

## CLIMATE CHANGE AND WELL-BEING

### Science20 (S20) South Africa 2025 Statement

#### Preamble

Climate change remains one of the most urgent challenges of our time, with far-reaching consequences for human and planetary well-being. It threatens health, livelihoods, and the stability of Earth's life-support systems—especially for people in vulnerable situations. The Intergovernmental Panel on Climate Change (IPCC) bases its assessments about climate change on decadal and multi-decadal averages, not single-year observations. The year 2024 was designated as the warmest year on record due to incremental global warming trends<sup>1</sup>.

Since the industrial era, unequivocal historical and ongoing human activities have been the primary drivers of climate change, far outweighing natural phenomena like solar variations, volcanic activity, ocean circulation patterns, and natural greenhouse gas emissions. Responding to the effects of climate change requires urgent, science-based solutions for mitigation and adaptation, informed by evidence-driven policy and global cooperation. While climate change poses risks and trade-offs, addressing it also creates opportunities for innovation and delivers multiple co-benefits for health, ecosystems, and the economy.

The 2025 Science20 (S20) focus on *Climate Change and Well-being* aligns with South Africa's G20 theme *Solidarity, Equality, and Sustainability*. This Statement outlines five areas, each with supporting recommendations.

#### Priority Area 1: Human and Environmental Health

Climate change negatively impacts human well-being, oceans, and air and water quality, and reduces biodiversity<sup>2</sup>. More frequent heatwaves, storms, floods, droughts, and wildfires are eroding ecosystem resilience, contributing to the displacement of people and communities, increasing food and nutrition insecurity, and posing a heightened risk for disease, especially infectious diseases. An effective response must address the interlinked health of humans, animals and ecosystems alongside climate, food and water security, energy, biodiversity, and pollution, as emphasised by the One Health approach.

#### Key Recommendations

- Reduce environmental health and pandemic risks by establishing and improving air and water quality monitoring systems, strengthening regulatory arrangements, and promoting clean technologies.
- Build early warning and response capacity using data, advanced analytical tools, and climate-health surveillance systems, in line with national priorities.
- Strengthen disaster management plans, considering people in vulnerable situations and safeguarding essential ecosystem services.

<sup>1</sup> World Meteorological Organization (WMO). (2025, January 9). WMO confirms 2024 warmest year on record at about 1.55 °C above pre-industrial level. <https://wmo.int/news/media-centre/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level>

<sup>2</sup> World Health Organization (WHO). (2021). Tripartite and UNEP support OHHLEP's definition of "One Health". WHO. <https://www.who.int/news/item/01-12-2021-tripartite-and-unep-support-ohhlep-s-definition-of-one-health>

## **Priority Area 2: Food, Water, and Energy Nexus**

Climate change disrupts the interconnected systems that sustain the availability of food, water, and energy by shifting climate regimes that exacerbate extreme weather, land degradation, and ocean changes. With increasing demands for resources due to population growth and aspiration for improved living standards, safeguarding this nexus requires integrated, climate-resilient policies, resource-efficient technologies, and sustainable consumption patterns.

### **Key Recommendations**

- Advance climate-smart, nature-positive agriculture by promoting water-efficient and agroecological practices.
- Strengthen local food systems and support small-scale producers through training, resources, and community-based practices to enable evidence-based decision-making.
- Foster and enable urbanisation that is compact, resource-efficient, and low-emission, through co-location of people and jobs, integrating sustainable water management, renewable energy, and urban agriculture to ease pressure on water, energy, and food systems.
- Strengthen resilience of global food systems.

## **Priority Area 3: Indigenous Peoples and Local Communities, and People in Vulnerable Situations**

The knowledge systems, practices, and values of Indigenous Peoples and Local Communities (IPLCs) are increasingly recognised as vital in addressing climate impacts.<sup>3</sup> However, their livelihoods, health, and cultural heritage, as well as those of people in vulnerable situations, face disproportionate climate impacts due to their reliance on threatened ecosystems and limited resources.

### **Key Recommendations**

- Support the active participation of IPLCs and the integration of their traditional knowledge in decision-making processes, ensuring their knowledge and perspectives inform climate policies and actions.
- Support inclusive, community-led practices that build adaptive capacity through training, technical support, and partnerships.
- Ensure early warning systems are accessible to people in vulnerable situations to guide targeted and timely interventions.

## **Priority Area 4: Climate Change Adaptation**

Despite progress, gaps exist between current adaptation efforts and the levels required to effectively respond to climate risks. Effective adaptation considering multiple scenarios is essential to reduce vulnerability—particularly among communities in climate hotspots.

### **Key Recommendations**

- Strengthen infrastructure and early warning systems and integrate local capacity to help manage climate-related health, economic, and environmental risks, with a focus on people in vulnerable situations.
- Enhance access to regionally specific information, together with national and global data, to strengthen access and sharing of systems that guide evidence-based climate action.
- Restore and protect natural and semi-natural ecosystems to enhance climate adaptation potential and support biodiversity conservation.

