Focus on health innovation
The opening plenary was led by Minister of Health Dr Zweli Mkhize, who was making his second appearance at this annual convention. The BIO Africa Convention aims to create a platform for linkages across the continent and mobilise support across different stakeholders in biotechnology. From its inception it has strived to strengthen local innovation capacity to provide for all of our healthcare needs. As Dr Giorgio Roscigno, one of the members of the organising committee for BIO Africa, explains: “Innovation models ought to move from mere research to development and then commercialisation, as there is already enough knowledge assets globally to allow countries in Africa to rapidly move to appropriate products for their domestic needs.”

This was a point reinforced several times. In his keynote speech in the opening plenary, Professor Salim Abdool Karim pointed out that one of the reasons South Africa has fared above expectations in the containment of the Covid-19 pandemic is because it built on the important lessons of the past two decades in managing HIV and TB. He pointed out that the physical infrastructure was an investment made to contain the HIV challenge; little did we know that it would serve us well in another crisis.

Mkhize commended the incredible work coming out of our universities and research councils, but pointed to the need for enhanced partnerships with industry. He said our institutions do extraordinarily well in research, concurring with Karim’s earlier observations, and this is evident in the discipline of clinical practice, but we need to move to innovating products required by the healthcare system. The innovations need to be translated into local manufacturing so that we are not left at the mercy of international supply chains, as has happened during the Covid-19 crisis.

Later, Professor Ariel Pablos-Mendez — a renowned global health specialist who led the Bureau for Global Health in the US — pointed out that the concept of commercialising biotechnology in a developing world is at variance with reality. Making a reference to the experiences of the global product development partnerships and the World Health Organisation’s concerted efforts to

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**Professor Ariel Pablos-Mendez**

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Dr Giorgio Roscigno

Mkhize went on to commit the government, through his department, to a version of advanced market commitments. This would stimulate not only local innovation, but more importantly, local production. This sentiment was later reiterated by Roscigno, at the end of second day’s dialogue with global leaders in biotechnology, where he pointed out that this is no longer an issue of glibly speaking about a straight line of innovation to commercialisation, but the development of economic infrastructure. Dr Lawrence Banks from the International Centre for Genetic and Biotechnology, concurred and indicated that most of the technologies required to meet healthcare needs can be freely transferred to developing countries from the ICGEB (International Centre for Genetic Engineering and Biotechnology) to African countries’ SMMEs at minimal cost.

This begs the question of how we accelerate innovation that allows for freely available intellectual property, another very important dimension of innovation and often a hindrance towards promoting access. More importantly, how do we benefit from the intellectual property rights regime as a continent and use it in our favour? Is it simply a matter of throwing more resources into basic research and hoping that it bears fruit? Should we be more strategic and focus on certain areas of innovation that are relevant to our needs? We have seen with Covid-19 how our own universities and research institutions have stepped up to the challenge. One thing we are certain of is that with a focused approach, our local public research organisations are able to produce successes in the market. Biotechnology-based SMMEs such as Inqaba Biotec, CapeBio, TokaBio and BioTech Africa rose to the occasion and plugged the gaps left by the rupture of global supply chains. In his closing remarks Mkhize extolled us to observe the dictum of “avoiding the practice of trying to play in all the parts of the value chain. Each party must do what it does the best”.

As such the speakers were advocating that we pay particular attention to the university-research and council-industry linkages. Each party possesses unique traits that the other cannot replicate.

Minister Thoko Didiza’s speech at BIO Africa Convention 2020

This is an extract from Minister Thoko Didiza’s speech:
I must say that I am honoured that we are having this discussion today, and in South Africa, it actually comes at an interesting time where we are grappling with how we can use our BIO base for food security, but also for industrialisation.

Minister of Agriculture, Land Reform and Rural Development Minister Thoko Didiza, said we will soon need to increase food production yields by 60%.

I know that for some time ARC (Agricultural Research Council) has been working with some of our scientific entities, in government but also in the universities.

We were also looking at issues of Indigenous Knowledge Systems on how we could get some indigenous knowledge from our old people on the food that they were eating which made them healthier and stronger, which could actually come to our current aid.

At the same time, we are also grappling with issues of how we could utilise some strains of cannabis for industrialisation, particularly to deal with issues of medicine, and some of the strains of the broader cannabis family such as hemp for industrialisation and maximising the income of producers.

