

### **APRU Multi-Hazards Summer School 2020**

# Global impacts of disasters and climate change and recent advances in DRR Science and Policy



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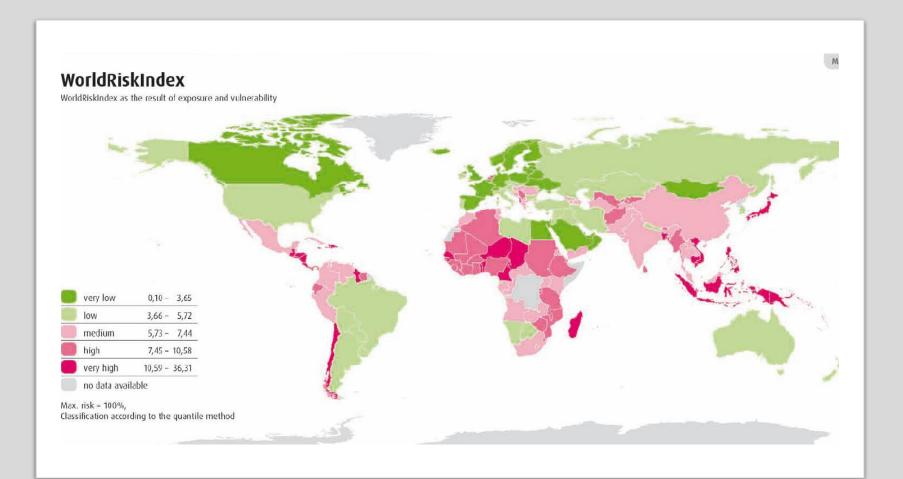
### Outline

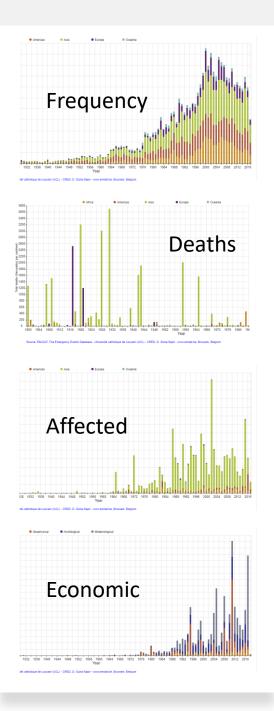
- 1. Global disasters and climate change risks
- 2. The science and impacts of climate change
- 3. International frameworks for disasters and climate change
- 4. Conclusion



Global Environmental Change The Anthropocene The Great Acceleration Planetary Boundaries



