14TH MEETING OF AGRICULTURE CHIEF SCIENTISTS (MACS)

26-28 MAY 2025

COMMUNIQUÉ

28 MAY 2025

Preamble

The 14th Meeting of Agricultural Chief Scientists of G20 states (G20-MACS), held on 26-28 May 2025 in Polokwane, Limpopo Province, was hosted by the Agricultural Research Council (ARC) and the Department of Agriculture under South Africa's G20 Presidency. A first for Africa, this G20-MACS followed intensive national and African continental dialogues, resulting in six thematic focus areas. These themes identified actionable science, technology, and innovation actions to advance the UN 2030 Agenda for Sustainable Development Goals (SDGs), the African Union's Agenda 2063, and the African Common Position on Food Systems. The G20-MACS outcomes align with South Africa's G20 Presidency Agriculture Working Group priorities. We advocate for policies and approaches that promote inclusive market participation, empower women and youth, foster innovation and technology transfer on voluntary and mutually agreed terms while respecting intellectual property rights, and strengthen climate, environmental, economic and sanitary resilience across agriculture and food systems.

We welcome the theme '*Solidarity, Equality, Sustainability'* for South Africa's G20 Presidency, which embraces the philosophy of *Ubuntu,* i.e. the belief that "I am because we are". The spirit of *Ubuntu* emphasises that the well-being of an individual is inextricably linked to that of the community, urging us to work together in solidarity and mutual respect as we navigate the complexity of agriculture and food systems.

Thematic priority on transformation of agriculture and food systems

We realise global agriculture and food systems need to develop to deliver adequate food security and nutrition. These systems face pressure from climate change, conflicts, biodiversity loss, and water scarcity, amongst others. To address global food insecurity and malnutrition, we recognise the need to transform how food is sustainably produced, processed, distributed, and consumed. This transformation aligns with the 17 SDGs and Africa's Agenda 2063 Goals 1– 5, 7, and 9.

We acknowledge that precision agriculture, sustainable intensification, regenerative and agroecological approaches, advanced breeding, and other innovative farming practices can increase productivity while improving resilience and sustainability, reducing waste, and decreasing greenhouse gas emissions from land use and agriculture. However, we also acknowledge that there is no one-size-fits-all approach. We propose research focusing on all forms of innovations that deliver healthier, sustainable, resilient, and equitable agriculture and food systems. This includes the integration of emerging agriculture technologies, such as robotics, sensor-based monitoring, and AI-driven decision support systems to optimise resource use, improve crop management and enable real-time responses to production challenges. We acknowledge the Comprehensive Africa Agricultural Development Programme (CAADP) Kampala Declaration and the African Union's regional nutrition strategy. Nutrition is one of the key purposes of agriculture and food systems and is a cornerstone of economic development. Ensuring an optimal system requires sustained research and knowledge building to achieve the right balance between nutrition, sustainability, and food affordability.

To bridge the divide between knowledge generation and policy implementation, we will strengthen the science-policy-society interface by empowering knowledge institutions to design

context-appropriate solutions and establish exchange mechanisms that translate research into policy actions and practical solutions. We recognise farmers as key actors in agriculture and food systems transformation and commit to work with them as actors in the research and innovation cycle, from the design to the implementation of activities. We promote science and evidence-based analysis to inform policies and approaches by leveraging frameworks that integrate Indigenous Knowledges and best practices. This aims to catalyse innovative and inclusive practices that advance economic, social, and environmental sustainability. Thus, innovation should recognise all stakeholders in the value chain, including researchers, policy makers, the private sector, farmers, and consumers.

We advocate for research approaches that transcend disciplinary boundaries, encouraging cross-sectoral integration across all sciences and foster place-based innovation, including through living labs and demonstration farms. An example is the 'One Health' approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems. We acknowledge the need for mutually reinforcing collaboration between national, regional, and global knowledge systems to accelerate the adoption of science-, evidence- and locally-based solutions to deliver outcomes for sustainable agriculture and food systems.

Thematic priority on stewardship of biodiversity, genetic and natural resources

We recognise that decline in the quality of natural resources is a global concern, with major consequences for communities, agriculture, biodiversity, and ecosystem services. Conservation and sustainable use of biodiversity, genetic and natural resources are critical for climate adaptation and addressing food security, nutrition, climate change and desertification. We highlight that soil and land degradation are extremely sensitive to regional climatic conditions and soil characteristics, and demand specific scientific solutions.

