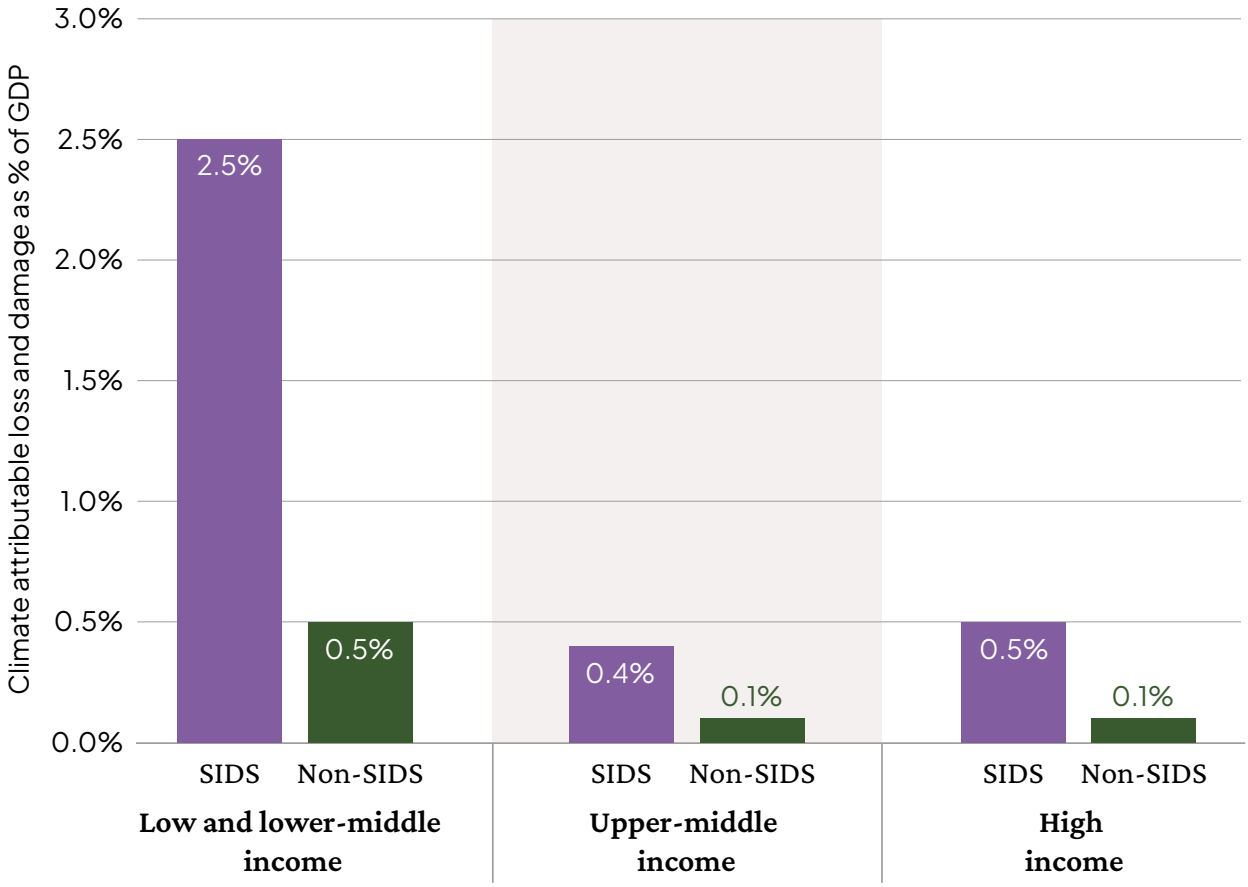
Figure 2 Average annual climate attributable loss and damage in SIDS, as a percentage of GDP (2000–2024)



Note: Analysis is based on the disaster damage records of EM-DAT, using regional average FARs. Annual average over the period 2000–2024 is used to calculate estimates. Figures for Kiribati, Maldives, Palau and Tuvalu were negligible and not reported here.

In relation to other country groups, loss and damage estimates are higher in SIDS than for non-SIDS with similar levels of income (Figure 3). For instance, low- and lower-middle-income SIDS experience about five times higher climate attributable loss and damage than non-SIDS in the same income group.

