

**SCIENCE FOR GLOBAL TRANSFORMATION**  
**S20 Brasil 2024**  
**Communiqué**

**Preamble**

In September 2015, at the United Nations Headquarters, representatives of 193 countries approved a global agenda to be achieved by 2030. The signatory countries recognized that to make our planet suitable for sustainable living, we urgently need to take action on the 17 Sustainable Development Goals (SDGs). Among the most important identified was eradicating poverty in all its forms and dimensions, including extreme poverty, which is the greatest global challenge and an indispensable requirement for sustainable development. Bold and transformative measures were outlined, with our governments committing to embrace them to steer the world towards a sustainable and resilient path. These actions are integrated and indivisible and must balance the three dimensions of sustainable development: social, economic, and environmental. Science and international scientific collaboration serve as key mechanisms to reach these goals. With this standpoint, under the motto “Science for Global Transformation”, the S20 Academies of Sciences met in Rio de Janeiro in 2024, and focused the discussions on five themes related to the UN 2030 Agenda: (1) Artificial Intelligence; (2) Bioeconomy; (3) Energy Transition Process; (4) Health Challenges; and (5) Social Justice.

We present to the G20 governments and society, the S20 Brasil 2024 recommendations with the expectation that these will be considered by our governments and help guide the final document of the G20. We also draw attention to the fact that G20 countries should consider their demographic trends, proactively anticipating and adapting to changes in their workforce size and age distribution, as these factors will significantly impact social security, pension systems, health and welfare programs, thereby affecting economic growth and competitiveness. It is essential for the educational system to address the diverse needs of both aging and youthful populations. Grasping social and demographic trends is essential for anticipating technological requirements and driving innovation.

**Artificial Intelligence**

AI is a critical driver for development, especially in healthcare, education, and tackling climate change. It may also pose risks, including the potential to widen inequalities and negatively impact the environment. To navigate these challenges effectively, AI's advancement requires a robust ethical framework. The rapid pace of AI innovation creates significant uncertainties for governance, complicating efforts to manage its implications. While AI might result in job losses in some industries and regions, it also has the potential to create new job opportunities in others.

Recommendations:

1. Create policies in an AI-driven economy to assure job security and workers' rights that are flexible and adaptable, rooted in shared ethical principles. This will ensure innovation while reducing societal risks.
2. Contribute to establish AI regulations and data governance standards that benefit all countries fairly and uphold human values.
3. Enable citizens through education to make informed decisions about AI, understanding its potential, benefits, limitations, and potential risks.
4. Work together to create and share large, valuable, and well-curated scientific datasets, respecting data governance.
5. Invest in data infrastructure, high-performance computing, and training to use AI effectively in fields of application.
6. Prioritize AI technologies for the benefits of humanity and environmental sustainability.

7. Support scientific communities in researching, developing, and effectively using AI across various disciplines.
8. Evaluate establishing regional academic research centers that share AI infrastructure.
9. Seek to establish intergovernmental frameworks to oversee AI technologies that might operate beyond human control or oversight.
10. Advocate for AI to contribute effectively to achieving the Sustainable Development Goals (SDGs).

### **Bioeconomy**

Bioeconomy encompasses the sustainable use of biological resources, aiming to transform major sectors of the economy, ensuring fair biotrade and promoting sustainable innovation. S20 members understanding on the subject is: the bioeconomy is based on the supply of goods derived from renewable biological resources (biobased products, food, feed, bioenergy, health supplies and pharmaceuticals) comprising all economic activities that depend upon these resources and their derivatives, protecting traditional knowledge and practices, and in line with the United Nations Sustainable Development Goals. Moreover, bioeconomy models must aim to meet certain criteria: 1) conserve and protect natural resources and support restoration efforts; 2) adopt appropriate technologies, tailored to each biome; and 3) engage Indigenous and local communities in the decision-making while protecting traditional knowledge, upholding human rights, and promoting capacity building.

#### Recommendations:

1. Invest in research and infrastructure: Support cutting-edge research to drive technological breakthroughs, enhancing innovations in biogenics feedstocks, bioenergy, medicines, and other materials from biomass, forest, plants and microorganisms from the biodiversity of different biomes.
2. Integrate social justice: Promote sustainable and inclusive bioeconomic models, enabling community-driven innovations that protect and integrate traditional knowledge and culture, and focusing on leveraging local biological resources to promote regional economic growth.
3. Build robust international and multilateral cooperation: The G20 nations should reach a consensus on the role of the bioeconomy as one of the strategies for tackling climate change, biodiversity loss, poverty, and human and non-human health. Formulate a joint policy framework that enables countries to implement bioeconomy programs, invest in social and technological innovations, share critical knowledge, improve the quality of life, and safeguard natural resources.