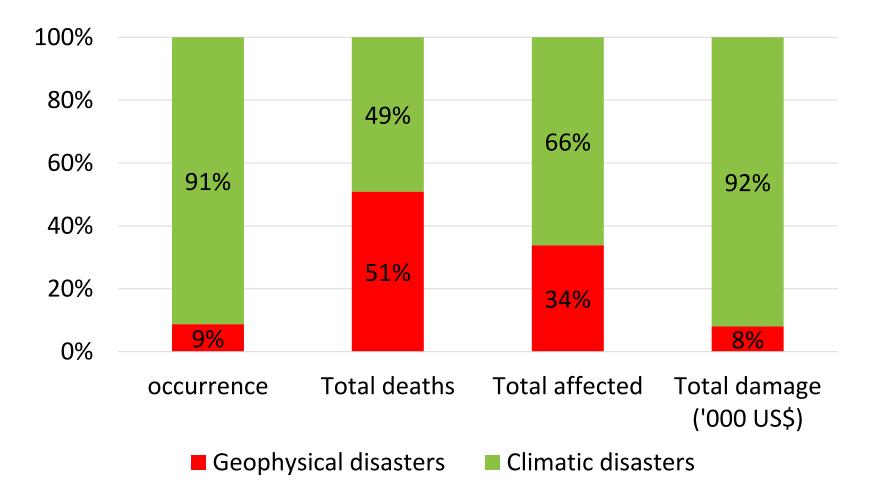




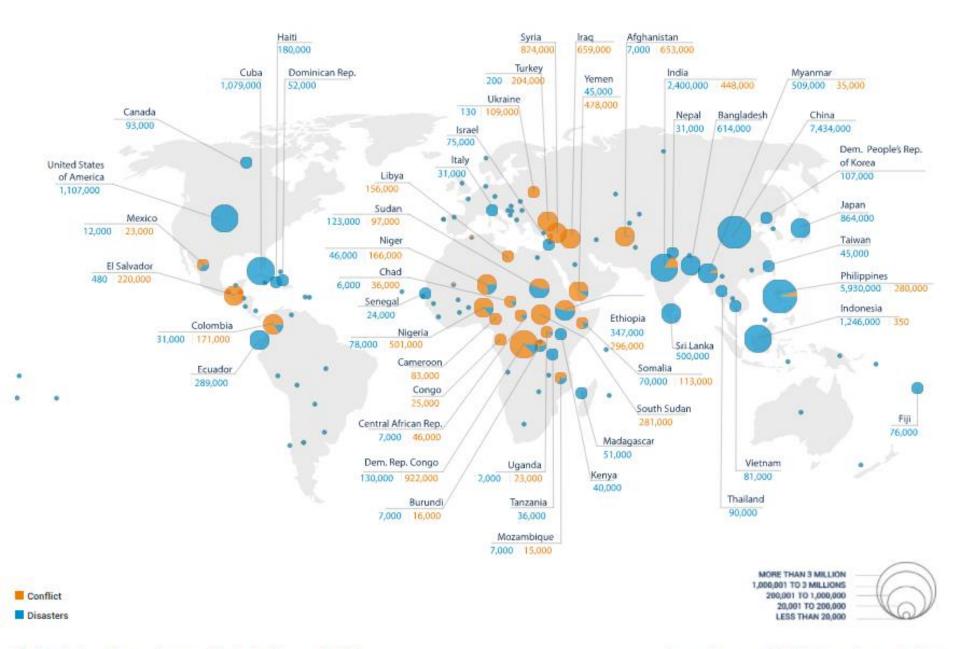
## Global Disaster Impacts

- Number of disasters
- Number of deaths
- Number of total affected
- Economic damage

### Comparing Impacts of Geophysical vs. Climatic Disasters







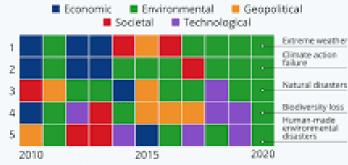
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by IDMC. The country name and the figure are shown only when the value exceeds 20.000 people displaced

### Global Risk Report 2020



#### Environmental Risks Rise to Global Dominance

Global risks considered the most likely in the next ten years, by category (1=most likely)

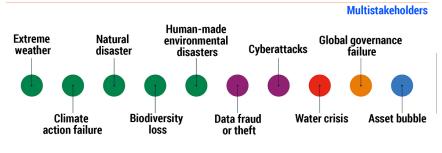


A 'global risk' is defined as an uncertain event/condition that can cause significant negative global impact within the next 10 years. Some category definitions have been adapted over time.

Based on surveys of business, government, civil society and thought leaders -Source: WEF - The Global Risks Report 2020