Figure 3 Average annual climate attributable economic losses (as percentage of GDP) in SIDS and non-SIDS (2000–2024)



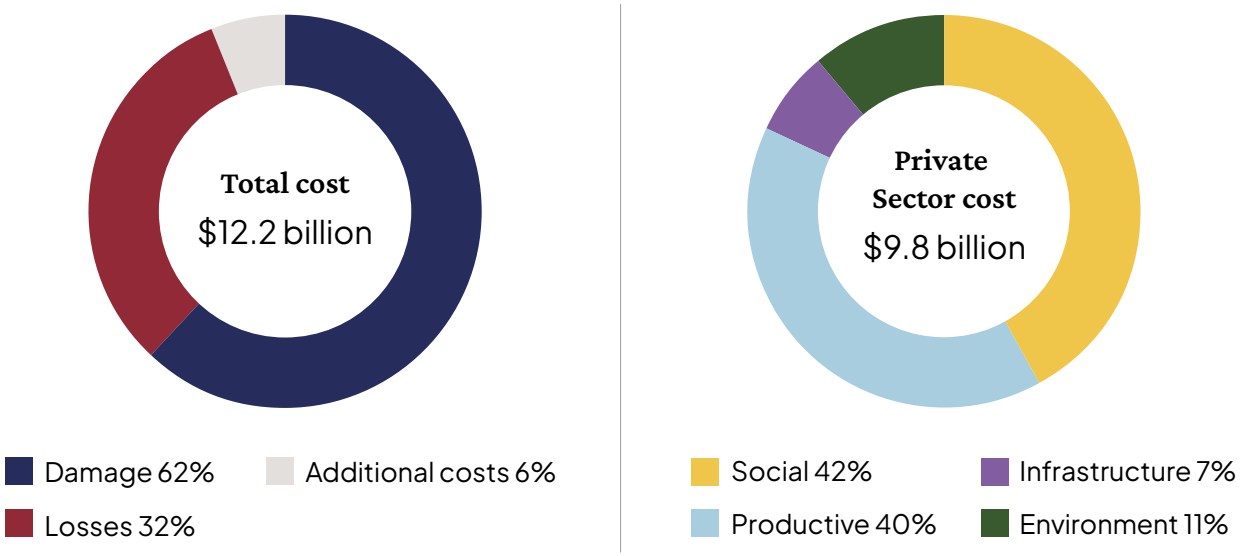
Note: Analysis is based on the disaster damage records of EM-DAT. Analysis includes 35 UN Member SIDS, excluding Singapore, Cook Island, Niue and Nauru.

3 Loss and damage from Hurricane Melissa in Jamaica

Hurricane Melissa's impact in Jamaica provides a recent example of how climate-attributable extreme weather is translating into severe economic loss and damage in SIDS.

A deep dive into attributable loss and damage from Hurricane Melissa in Jamaica is now possible thanks to attribution studies and a detailed Damage and Loss Assessment (DaLA) report produced since the hurricane in October 2025.

Figure 4 DaLA estimates of total cost of Hurricane Melissa



Source: ECLAC (2026)

3.1 Devastating impacts of Hurricane Melissa

In October 2025, Hurricane Melissa made landfall in Jamaica's western parishes as a Category 5 hurricane. At its peak, winds reached 298 kilometres per hour (185 miles per hour), ranking Melissa as the most powerful hurricane in the world in 2025 and the strongest ever registered in Jamaica.

Hurricane Melissa caused severe direct economic damage. The February 2026 DaLA report (ECLAC, 2026) recorded 45 deaths and total losses of US$12.23 billion, making it the costliest hurricane in Jamaica's history. This total includes around US$7.6 billion in direct physical damage, US$3.8 billion in economic losses from disrupted livelihoods and services and about US$0.7 billion in additional costs imposed. Social sectors, largely because of housing damage, suffered the greatest destruction, while productive sectors, especially tourism, bore most of the economic losses. Overall, the private sector accounted for 80% of total impacts.

These impacts are likely to result in a major macroeconomic reversal: Jamaica's real GDP growth for FY2025/26 was projected at 2.2%, which is expected to contract by 1.4% post Melissa. For FY2026/27, projected growth may contract by 1%.

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Damage to houses and forests in Jamaica from Hurricane Melissa, October 2025. Photo: World Central Kitchen/Wikimedia Commons.