### **Energy Transition Process**

The energy transition process requires continued innovation and international collaboration to achieve a sustainable and resilient future, balancing technological, economic, environmental, and social dimensions to create a cleaner and more equitable world. Transitioning from fossil-based to affordable and clean energy systems is essential for addressing climate change, resource depletion, and ensuring global energy security. Integrating social and economic considerations remains crucial to guarantee universal access to sustainable, clean, affordable, and reliable energy, thereby addressing the persisting issue of energy poverty in many parts of the world. Energy transition being a complex issue, G20 countries must ensure just and equitable transitions.

#### Recommendations:

1. Energy transition should integrate clean energy sources such as solar, wind, hydropower, and geothermal, as well as mitigation and negative emissions through technological and nature-based approaches.
2. The overall efforts to reduce emissions in the energy transition process should rely on the increasing use of low-emission energy sources, including nuclear and renewable energies, in a mix that varies from one country to another, and moving forward to phasing out coal.

3. Carbon capture, utilization, and storage, along with market-based approaches, such as carbon pricing on a global scale, should be used for minimizing CO<sub>2</sub> emissions from fossil fuels as we move away from these sources toward a low-emission energy future.
4. Biofuels and sustainable hydrogen could be employed, particularly for sectors like transportation and heavy industry.
5. Ocean energy sources, including tidal, wave, and thermal, could also be considered to generate electricity.
6. Batteries, complementing traditional renewable sources, could be utilized to offer storage and transportation of energy, and baseload power generation solutions.
7. Pursue enhanced energy efficiency and ensure equitable reductions in energy demand, which are critical for significantly lowering CO<sub>2</sub> emissions and mitigating climate change.
8. Complete recycling processes for materials used in renewable energy systems should be implemented for sustainable and cleaner energy solutions.
9. Public outreach education, by enhancing awareness of the principles of reduce, reuse and recycle, along with stakeholder engagement, should both be embraced to properly address social acceptance and gain community support to clean energy projects.
10. To ensure the success of energy transition, an ongoing international dialogue that facilitates regular updates and the sharing of best practices among nations should be established.
11. Social and economic considerations should include job creation, technological advancements, equitable access to energy, public engagement and environmental justice.

### **Health Challenges**

There is urgent need to develop a more equitable, sustainable, and resilient health system by emphasizing preventive healthcare and healthy lifestyles, particularly in communities with known vulnerabilities. The achievement of universal health coverage with emphasis on access, quality and community engagement holds the potential to drive improvements in various aspects of health, spanning mental health, communicable and non-communicable diseases management, maternal and child health as well as longevity issues in the growing aging populations. Despite the large burden that mental ill-health imposes on people and on economies, many countries continue to neglect mental health care, and the unmet need for treatment remains high. Making mental health care policy a priority would enhance people's well-being and have significant social and economic benefits. Climate and environmental change, along with biodiversity loss and pollution, directly and indirectly impact health and societal sustainability. These factors affect agricultural production, food prices, energy availability and access to high quality water and air, with low- and middle-income countries and groups with known vulnerabilities suffering the most. Rising global temperatures and extreme weather events create conditions that favor the spread of both communicable and non-communicable diseases. This requires an integrated One Health approach that recognizes the interdependencies between the health of people, animals, and ecosystems.

### Recommendations:

1. Ensure global access to essential vaccines, medicines and diagnostic tools for all. Promote sustainable local and regional production through capacity-building in research and innovation, knowledge sharing, and technology transfer.
2. Strengthen global surveillance, open science, and information sharing for early detection of health emergencies and public health events of international concern.
3. Address the challenges of antimicrobial resistance by urgent development of new antimicrobials, and supporting alternative solutions, while promoting a rational use of antibiotics in people and animals worldwide.
4. Develop policies to promote healthy lifestyles, including physical activity and quality nutrition, to address issues such as obesity, tobacco, alcohol, substance abuse, ultra-processed food and sugar-sweetened beverages.