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<sup>3</sup> Intergovernmental Panel on Climate Change (IPCC). *Climate Change 2022 – Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, 2023. Cambridge Core. <https://doi.org/10.1017/9781009325844>.

## Priority Area 5: Climate Change Mitigation

To limit the impact of climate change, sustained efforts to manage and reduce emissions to net zero/carbon neutrality are critical. This involves transitioning away from anthropogenic greenhouse gas emitting activities<sup>4,5</sup>, embracing renewable energy and low emission energy technology strategies, scaling up research and implementation of technologies that abate and remove carbon, improve efficiency, manage waste, and invest in nature-based and circular solutions.<sup>6</sup> For some technological interventions, further research, under strong governance, is essential before considering deployment.

### Key Recommendations

- Accelerate efforts and uptake of solutions that reduce emissions, including market-based approaches, taking cognisance of environmental and socio-economic contexts.
- Implement circular solutions like the circular carbon economy (CCE) by supporting the approach of reduce, re-use, remove, and recycle, investing in infrastructure, incentivising adoption of sustainable approaches, raising awareness, and tracking progress.
- Consider research programmes including governance on carbon dioxide removal, solar radiation management, and other forms of geoengineering to better understand risks and long-term consequences.

### Opportunities and Way Forward

Continued efforts to enhance mitigation action will reduce the impact of climate change risks and the costs of adaptation measures and increase their effectiveness. Accelerating the adoption of clean energy technologies creates opportunities also for regions with limited hydropower or wind potential to be at the forefront of energy efficiency innovations and diversify energy sources. Ecosystem-based adaptation, as part of an integrated suite of solutions, can strengthen urban resilience, safeguard food systems, and unlock new market opportunities for developing countries. Inclusive planning across health, transport, agriculture, construction, energy, and water systems can help establish co-beneficial safety nets that reduce climate change impact in vulnerable situations and contribute to global well-being.

As low emissions technologies emerge, affordability within national contexts will be critical to ensuring their uptake. Addressing climate change is now a policy and societal imperative that, if not addressed, will have a significant negative impact on the well-being of future generations. By acting decisively across the five priority areas outlined in this Statement, we can improve public health, advance social equity, strengthen food and water security, and drive sustainable innovation. While climate change itself presents serious challenges, the research and innovation it has inspired offer pathways to a more sustainable and economically dynamic future. With global cooperation, inclusivity, and science at the core of climate action, these challenges, when addressed, can become a powerful catalyst for shared well-being and lasting prosperity.

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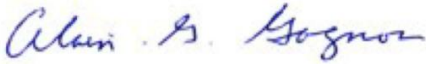
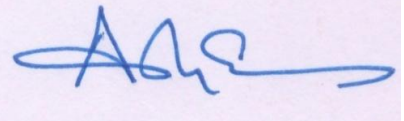
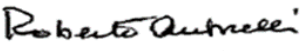
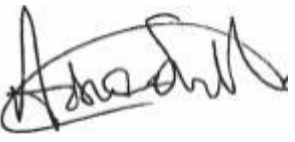
<sup>4</sup> 28<sup>th</sup> Conference of the Parties (COP28). 2023. Global Renewables and Energy Efficiency Pledge.

<https://www.cop28.com/en/global-renewables-and-energy-efficiency-pledge>

<sup>5</sup> United Nations Framework Convention on Climate Change (UNFCCC). 2023. COP 28: What Was Achieved and What Happens Next? Conference. [https://unfccc.int/cop28/5-key-takeaways#:~:text=The%20decision%20emphasizes%20%E2%80%9Cthe%20importance,on%20Climate%20Change%20\(UNFCCC\)](https://unfccc.int/cop28/5-key-takeaways#:~:text=The%20decision%20emphasizes%20%E2%80%9Cthe%20importance,on%20Climate%20Change%20(UNFCCC))

<sup>6</sup> Circular solutions refer to strategies that design out waste and pollution, keep products and materials in use, and regenerate natural systems. These solutions promote sustainability by extending the life cycle of resources through reuse, repair, recycling, and sustainable design—reducing environmental impact and supporting ecosystem resilience. Other circular solutions, like the Circular Carbon Economy (CCE), focus on the circularity of carbon through four pillars: Reduce, Reuse, Recycle, and Remove; those pillars offer a comprehensive approach to addressing emissions while supporting sustainable development and economic growth.

## Endorsing Science20 Members

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|  <p>Mexico - Mexican Academy of Sciences</p>                               |  <p>Russia - Russian Academy of Sciences</p>                              |  <p>Saudi Arabia - King Abdulaziz City for Science and Technology</p> <p>With reservations on the inclusion of "the year 2024 being designated as the warmest year" and ref 1 (Preamble). In addition to "transitioning away from anthropogenic greenhouse gas" and ref 4 &amp; 5 (Priority 5).</p> |
|  <p>South Africa - Academy of Science of South Africa</p>                  |  <p>South Korea - Korean Academy of Science and Technology</p>             |  <p>Türkiye - Turkish Academy of Sciences</p>                                                                                                                                                                                                                                                       |
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