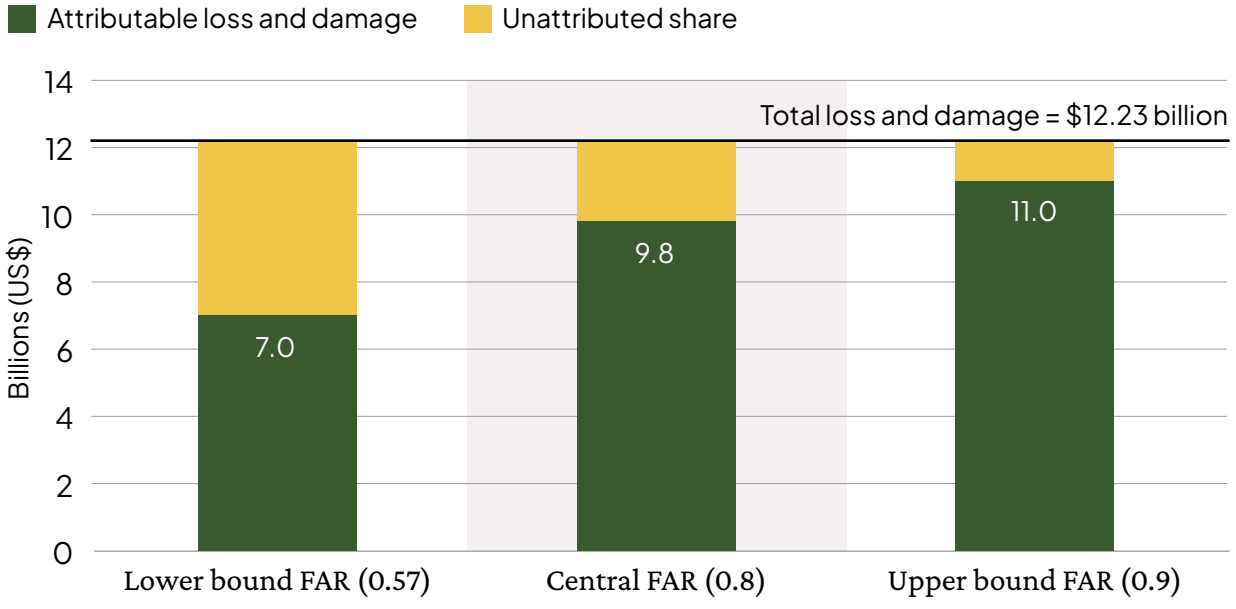
3.2 Climate attribution of Hurricane Melissa

Climate attribution studies for Hurricane Melissa produced by Clarke et al. (2025) and corroborated by Imperial College London (2025) suggest that around 80% of the event probability can be attributed to anthropogenic climate change. To capture the plausible bounds of attribution, a lower-bound FAR of 0.57 is applied, corresponding to the regional average FARs between 2000 and 2024 for storms, while the upper-bound FAR of 0.90 is based on evidence indicating up to a tenfold increase in likelihood of Melissa due to climate change (see Hall, 2025).

Based on these attribution studies, estimates of climate-attributable loss and damage for Hurricane Melissa can be made:

- Using the central FAR estimate of 0.80, climate-attributable loss and damage is estimated at US$9.8 billion, equivalent to about 43% of Jamaica's GDP in 2024.
- This estimate increases to $11 billion, or roughly 52% of GDP when upper bound FAR estimate of 0.90 is used.
- Even with conservative assumption of FAR (0.57), a large proportion of the total damages ($7 billion, or nearly 33% of GDP) could be attributed to climate change.
- The overall estimate could increase further if SLOL estimates are included in the analysis. Climate-attributable SLOL for Hurricane Melissa translates to $255 million (of the total $319 million) – taking the attributable loss and damage (using the central FAR) to more than $10 billion, or 46.6% of GDP.

Figure 5 Estimated climate attributable loss and damage for Hurricane Melissa in Jamaica



Note: Estimation based on the total loss and damage estimates provided by GFDRR (2025) and the EEA methodology described in Panwar et al. (2023)

4 Responding to increasing loss and damage

All SIDS face intensifying climate impacts and urgently need to invest in resilience. Jamaica's experience after Hurricane Melissa demonstrates both the value and the limits of disaster risk financing. The government was able to mobilise more than US$1 billion for immediate response and recovery through pre-arranged financing and emergency facilities, but this was dwarfed by total losses of $12 billion, which will weigh heavily on the country's economy for years to come.

