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Leading Scientists Highlight 10 Essential Climate Science Insights for 2022

Researchers stress that only through ambitious mitigation efforts and systemic transformation, can we avoid facing widespread limits to adaptation, and increased losses and damages

Sharm El-Sheikh, Egypt – Today at COP27, leading global experts from the natural and social sciences presented ten essential insights on climate change since 2021.

Convened by the international networks The Earth League, Future Earth, and World Climate Research Programme, scientists from around the world released the annual *10 New Insights in Climate Science* report with UNFCCC Executive Secretary Mr. Simon Stiell.

The *10 New Insights in Climate Science* presents key insights from the latest climate change-related research this year and responds to clear calls for policy guidance during this climate-critical decade. The authors emphasize and unpack the complex interactions between climate change and other drivers of risk, such as conflicts, pandemics, food crises and underlying development challenges in the report.

The scientific synthesis report identifies that the potential to adapt to climate change is not limitless. Rising sea levels capable of submerging coastal communities and extreme heat intolerable to the human body, are examples of 'hard' limits to our ability to adapt. It also highlights that over 3 billion people will inhabit 'vulnerability hotspots' -- areas with the highest susceptibility to being adversely affected by climate-driven hazards -- by 2050, double what it is today.

The report further outlines that persistent dependence on fossil fuels exacerbates major vulnerabilities, notably for energy and food security, and that deep and swift mitigation to tackle the drivers of climate change is immediately necessary to avert and minimise future loss and damage.

"People and ecosystems in different places across the world are already confronted with enormous impacts, and if the planet warms beyond 1.5/2°C, more widespread breaching of adaptation limits can

be expected. Adaptation efforts cannot substitute for ambitious mitigation,” says said Prof. Mercedes Bustamente, Department of Ecology, University of Brasilia, Brazil

"The latest science confirms the rising social costs of severe climate extremes and the urgent need to deviate away from risks of going beyond limits to adaptation and crossing irreversible tipping points. As science advances, we have more evidence of massive costs, risks but also global benefits of reduced loss and damage, through an orderly safe landing of the world within the Paris climate range. To succeed requires global collaboration and speed at an unprecedented scale,” says Prof. Johan Rockström, co-chair of the Earth League, the Earth Commission and Director of the Potsdam Institute for Climate Impact Research

“Decision makers must recognise the interconnectedness of biophysical-social challenges, and that the most impactful responses are not siloed. Substantially shifting the allocation of capital and land use towards meaningful mitigation, enacting robust and coordinated global policy responses for adaptation, loss and damage, as well as deconstructing the barriers to just climate action are some of the approaches identified within the report to accelerate reaching Paris Agreement Goals,” says Prof. Chukwumerije Okereke, Alex Ekwueme Federal University Ndufu-Alike, Nigeria

In 2022, the *10 New Insights in Climate Science* covers crucial topics that are key focus areas for negotiators at COP27, from adaptation and mitigation, to the intersections of climate and food systems, security, and finance:

1. Questioning the myth of endless adaptation
2. Vulnerability hotspots cluster in ‘regions at risk’
3. New threats on the horizon from climate-health interactions
4. Climate mobility: From evidence to anticipatory action
5. Human security requires climate security
6. Sustainable land use is essential to meeting climate targets
7. Private sustainable finance practices are failing to catalyse deep transitions
8. Loss and Damage: The urgent planetary imperative
9. Inclusive decision-making for climate-resilient development
10. Breaking down structural barriers and unsustainable lock-ins

“Globally, crises are intensifying. We are seeing worrisome global environmental and societal trends, such as megafires, historic floods, and increasing atmospheric methane concentrations. But we also have options to respond to these crises. The 10 scientific findings on climate change highlighted in this report, including, for example, land use, health interactions, vulnerability hotspots, are designed to illuminate a positive, forward-looking pathway for decision-makers from local to global levels, including COP27 deliberations,” says Prof. Peter Schlosser, vice president and vice provost of the Julie Ann Wrigley Global Futures Laboratory at Arizona State University and co-chair of the Earth League.

Additional quotes

"The *10 New Insights in Climate Science* lays out how closely intertwined climate change is with issues of human security, health, migration, and land use and highlights the 1.6 billion people, living in regions most vulnerable to the effects of climate change, are also struggling the most with adaptation because of structural inequities, a lack of resources, and poor governance," says Dr Aditi Mukherji, International Water Management Institute/CGIAR, New Delhi

"Loss and damage is typically understood as those consequences of climate change that remain even after adaptation - either because one has hit limits to adapting or because adaptation options aren't available to everyone equally," says Dr Chandni Singh, report co-author and researcher at the Indian Institute for Human Settlements. "While adaptation policies focus on planning for and building capacities to deal with climate risks, L&D policies can address the related but distinct issue of economic-and non-economic losses and damages one cannot adapt to," Singh continued.