We support the global commitments under the Convention on Biological Diversity (CBD), including the Kunming-Montreal Global Biodiversity Framework, the United Nations (UN) Decade on Ecosystem Restoration, and the UN Convention to Combat Desertification. We take note of the importance of the International Treaty on Plant Genetic Resources for Food and Agriculture, the CBD Nagoya Protocol on Access and Benefit Sharing, and the Cali Fund for the use of digital sequence information for the G20 countries that are parties to them. We continue to support initiatives emerging from G20-MACS, such as those for wheat, millet, and food loss and waste. We therefore recommend context-specific, and locally adapted approaches for the stewardship of biodiversity, genetic and natural resources towards sustainable agriculture and food systems. We recommend approaches that prioritise advancing biodiversity-friendly agriculture and ecosystem restoration, focusing on collaborative research and sharing innovative practices for the stewardship of biodiversity. This should be achieved by fostering co-creation, collaboration, and knowledge exchange between farmers and other stakeholders.

We acknowledge that nature- and ecosystem-based approaches, including sustainable water management, can address environmental challenges. We recognise the value of Indigenous Knowledges associated with genetic resources, and promote protection and sustainable use, while facilitating their access, and sharing benefits arising from their utilisation in a fair and equitable way. We encourage members to invest and cooperate in the conservation and sustainable utilisation of biodiversity, genetic and natural resources, and to adopt science- and evidence-based precautionary measures, including biosecurity, to prevent the introduction and spread of invasive species.

Thematic priority on soil health and sustainable management

We acknowledge that global soil health faces a critical and escalating threat driven by unsustainable agricultural practices and harmful land use changes such as deforestation, along with pressures from desertification, widespread pollution, and climate change.

We support ongoing research and innovation to improve soil health through agricultural practices such as sustainable intensification, regenerative practices, agroecology, efficient use of fertilisers, and sustainable water, land, and soil management. We emphasise the need for actions to scale up soil and water management practices for adoption at farmer and ecosystem level.

We underscore the importance of targeted national, regional, and international approaches for promoting soil health and sustainable soil management. In this regard, we note the Africa Fertiliser and Soil Health Action Plan 2024-2034, which aims to enhance policy and action convergence for sustainable agriculture. We advocate for soil health monitoring and information systems, and national and regional frameworks for soil health assessments. We emphasise the need for raising awareness and knowledge sharing and strengthening the support to farmers and related extension and advisory services. We call for increased investments and approaches to enhance soil health conservation, improvement, and restoration to reverse degradation, enhance carbon sequestration and improve farmer productivity and profitability.

Thematic priority on reinforcing climate-smart agriculture for sustainability and resilience in food and agricultural production systems

We recognise that climate change is one of the biggest problems facing humanity, against a projected global population of 9.8 billion in 2050. This presents major challenges for achieving

global food security and nutrition, efforts to reduce poverty and hunger, and achieving greater social equity.

We reaffirm the importance of context-specific research and innovation for climate adaptation and mitigation, taking into consideration local, national, and regional circumstances. We advocate for equitable access to finance from all sources, as well as to technologies, and other resources – including for smallholder farmers, women, youth, Indigenous Peoples, and local communities – to increase the adaptive capacity of the agricultural sector for climate resilience. We are committed to supporting the work of the UNFCCC Sharm El-Sheikh Joint Work on the Implementation of Climate Action on Agriculture and Food Security.

We call upon G20 countries to share information and strengthen collaboration and partnerships to support climate resilience practices, such as advisory services and early warning systems. We emphasise the strengthening of international cooperation in the integration of science, technology, innovation, and Indigenous Knowledges. We highlight the impact of climate change on the global water cycle, and the need to implement integrated water management to ensure water-resilient agriculture and food systems.

We invite G20 Agriculture Ministers to strengthen policy coordination and recommend synergies for physical and virtual research, knowledge and innovation platforms, and hubs for countries to share science- and evidence-based policy experiences applicable to sustainable climate-resilient practices. We emphasise the importance of promoting training and capacity building to enhance skills for holistic and systemic approaches to climate resilience through exchange programs and sharing research information.

