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IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation

FACT SHEET

Background

This IPCC report addresses, for the first time, how integrating expertise in climate science, disaster risk management, and adaptation can inform discussions on how to reduce and manage the risks of extreme events and disasters in a changing climate. The report evaluates the role of climate change in altering characteristics of extreme events. It assesses experience with a wide range of options used by institutions, organizations, and communities to reduce exposure and vulnerability, and improve resilience, to climate extremes. Among these are early-warning systems, innovations in insurance coverage, improvements in infrastructure, and the expansion of social safety nets.

This report also incorporates case studies that illustrate specific extreme events and their impacts in different parts of the world, as well as a range of risk management activities.

The report provides information on how:

- Natural climate variability and human-generated climate change influence the frequency, intensity, spatial extent, and duration of some extreme weather and climate events;
- The vulnerability of exposed human society and ecosystems interacts with these events to determine impacts and the likelihood of disasters;
- Different development pathways can make future populations more or less vulnerable to extreme events;
- Experience with climate extremes and adaptation to climate change provides lessons on ways to better manage current and future risks related to extreme weather and climate events, and;
- Populations can become more resilient before disasters strike.

Key themes

- In some parts of the world, increases in some extreme weather and climate events have been observed. Further increases are projected over the 21st century.
- Socioeconomic development, natural climate variations, and human-caused climate change influence climate- and weather-related disaster risk.
- Experience with disaster risk management and climate change adaptation provides a knowledge base for informing effective approaches to prepare for and respond to extreme events and disasters.

Specific findings of the report

Two metrics are used to communicate the degree of certainty in key findings: qualitative confidence in the validity of a finding based on evaluation of the underlying scientific evidence and agreement; and quantified measures of uncertainty expressed as probabilities. Terms such as "robust evidence," "medium confidence," "likely," or "very likely" have specific meanings that are discussed in the final section of this document.

Changing extreme events

—Observations since 1950 show changes in some extreme events, particularly daily temperature extremes, and heat waves.

—It is likely that the frequency of heavy precipitation will increase in the 21st century over many regions.

—It is virtually certain that increases in the frequency of warm daily temperature extremes and decreases in cold extremes will occur throughout the 21st century on a global scale. It is very likely—90 per cent to 100 per cent probability—that heat waves will increase in length, frequency, and/or intensity over most land areas.

—It is likely that the average maximum wind speed of tropical cyclones (also known as typhoons or hurricanes) will increase throughout the coming century, although possibly not in every ocean basin. However it is also likely—in other words there is a 66 per cent to 100 per cent probability—that overall there will be either a decrease or essentially no change in the number of tropical cyclones.

—There is evidence, providing a basis for medium confidence, that droughts will intensify over the coming century in southern Europe and the Mediterranean region, central Europe, central North America, Central America and Mexico, northeast Brazil, and southern Africa. Confidence is limited because of definitional issues regarding how to classify and measure a drought, a lack of observational data, and the inability of models to include all the factors that influence droughts.

—It is very likely that average sea level rise will contribute to upward trends in extreme sea levels in extreme coastal high water levels.

—Projected precipitation and temperature changes imply changes in floods, although overall there is low confidence at the global scale regarding climate-driven changes in magnitude or frequency of river-related flooding, due to limited evidence and because the causes of regional changes are complex.

Trends in disaster losses

—Economic losses from weather- and climate-related disasters vary from year to year and place to place, but overall have increased (high confidence).

—Total economic losses from natural disasters are higher in developed countries (high confidence).

—Economic losses expressed as a proportion of Gross Domestic Product (GDP) are higher in developing countries (high confidence).

—Deaths from natural disasters occur much more in developing countries (high confidence). From 1970 to 2008 for example, more than 95% of deaths from natural disasters were in developing countries.

—Economic losses from weather- and climate-related disasters have been heavily influenced by increasing exposure of people and economic assets (high confidence).

Managing the risk

—An iterative process involving monitoring, research, evaluation, learning, and innovation can reduce disaster risk in the context of climate extremes (robust evidence, high agreement).

—Many measures for managing current and future risks have additional benefits, such as improving peoples' livelihoods, conserving biodiversity, and improving human well-being (medium evidence, high agreement).

—Many measures, when implemented effectively, make sense under a range of future climates (medium evidence, high agreement). These "low regrets" measures include systems that warn people of impending disasters; changes in land use planning; sustainable land management; ecosystem management; improvements in health surveillance, water supplies, and drainage systems; development and enforcement of building codes; and better education and awareness.

—Effective risk management generally involves a portfolio of actions, from improving infrastructure to building individual and institutional capacity, in order to reduce risk and respond to disasters (high confidence).

—Post-disaster recovery and reconstruction provide an opportunity for reducing the risks posed by future weather- and climate-related disasters (robust evidence, high agreement). However, short-term measures to protect people from immediate risks can increase future risks, such as improvements in levees encouraging further development in flood plains (medium evidence, high agreement).

—Risk management works best when tailored to local circumstances. Combining local knowledge with additional scientific and technical expertise helps communities reduce their risk and adapt to climate change (robust evidence, high agreement).

—Actions ranging from incremental improvements in governance and technology to more transformational changes are essential for reducing risk from climate extremes (robust evidence, high agreement).

Defining terms

This report characterizes the confidence in the validity of findings in relative terms (such as "low," "medium," and "high"), based on the assessment of underlying scientific evidence and agreement. The report uses common terms to quantify the probability of various outcomes, because without precise definitions, these terms could mean different things to different people. So when we say

Virtually certain	we mean	99-100% probability
Very likely	we mean	90-100% probability
Likely	we mean	66-100% probability
About as likely as not	we mean	33 to 66% probability
Unlikely	we mean	0-33% probability
Very unlikely	we mean	0-10% probability
Exceptionally unlikely	we mean	0-1% probability