Reductions in international climate finance risk widening an already significant financing gap.

As per our new estimates (given in section 2.2 of this paper), climate change could be responsible for around $2.28 billion in economic loss and damage across SIDS every year. These costs are already substantial and are projected to rise further. Under a 1.5°C warming scenario, our estimates predict that floods could cause cumulative climate-attributable loss and damage in SIDS of $12 billion over the next 25 years; this rises to nearly $13 billion under a 2°C warming scenario. Storms are likely to inflict significantly higher losses of $49.8 billion and $51 billion under 1.5°C and 2.0°C warming scenarios, respectively, by 2050.

The recent International Court of Justice Advisory Opinion on Obligations of States in respect of Climate Change reinforces the case for supporting countries facing the impacts of climate change. Wealthier nations have a clear moral responsibility, and increasingly recognised legal obligations, to help vulnerable island states respond to escalating loss and damage.

They need to be stepping up, not defaulting on their climate finance commitments. This includes support to the newly established Fund for Responding to Loss and Damage (FRLD). As of 15 March 2026, $822 million has been pledged to the FRLD, but this would not come close to covering climate-attributable losses from extreme weather in SIDS.

Yet climate finance commitments are moving in the wrong direction. The UK has announced that it will deliver only $1.1 billion of the $2.18 billion it pledged to the Green Climate Fund (GCF) during the current funding period (2024–2027). At a time when climate-attributable losses in SIDS already exceed the collective climate finance contributions of major donors, reductions in international climate finance risk widening an already significant financing gap.

With Australia positioning COP31 as a 'Pacific COP', SIDS will be expecting climate finance commitments to materialise this year and match the scale of accelerating climate impacts.

References

Clarke, B., Barnes, C., Keepin, T., et al. (2025) *Climate change enhanced intensity of Hurricane Melissa, testing limits of adaptation in Jamaica and eastern Cuba*. WWA Scientific Report No. 76. World Weather Attribution (www.imperial.ac.uk/grantham/research/climate-science/modelling-tropical-cyclones/hurricane-melissa/)

ECLAC – Economic Commission for Latin America and the Caribbean (2026) Assessment of the effects and impacts of Hurricane Melissa in Jamaica. Unedited report: ECLAC and IDB (https://www.pioj.gov.jm/product/assessment-of-the-effects-and-impacts-of-hurricane-melissa-in-jamaica/)

GFDRR – Global Facility for Disaster Reduction and Recovery (2025) *Global Rapid Post-Disaster Damage Estimation (GRADE) Report: Hurricane Melissa 2025 Jamaica*. Global Facility for Disaster Reduction and Recovery (www.gfdrr.org/sites/default/files/publication/GRADE%20Jamaica_v1.pdf)

Hall, T. (2025) 'Climate change and Hurricane Melissa's historic landfall on Jamaica'. S&P Global, 19 November (www.spglobal.com/sustainable1/en/insights/special-editorial/climate-change-and-hurricane-melissa-s-historic-landfall-on-jamaica)

Imperial College London (2025) 'Modelling tropical cyclones: Hurricane Melissa'. Grantham Institute – Climate Change and the Environment, Imperial College London (www.imperial.ac.uk/grantham/research/climate-science/modelling-tropical-cyclones/hurricane-melissa)

Newman, R. and Noy, I. (2023) 'The global costs of extreme weather that are attributable to climate change' *Nature Communications* 14: 6103 (https://doi.org/10.1038/s41467-023-41888-1)

Panwar, V., Noy, I., Wilkinson, E., et al. (2023) *The Costs of Inaction: calculating climate change-related loss and damage from extreme weather in Small Island Developing States*. ODI Working Paper. London: ODI Global (https://odi.org/en/publications/calculating-loss-and-damage-from-extreme-weather-in-sids)

Panwar, V., Wilkinson, E. and Noy, I. (2024) *The price of a changing climate: extreme weather and economic loss and damage in SIDS*. ODI Policy Brief. London: ODI Global (https://odi.org/en/publications/calculating-economic-loss-and-damage-in-sids)

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