### Long-Term Risk Outlook: Likelihood

Top 10 risks over the next 10 years



#### Economic Environmental Geopolitical Societal Technological

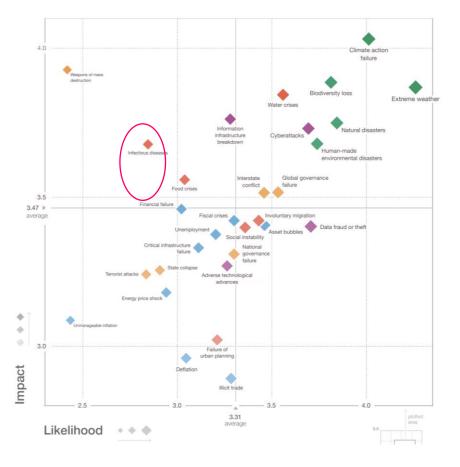
Source: WEF's Global Risks Report 2020

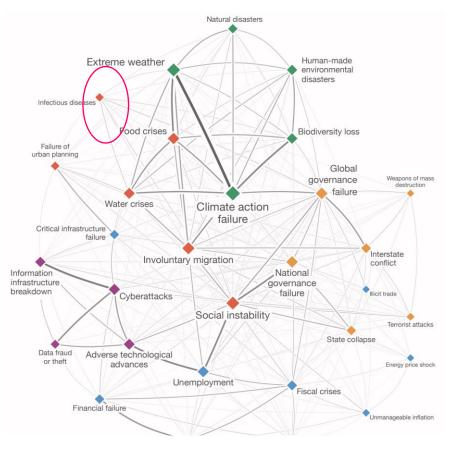
Bloomberg | Quint













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Global Warming of 1.5°C



#### Where are we now?

Since pre-industrial times, human activities have caused approximately 1.0°C of global warming.

- Already seeing consequences for people, nature and livelihoods
- At current rate, global warming would reach 1.5°C between 2030 and 2052
- But past emissions alone do not commit the world to 1.5°C







### CLIMATE CHANGE 2013

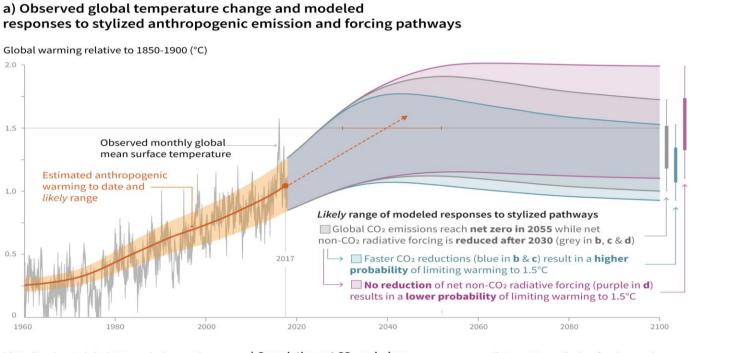
The Physical Science Basis

WORKING GROUP I CONTRIBUTION TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

WGI

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# **SPM.1:** Cumulative emissions of $CO_2$ and future non- $CO_2$ radiative forcing determine the probability of limiting warming to $1.5^{\circ}C$



Cumulative CO<sub>2</sub> emissions in pathways

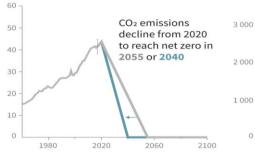
2055 and 2040

2020

reaching net zero in

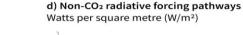
2060

b) Stylized net global CO<sub>2</sub> emission pathways Billion tonnes CO<sub>2</sub> per year (GtCO<sub>2</sub>/yr)

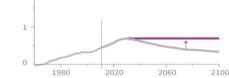


pathwaysc) Cumulative net CO2 emissions/r)Billion tonnes CO2 (GtCO2)

1980



Non-CO2 radiative forcing reduced after 2030 or not reduced after 2030



Faster immediate CO<sub>2</sub> emission reductions limit cumulative CO<sub>2</sub> emissions shown in panel (c).

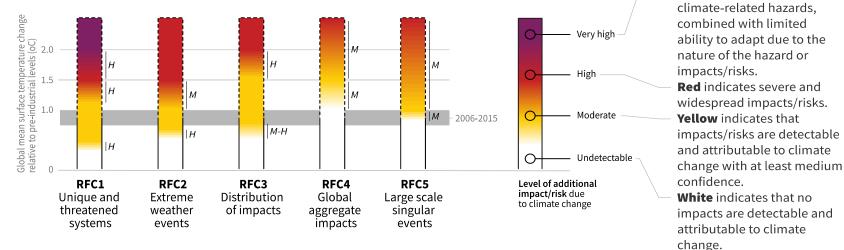
Maximum temperature rise is determined by cumulative net CO<sub>2</sub> emissions and net non-CO<sub>2</sub> radiative forcing due to methane, nitrous oxide, aerosols and other anthropogenic forcing agents.