Thematic priority on building resilient agriculture-based bioeconomies

We acknowledge the importance of fostering sustainable, resilient, and circular agriculture-based bioeconomies to create sustainable economic opportunities in agriculture and advancing the SDGs. We emphasise sustainable use and management of biological resources by combining Indigenous and Traditional Knowledges and innovations that support resource-efficient and circular economy practices. Strengthening the position of primary producers in bioeconomy value chains, including their ability to trade, will ensure that they are active beneficiaries of innovation and solutions. We will promote approaches that support local valorisation from the sustainable utilisation of biomass to drive economic growth and development, contributing to more sustainable and resilient rural communities. We promote proactive measures to advance the bioeconomy's potential on a global scale while being context-specific.

We call for global investment and collaboration within G20 countries and beyond for promoting research and innovation hubs, enhancing education and training, and enabling knowledge transfer by extension and advisory services. We further promote public-private partnerships and support the development of policies and strategies that facilitate sustainable and circular bioeconomies. We recognise the protection of Intellectual Property Rights as an essential component for enhancing investment in innovation. The diversification of value chains through the integration of all knowledge systems and best practices, including with modern biotechnology, can support local, regional, and global bioeconomy integration, which explicitly strengthens the position of farms of all scales, including smallholder farmers in value chains.

Thematic priority on digital agriculture and the adoption of Fourth Industrial Revolution (4IR) technologies

Digital technologies possess transformative potential to enhance agricultural sustainability, resilience, productivity, profitability, food security and nutrition, and poverty reduction. However, the digital divide poses a significant challenge. By empowering farmers and entrepreneurs with affordable and accessible digital tools, we can optimise practices for sustainable and resilient agricultural and food systems, transform livelihoods and attract newcomers to agriculture. Collaboration among stakeholders – governments, international organisations, universities, research institutions, private technology companies, nonprofit organisations, financial institutions and farmers and their organisations – is crucial for driving investments in digital infrastructure development and training programs to improve digital literacy. For instance, mobile applications and platforms offering weather forecasts, market prices, or pest monitoring and control have proven transformative. We support developing the capacities, infrastructure, and technologies necessary to ensure equity in the collection, access, ownership, and application of data.

We encourage global and regional partnerships to design strategies for expanding digital infrastructure, ensuring affordable internet access for farmers in underserved areas, and driving equitable digital transformations in agriculture. We recognize that locally tailored digital solutions leveraging artificial intelligence (AI), the Internet of Things, and big data can be critical drivers of agricultural transformation. AI applications that emphasise human-centric innovation are particularly beneficial for farmers. Transparent and ethical AI, responsible data governance, respect for relevant rights associated with data, and technology transfer on voluntary and mutually agreed upon terms must remain central to these efforts. Ultimately, it is vital to ensure

equal access to innovation, with special attention to smallholder farmers. We need digitalisation that does not distort rural identity but rather strengthens it, placing people at the centre.

Conclusion

We recognise the urgency of strengthening agricultural research, innovation, collaboration, and partnerships for sustainable agriculture and food systems transformation, and the role of farmers and Indigenous Knowledges as key contributors to research and innovation. We invite G20 Agriculture Ministers to support the recommendations made by this MACS and strengthen knowledge and innovation hubs/centres/networks and place-based innovation tools such as living labs. This will enhance the sharing of best practices and collaboration for the sustainability and resilience of agriculture and food systems that are increasingly adaptive to the evolving global landscape.

Finally, we emphasise the importance of free, independent science to support agriculture and food systems, adhering to the highest ethics and integrity standards in challenging existing knowledge and generating new insights. Freedom of science must apply to the choice of research questions, the choice of research methods, and communication of findings. This will advance our understanding and adoption of science- and evidence-based, sustainable and innovative solutions, as well as provide timely and relevant advice to policy and decision-makers to support the transformation of agriculture and food systems.

We welcome the scientific presentations, demonstrations, and site visits that took place during the 14th G20-MACS and believe that we made significant progress in advancing our shared priorities through the robust, constructive, and innovative scientific deliberations that we had. The proposed recommendations contained herein are built on the previous G20-MACS and

include extensive consultations, and should therefore endure beyond South Africa's presidency, especially for Africa.

We express our sincere gratitude to the Brazilian G20-MACS team for their support to the South African G20-MACS team since the handover. We thank the South African Presidency for the successful hosting of the G20-MACS 2025. We wish the United States of America success for their upcoming G20-MACS Presidency in 2026.