

Ceylon Chamber of Commerce

Introduction to the Climate Crisis The Why

David Rogers, World Bank and Paul Davies, Met Office

Overview



- Why is it a crisis?
- Trends
- Why we need to keep average global temperture below 1.5°C
- Examples of Impacts
- Implications for Sri Lanka
- What to do?



Consequences

Risk to human health, flood security, water resources and economic security

More droughts





Sea level rise

More Floods

Retreating glaciers

Changes in precipitation

Rising sea and air tempertures

Melting Ice caps





Are extremes becoming more frequent?

Trends

Is the crisis getting worse?

Met Office Are extremes becoming more frequent?



Geophysical events

Earthquakes, tsunami, volcanic activity

Meteorological events

Tropical storm, extratropical storm, convective storm, local storm.



Flood, mass movement.



Extreme temperature, drought, wildfire.

Drought Count **Flooding Count** Freeze Count Severe Storm Count Tropical Cyclone Count Wildfire Count Winter Storm Count Combined Disaster Cost Costs 95% CI 5-Year Avg Costs \$500 22 18 \$400 15 \$300 Cost in Billions 12-9 \$200 6 \$100 3 - \$0 2002 2004 2006 2008 2010 2012 2014 2016 2018 2021 1980 1982 1988 1990 1992 1998 2000 1984 1986 1994 1996

Number of Events

United States Billion-Dollar Disaster Events 1980-2021 (CPI-Adjusted)



Sources: UNEP (2017, 2021) Emissions Gap Report, (2021) Adaptation Gap Report, SEI (2021) Production Gap Report, IPCC (2021) Sixth Assessment Report.





Met Office Global average surface temperature from 2000



Blocked Pattern causing persistent weather extremes



Extreme events and the summer of 2021

<u>GERMAN FLOODS 2021</u>: Global warming made the heavy summer rainfall between 3% and 19% stronger, and 1.2 to nine times more likely







Large area >150 mm/24h 207 mm/6h THE NEW NORMAL: COMBATING STORM-RELATED EXTREME WEATHER IN NEW YORK CITY





Record-shattering rainfall extremes

Autumn (October) 2021



Italy (Sicily) Floods

Medicane – hurricane-like storm in the Mediterranean





740.6 mm/12h 496 mm/6h

2023: a year to remember

Global temperatures at record levels in 2023

Daily global average air temperature, 1940-2023



Ocean temperatures highest on record

Daily average sea surface temperature, 1979-2023



Record-shattering rainfall extremes

Summer/Autumn 2023

Medicane – hurricane-like storm in the Mediterranean

Greece – Storm Daniel



1092 mm/24h \$2.14 billion Flooded 730 km²



Spain – Storm Dana



243.4 mm/24h

Libya – Medicane Daniel



>400 mm/6h \$19 billion >20,000 deaths



Record-shattering rainfall extremes

Summer/Autumn 2023

Medicane – hurricane-like stc Mediterranean

Greece – Storm Daniel



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Key points

- A blocked wave pattern in September caused slow-moving cut-off lows that drenched Europe; Storm Daniel deposited >1,000 mm rainfall in Thessaly, Greece, over a 24-hour period.
- Tropical cyclones drove extreme rainfall across many global regions; Tropical Cyclone Freddy inundated parts of Mozambique with 400-800mm rainfall in 24 hours.
- A high number of severe convective storms caused flash flooding in many locations; Hebei Province, China, recorded rainfall totals >1,000 mm in 3 days.

Year in review

Climate chronicles

Precipitation extremes in 2023

Hayley J. Fowler, Stephen Blenkinsop, Amy Green & Paul A. Davies

2023 saw a multitude of extreme precipitation events across the globe, causing flash flooding, countless fatalities and huge economic losses. Fuelled by a combination of a strong El Niño, record ocean warmth and anthropogenic warming, these events highlight the ongoing risks posed by extreme precipitation in a warming climate.

Extreme precipitation arises from many atmospheric phenomena. including atmospheric rivers, tropical and extratropical cyclones and convective storms. Its impacts are often catastrophic, with of twenty-three rivers across the region and resulted in 8 fatalities resulting flash floods causing substantial economic damage (which indiscriminately affects developed and developing nations') and countless fatalities. For instance, monsoon-related extreme precipitation across India and Bangladesh in May-June 2022 affected and displaced 10 million and 250.000 people, respectively; Raigad district in Maha-

The storm subsequently moved offshore on the 9th September, tran ning into a rare Mediterranean tropical cyclone - a Medicane. The cyclone hit Libya on 10th September, producing -440 mm rainfall in 6 h that broke two dams above the city of Derna. The resulting 7-m flood wave caused tens of thousands of fatalities and damage totalling an estimated US \$19 billion. Anthropogenic climate change made the extreme rainfall 50 times more likely

https://doi.org/10.1038/s43017-024-00547-9

Check for update

Low-pressure systems not associated with blocking also ca extreme rainfall events. For example, Emilia-Romagna, Northern Italy experienced heavy rainfall associated with three distinct low-pressure systems situated over the Tyrrhenian Sea on the 2nd, 10th and 16th May. In 2 weeks, the region received the normal amount of rainfal for 7 months, including 366.4 mm in Modigliana between 8-21 May with a return period of -200 years. The rainfall caused the overflow Arthropogenic climate change had a limited influence on this hear spring rainfall event

A low-pressure system associated with remnants of Typhoon Haika also brought record-breaking rainfall in Hong Kong on 7th September The region received >600 mm rain in 24 h, over a quarter of annua



\$19 billion



Temperature Trends in Sri Lanka



Hot spots



- Magnitude of predicted changes in average weather at the local level
- Relationship between weather and living standards



Carbon-intensive scenario 2050

Implications for Sri Lanka





- Overall reduction in per capita consumption expenditures – 10.5% reduction in GDP per capita by 2050 in a carbon intensive scenario (~US\$49.9 billion).
- Reduction in living standards by 7.5% in Western Province including Colombo by 2050.

Source: World Bank

Public policy

- Investment in skills, health, knowledge, better infrastructure and a more diversified economy should reduce hotspots at the household, district and country levels
- Interventions tailored to the specific needs of communities
- Inform decision making on locations and households most in need of resources



Contraction of

Public policy

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Thank you!