

G7 Science Ministers' Communiqué

Frankfurt am Main, 12-14 June 2022

We, the G7 Science Ministers, have come together in Frankfurt am Main, Germany on 12-14 June 2022, in order to foster progress in science and research for a sustainable future that benefits all people, based on our common values of democracy, respect for international law and respect for human rights and freedom, and a commitment to improving equity, diversity and inclusion in the conduct of science and the benefits from scientific research.

These universal values are at present seriously undermined due to Russia's premeditated and unjustified invasion of Ukraine. We, the G7 Science Ministers, in alignment with the joint statement by the National Academies of the G7 States, wish to reaffirm our unified position condemning the invasion of Ukraine, as demonstrated in the G7 Leaders Statement of 24 February 2022. We strongly condemn Russia's assault on the fundamental principles of freedom, democracy and self-determination. These fundamental principles provide the basis for academic freedom and for scientific exchange and cooperation. We are restricting as appropriate, government funded research projects and programs involving Russian government participation. We are committed to the open international exchange of ideas in science and technology, including with Russian scientists who have chosen to leave Russia.

We confirm our unwavering support for Ukrainian scientists and students whose lives and engagement in science and research are threatened by Russia's aggression. We commit to continued research collaboration with Ukraine and to support Ukrainian scientists and students in Ukraine and abroad, including those in exile. We also acknowledge the difficulties of all Russian and Belarusian scientists and students facing political persecution for opposing Russia's actions. We remain concerned that Russian government-funded and state-affiliated institutions have chosen to perpetuate the Kremlin's disinformation and repress independent voices within. In the spirit of science diplomacy, we will continue the dialogue between civil societies, including exchanges with Russian scientists and students to the furthest extent possible, especially through the promotion of individual academic and student mobility.

We support those who stand up for peace and universal values such as freedom in science, teaching and research, which are integral elements of liberal democracies and which are, for example, the backbone of the EU Global Approach on international cooperation on research and innovation.

We emphasise the pivotal role of science and innovation for freedom and for the well-being of our global community, as well as for the sustainable future of our planet. We are united in our commitment to cooperate in research and science to find concrete solutions to pressing global challenges that will benefit all people from all backgrounds, including historically disadvantaged populations. Furthermore, we emphasise that technology should not be deployed in a way that violates individual human rights and democratic freedom such as authoritarian surveillance and oppression.

Guided by Germany's G7 Presidency motto "Progress towards an equitable world", and in line with the G7's priorities, our main focus is to protect the freedom, integrity and security in science and research. We affirm the importance of equity, diversity and inclusion in improving all aspects of research and innovation, by providing a broader set of perspectives, skills, experiences, and solutions to the interdisciplinary, global issues we currently face. We will ensure that more of society can participate in, benefit from, and contribute to the scientific research ecosystem. We continue our support of the G7 Gender Equality Advisory Council and the G7 Research Compact laying out our shared values on diversity and inclusion in research, particularly as it relates to gender equity. Recognizing these shared values, our common goal is to advance research on climate change and on the Post COVID-19 condition that will produce benefits for our population in ways that improve diversity, equity, inclusion, and accessibility in the scientific research ecosystem.

We highlight our closer cooperation in the following three areas:

1. Promoting and protecting freedom, integrity and security in science and research

We emphasise our responsibility to effectively ensure the continued freedom, openness, integrity and security of our research ecosystem, and the responsible use of technologies, together with the research community. We believe that openness is fundamental, security is essential and freedom and integrity are crucial. We therefore affirm the relevance of freedom in scientific research for the progress of our societies and recognize the role of governments to promote and protect freedom in scientific research.

We acknowledge the values, principles and definition of freedom in scientific research, expressed in the Bonn Declaration on Freedom of Scientific Research of 20 October 2020. We also acknowledge the Marseille Declaration of 8 March 2022 on International Cooperation in Research and Innovation, which promotes a multilateral dialogue on key research and innovation principles. We stand together in unity and acknowledge that respecting freedom in scientific research is an indispensable cornerstone of democracy and a common core value for trustful and open science cooperation with international partners.

We highly value the work done to date by the "Security and Integrity of the Global Research Ecosystem" (SIGRE) Working Group. We stand committed to the values and principles articulated in the "G7 Research Security and Integrity Principles" paper (see Annex). We share the joint objective of advancing previous efforts by the G7 to develop best practices for promoting and protecting research integrity and security while enabling flourishing research cooperation that is based on the principles of open science. We will seek to strengthen cooperation with other multilateral processes that pursue similar goals.

A culture of integrity of science and research needs to include integrity of communication. Effective and responsible science communication is indispensable in enabling societal and policy decisions based on reliable evidence. It is also important for ensuring public trust and countering science-related disinformation, information manipulation and the misuse of science. Disinformation has led to a worrying mistrust towards science and scientists in some parts of society. We therefore have decided to explore a Working Group to strengthen the cooperation between the G7 partners on effective science communication. The focus is on the promotion of an evidence informed development of science communication practice and enhanced science literacy. This will include the strengthening of knowledge transfer from international research on science communication, science denial, information manipulation, and disinformation into the practice of science communication. The Working Group could also engage in an exchange of best practices in the intercultural context and the development of guidelines for effective and responsible science communication.

We support the work and results achieved so far by the G7 Open Science Working Group. The group has made noticeable progress in examining data-sharing infrastructures, research evaluation policies and open science incentives, and lessons of research on research, and has identified barriers, challenges and enablers for practicing open science that deserve and require common action (see Annex). We encourage the group to continue its exploratory work and follow up with tangible recommendations based on good practices and guiding principles.