5. Promote effective communication strategies for disseminating health information, countering disinformation, and conducting health campaigns.
6. Promote democratic digital health and technological transformations that are crucial for supporting strong and resilient universal health systems.
7. Prioritize mental health care, especially for the youth and groups with known vulnerabilities, with investments in prevention programs to reduce violence and address substance abuse.
8. Develop long-term support for the management of the health of older people.
9. Integrate climate change issues across all key G20 Health Working Group priority areas and identify opportunities for health co-benefits in developing climate policies which expand beyond the health sector.
10. Address climate and environmental changes impact on communicable and non-communicable diseases by research and environmental management and improved surveillance.
11. Leverage global resources focused on the health impacts of climate change and environmental change with a focus on groups with known vulnerabilities, such as those exposed to extreme weather events. Enhance climate-resilient health systems to better prepare for climate-related crises.

### **Social Justice**

Despite the extraordinary technological progress attained through the contributions of science, glaring inequalities and social disparities remain. Poverty continues to be a scourge that afflicts vast segments of the global population. Many humans are facing food deprivation, lack of shelter and medical care, and are deprived of access to energy, clean water and basic sanitation. Digitalization, artificial intelligence and robotization cause the dismantling of jobs and the creation of new ones at an unprecedented pace. Additionally, the changing job market presents challenges for retraining the workforce, particularly in low- and middle-income countries. While poverty and inequality can exist independently, they are frequently intertwined, creating a complex social landscape.

Social justice requires ending poverty, reducing inequalities, and promoting inclusion so that no one is left behind. Harnessing the power of science is not only a pathway but a responsibility in this quest. Societies can create a more equitable and sustainable future through technological innovation, data-driven policymaking, and advancements in various scientific fields. Through the integration of scientific knowledge, technological innovations and development strategies, we can address the root causes of poverty and exclusion, paving the way for a world where everyone can thrive and contribute to the betterment of humanity. Science should be seen inherently as a social practice requiring ethical considerations and awareness of its consequences.

### Recommendations:

1. Construct a perspective of rights and guarantees that considers the value of developing institutions to promote social inclusion and cultural diversity. People should be in the center of all social, economic and development policies; allocate necessary resources to ensure full economic, social, cultural, and environmental rights.
2. Harness the power of science responsibly: generate knowledge and make discoveries that enhance social, environmental, and human well-being; pursue scientific advances with ethical considerations and awareness of consequences; integrate scientific knowledge into development strategies to address poverty and exclusion.
3. Promote interdisciplinarity and local community collaboration: combine social, natural, and life sciences to decrease discriminatory practices and promote social justice; apply scientific insights into human behavior to develop interventions challenging stereotypes and biases.
4. Emphasize the ethical imperative of reducing all types of inequalities to enrich human resources and use social justice to eliminate discrimination, intolerance, and violence to build a more equitable society.

5. Expand infrastructure for universal internet access; enhance digital literacy to ensure all segments of society benefit from digital advancements; formulate inclusive and equitable approaches to digital development.
6. Address science-related disinformation in digital media to prevent adverse societal impacts, while developing national, regional, and global strategies involving scientific communities and civil society.
7. Enhance scientific literacy: cultivate scientific literacy and awareness of science as a self-correcting process; equip societies to meet future technological challenges through better scientific understanding.
8. Promote education, social equality, and fair treatment for all: focus on health and well-being for all demographic strata; transition to sustainable energy and industry practices; ensure sustainability in food production, land use, water management, and ocean health; develop sustainable, just, and resilient cities and communities; harness the digital revolution for sustainable development.

### Endorsing S20 Members



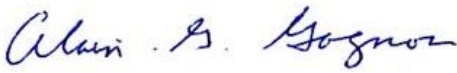
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Australia - Australian Academy of Science



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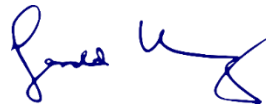
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China - Chinese Academy of Sciences



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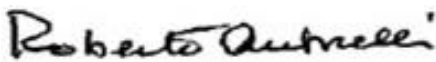
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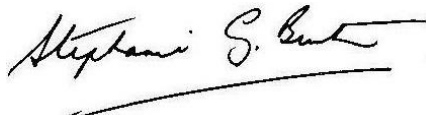
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Russia - Russian Academy of Sciences



South Africa - Academy of Science of South Africa



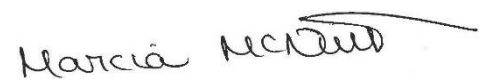
South Korea - The Korean Academy of Science and Technology



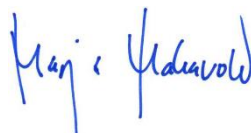
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United Kingdom - Royal Society



United States - National Academy of Sciences



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