"It is imperative that we look at emission pathways and apply both ambitious mitigation efforts, to stabilize temperature increases, and targeted adaptation, to deal with the inevitable compounding and cascading climate risks that will impact the Earth system – a system that our lives and livelihoods depend on and that the status quo is failing to protect. The 10NICS, which WCRP is proud to be part of, provides stakeholders with new scientific insights required to help address these issues," says Prof. Detlef Stammer, Director of the Center for Earth System Research and Sustainability and chair of WCRP Joint Scientific Committee.

"We need an urgent, global and coordinated response to reverse the growth of greenhouse gas emissions to secure a safe and just future for humankind. In a year of compounding crises, including geopolitical instability, extreme weather events, and reverberations from the pandemic, *10 New Insights in Climate Science* delivers essential research findings to inform decisions," says Wendy Broadgate, Global Hub Director (Sweden), Future Earth.

"While the evidence on climate change and its impacts is undeniable, new research is showing how more integrated, intersectional approaches to thinking about climate action and development are vital. These Insights highlight key topics where knowledge gains have been made that can very clearly help decision makers," says Dr Lisa Schipper, incoming professor of Development Geography at the University of Bonn.

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PRESS CONFERENCE

Event invitation with report authors and UNFCCC Executive Secretary (for COP27 Accredited journalists)

- **Title:** 10 New Insights in Climate Science 2022 press conference
- **Date:** Thursday 10 November 2022
- **Time:** 9.00 am local time (**Note that this time may be subject to change**)
- **Location:** UNFCCC Press room, COP27 Blue Zone, Sharm el-Sheikh, Egypt
- **Overview:** The *10 New Insights in Climate Science* presents 10 salient insights from climate change research, stemming mainly from literature published in 2021 and 2022. Taken together they reveal the complexities of the interactions between climate change and other drivers of risk, such as conflicts, pandemics, food crises and underlying development challenges – pushing us ever closer to breaking past the socioecological limits within which people and ecosystems must remain to be able to thrive.
- **Speakers**
 - Mr. Simon Stiell, Executive Secretary, UNFCCC
 - Prof. Johan Rockström, Director, Potsdam Institute for Climate Impact Research (PIK)
 - Prof. Mercedes Bustamante, Department of Ecology, University of Brasilia, Brazil
 - Prof. Chukwumerije Okereke, Alex Ekwueme Federal University Ndufu-Alike Nigeria
 - Dr. Lisa Schipper, University of Oxford, University of Bonn, Germany
 - Dr. Aditi Mukherji, International Water Management Institute, New Delhi
- **Moderator:** Dr. Wendy Broadgate, Global Hub Director,(Sweden), Future Earth

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About the 10 New Insights in Climate Science:

The *10 New Insights in Climate Science* series is a joint initiative of Future Earth, the Earth League, and the World Climate Research Programme. The *10 New Insights in Climate Science 2022* report was prepared by a consortium of 65 leading researchers from 23 countries. The annual series synthesizes the latest climate change related research for the international science-policy community. Since 2017, installments have been launched annually at the Climate COP with the UNFCCC Executive Secretary.

About Future Earth: Future Earth is a global network of scientists, researchers, and innovators working to provide the knowledge needed to support transformations towards sustainability. With a strong focus on systems-based approaches, Future Earth seeks to deepen our understanding of complex Earth systems and human dynamics across different disciplines, and leverage this understanding to underpin evidence-based policies and strategies for sustainable development. Learn more at futureearth.org.

About the Earth League: The Earth League is an international alliance of institutional and individual members, who work together to respond to some of the most pressing issues faced by humankind including climate change, depletion of natural resources, land degradation, water scarcity, or food security. While addressing existing and emerging problems created by resource use beyond our planet's capacity, the Earth League explores how problems can be anticipated and avoided through strategic action and innovation. The Earth League aims at providing stakeholders and actors with robust information for decision-making concerning a wide range of issues that need immediate and long-term action. By coming together in a self-organized alliance, the Earth League members form a united voice in the global dialogue on planetary issues. Learn more at the-earth-league.org.

About the World Climate Research Programme: WCRP coordinates and guides international climate research to develop, share, and apply climate knowledge that contributes to societal well-being. WCRP addresses aspects of climate science that are too large and too complex to be tackled by a single nation, agency, or scientific discipline. Through international science coordination and successful partnerships, WCRP helps lead the way in understanding the fundamentals of the climate system and in determining its interactions with human activities. Learn more at wcrp-climate.org

About the Julie Ann Wrigley Global Futures Laboratory: The Julie Ann Wrigley Global Futures Laboratory at Arizona State University represents the urgent belief that we can and must make a meaningful contribution to ensuring a habitable planet and a future in which well-being is attainable. The Global Futures Laboratory is the world's first laboratory dedicated to the health of the planet and its inhabitants. It is built upon the deep expertise of ASU and leveraging an extensive network of partners for an ongoing and wide-ranging exchange across all knowledge domains to address the complex social, economic and scientific challenges spawned by the current and future threats from environmental degradation. This platform positions a new world headquarters for an international array of scientists, scholars and innovators and lays the foundation to anticipate and respond to existing and emerging challenges and use innovation to purposefully shape and inform our future. For more information visit globalfutures.asu.edu.

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