2100

2

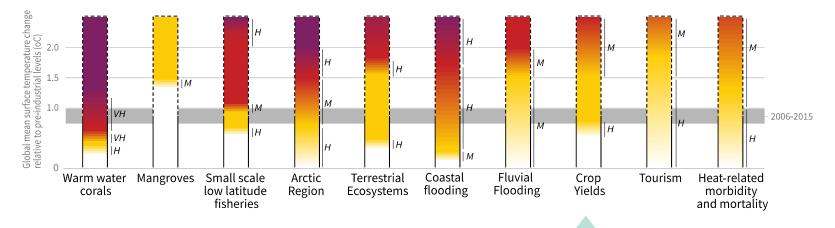


Five Reasons For Concern (RFCs) illustrate the impacts and risks of different levels of global warming for people, economies and ecosystems across sectors and regions.



#### Impacts and risks associated with the Reasons for Concern (RFCs)

#### Impacts and risks for selected natural, managed and human systems



**Purple** indicates very high

and the presence of significant irreversibility or

the persistence of

risks of severe impacts/risks

### Climate tipping elements:

What are they and how worried should we be?

#### Emerging Arctic Ozone Hole

Disappearing Artic Summer Sea Ice

Ocean

Slowing Jet

Greening

Sahara/Sahel

Stream

 Most immediate threats
Threshold in distant future
Disastrous, yet uncertain
Competing factors at play
More research needed
Gradual changes
Dying Boreal Forests

America

SW North

Enduring El Nino-Southern Oscillation (ENSO) Dying Amazon Rainforest

Melting

Sheet

Anoxic Disrupted

Thermohaline

Circulation

Ocean

Greenland Ice

Shifting **Tundra** Melting **Permafrost** 

Dying Boreal Forests

Melting Himalayan Glaciers

Chaotic Indian Summer Monsoon Released Methane Hydrates

Collapsing Coral Reefs

Weakened Marine Carbon Pump

Collapsing Deep Antarctic Circulation

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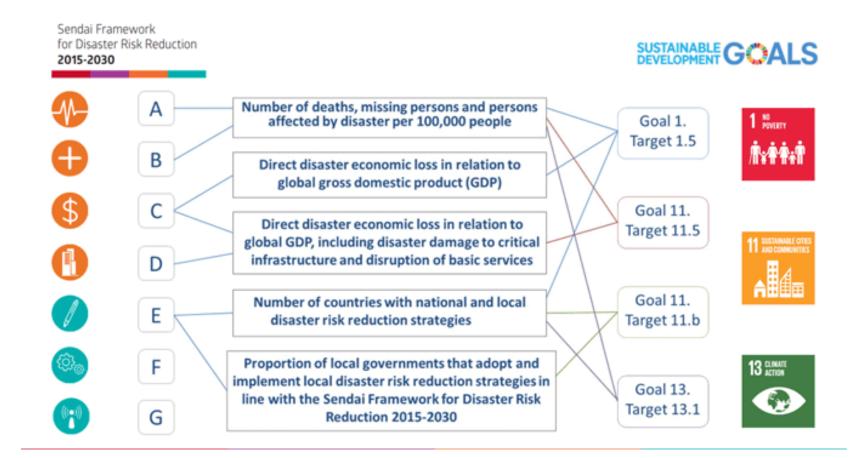
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### The Sustainable Development Goals



# SDGs and DRR



Climate change adaptation UNFCCC

Sustainable Development Goals 2030 Agenda Reducing vulnerability and enhancing resilience

> Disaster Risk Reduction Sendai Framework



### Conclusion

- 1. Disasters and climate change are interrelated
- 2. The human impacts of climate disasters are increasing
- 3. The science of climate change has improved vastly
- 4. The need for coherence on the International frameworks for disasters and climate change



### References

- 1. EMDAT, 2020
- 2. Stephen et al 2015, Planetary Boundaries
- 3. IPCC, 2020
- 4. SDG Progress, 2020
- 5. World Risk Report, 2020