2. Research on climate change

‘A sustainable planet’ is one of the priorities of Germany’s 2022 G7 Presidency. We acknowledge with concern that the unprecedented, interdependent and urgent crises of climate change and biodiversity loss pose threats to nature and the prosperity and security of people. We underscore the important role of science in supporting the implementation of the Paris Agreement and to keep a limit of 1.5°C temperature rise within reach.

We have decided to promote interdisciplinary research on sustainable solutions to tackle climate change and biodiversity loss to further explore two important topics which would particularly benefit from increased international coordination and cooperation: carbon dioxide removal (CDR) and the ocean-climate-biodiversity nexus.

Carbon Dioxide Removal (CDR)

CDR has been identified as a necessary supplement to greenhouse gas emissions reductions, but we need more research on carbon dioxide removal and storage, in order to counterbalance hard-to-abate residual emissions. While reducing greenhouse gas emissions remains the first priority to address climate change, we acknowledge the need to assess the environmental, technical, economic, and societal feasibility and side effects of CDR methods.

We will promote an exchange on research needs on monitoring, reporting and verification (MRV) and on the feasibility and effectiveness of CDR approaches, also taking into account methodologies from sources like the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). We support the development of possible Life Cycle Analysis (LCA) methodologies for evaluating CDR technologies and their potential impacts in the short- and long- term. We also support the development of a landscape analysis of existing CDR-related initiatives for example the Mission Innovation Carbon Dioxide Removal Initiative or the Innovation for Cool Earth Forum, to identify clear research gaps and encourage coordination.

Ocean-Climate-Biodiversity Nexus

Acknowledging the key role of a healthy ocean to an equitable, resilient and sustainable planet, we are showing global leadership and taking urgent action to address the ocean’s climate and biodiversity crises by focusing on the ocean-climate-biodiversity nexus.

Global warming, ocean acidification, deoxygenation, eutrophication, pollution, invasive alien species and human activities such as overfishing and coastal development are damaging the integrity and functioning of marine ecosystems worldwide and are threatening the livelihoods of the populations that depend on them. The absorption and storage of heat and CO₂ are closely intertwined with ocean circulation, and ocean currents may change significantly due to alterations in heat and freshwater inputs. This will have a critical impact on marine ecosystems, the ocean's capacity to regulate atmospheric CO₂ concentrations and the efficiency of biological carbon sinks.

There is a particular need for better quality projections of changing ocean dynamics and their influence on marine biodiversity and ecosystems processes, and their cumulative impact on other drivers, such as pollution and overfishing. In order to contribute to the global response to climate change, we should advance a reliable quantification and projection of the marine carbon sink, and focus research on: emerging feedbacks which could increase greenhouse gas emissions concentrations; increases in ice and glacial melting in the coast-land continuum; the changing ecosystem conditions in the Arctic; the potential for protection of healthy ecosystems; and the increased protection and restoration of coastal and marine ecosystems.

To this end, with reference to the G7 Future of the Seas and Oceans Initiative (FSOI), we promote and support foundational climate and ocean ecosystem science to improve the quality and extend the range of modelling, scenario information and parameters through international coordination on global ocean observation, with a focus on unified data management, synthesis of data products and sustained information delivery.

We recognize the need for capacity development for global ocean observation, which could involve tailor-made programmes for training, outreach and fellowship and support, in particular the development of a sustained global Biogeochemical-Argo. We promote the G7 FSOI (see Annex), G7 UN Decade Navigation Plan 'Spotlight Activities', e.g. Global Ocean Indicators Framework, Net Zero Ocean Capability, and Digital Twins of the Ocean Summit 2022, and will continue to work on Policy Briefs for these activities.

We support the implementation of the G7 Ocean Decade Navigation Plan as part of the UN Decade of Ocean Science for Sustainable Development (2021-2030). We strive for change in ocean science and action for societal outcomes. We also emphasize that economic activities in the ocean need to adopt best practices to minimize harm, create multiple benefits, and ensure a sustainable and productive blue economy. We welcome and support the cross-sectoral G7 Ocean Deal, and the recent actions to protect, conserve and restore coastal and marine ecosystems as

declared by the G7 Climate, Energy and Environments Ministers in their Communiqué from 27 May 2022 and will foster scientific collaboration in support of these efforts, notably through initiatives and missions that restore our seas and ocean.

3. Post COVID-19 condition

We encourage international research on the long-term impacts of SARS-CoV-2 infection, in line with the priority "Healthy lives" of the German G7 Presidency. Even individuals with only a mild or asymptomatic course of infection may develop the Post COVID-19 condition, with vulnerable populations suffering disproportionately.

In view of the novelty of the Post COVID-19 condition and the limited insight into the late symptoms and longer-term consequences, there is a great need for scientific research on the long-term effects of infections to contribute to appropriate therapy and health care strategies and to reduce the burden of disease across population groups.

We recognize the need for the development of a common definition of the Post COVID-19 condition, supporting current WHO discussions to allow international research comparisons. Consequently, we support and promote the collection, open sharing and analysis of data, evidence and experiences on the Post COVID-19 condition. We also encourage research into the underlying mechanisms that contribute to the disease. We support protecting people's privacy while upholding open science principles.

We support the WHO Global Clinical Platform for COVID-19 in order to enhance information sharing on therapy, rehabilitation and best practices for the diverse population groups affected by the Post COVID-19 condition to generate sufficient data to enable evidence-based interventions. We therefore encourage potential synergies through international research coordination in order to protect human health and prepare for future pandemic responses.

We wish to thank the G7 National Academies (Science7) and acknowledge their joint statements.