I am saying this dialogue actually comes at the right time for South Africa as we are grappling with policy and legislation. Some of the legislative areas have been propelled as a result of the constitutional case that allows cannabis for home use.

But we also know in the legislative sector that, particularly in Parliament, we had some few years ago a member of the Inkatha Freedom Party, Honourable [Mario] Oriani-Ambrosini, who’s now departed, who promoted the use of cannabis as alternative therapy; particularly for some of the debilitating diseases. So I am raising these things pertaining to the context of why it is a very interesting dialogue to have at this time today.

But as we all know the relationship of the current pandemic, that while it has become a health and an economic issue, the genesis is also from the transference of some of the strains of this virus from the animal kingdom, which for a number of us who are in agriculture are the things that we work with, as well as those who are in the environmental space.

So that linkage is also important to better understand this transmission, while the health people...
So given this context I also want to say, we know that according to several studies and predictions by the United Nations Food and Agriculture Organization, International Fund for Agricultural Development, the World Food Programme and others suggest that the global health food system will experience unprecedented confluence pressure over the next 20–40 years.

On the demand side, the global population size will increase, including here in our own country, from nearly seven billion today to more than nine billion by 2030 and probably closer to 10 billion by 2050.

Currently and in the intermediate future we all need to understand the impact and implications of this Covid-19 pandemic on our food systems and food in general.

To fulfil the demand for food and the nutritional requirement of an increasing population, there will be a need to increase our current food production yields by 60%, and double productivity.

I am specifically saying yields because we also know that the land space is also shrinking, because there is a competition for human settlement and industrial use of our land.

So how we use the limited land space to increase our yield will become important. Otherwise, there will be increased social pressures and hindrances, not only in South Africa but throughout the world.

We’ve seen this during the beginning of the pandemic and the response of countries in the containment of the disease by closing down their countries, as well as closing areas of work and industry. We’ve seen actually how many people were in queues just to get by; to get food. We’ve also seen that as a result of this pandemic a number of people have been laid off work, which again has increased the pressure in terms of food security in various countries.

So these are the issues we need to address looking at the present but also going to the future.

We therefore need to understand now the current and future challenges on agriculture for improved production and productivity including, among others; competition for natural resources especially land, water and energy; negative impacts of climate change on production and productivity; competing demands for land and water for other uses, especially urbanisation; sustainable use of land and natural resources, which results — if not maintained or used sustainably — in decreasing of natural resources; and economic and social pressures such as marketing and logistics infrastructure, particularly on the prices of food.

And lastly, for me, the other pressure we are likely to face and we are facing currently in some of the regions of our continent is the issue of migration, which could be as a result of conflict or again some of the changes in special developments that other countries have actually chosen, which therefore displaces certain communities and results in the increased urbanisation we’ve seen.
ensuring that there is adequate sustainability in food supplies and protecting the most vulnerable from the volatility that may occur, particularly when we look at issues of price and agro-logistics; and achieving household access to food and ending hunger. This means producing enough food in the country and in the world so that everyone can potentially be fed, and is not the same as ensuring individual food and nutrition security.

It also means managing the contribution of the food system to the mitigation of climate change and maintaining biodiversity and ecosystem services while feeding the population.

Smallholder agriculture plays a crucial role to household food security and improved livelihoods in marginalised communities. This sector is however challenged by the use of nondescript and uncategorised genetics and compromised conditions that include extreme climate conditions, diseases and low-quality nutrition.

Different livestock species play very important economic and socio-cultural roles for the wellbeing of rural households such as food supplies, sources of income, asset saving, source of employment, soil fertility, livelihoods, transport, agricultural traction, agricultural diversity and sustainable agricultural production.

Livestock is also an important asset in rural parts of South Africa, helping to improve the nutritional status of their owners and contributing to their economic growth. It is no secret that following natural disasters such as drought, communities who live from livestock farming are far better off than those who don’t, though livestock farming is prone to adverse conditions, especially drought.

Direct contact includes increased temperature, floods and drought. Indirect contact is the result of reduced availability of water and changes in the environment that promote the spread of contagious diseases through increased contact between stock and wildlife, or increased survival or availability of the disease-causing agent on their intermediate host.

We also know for instance in our country, last year some of our regions were affected by drought while some of our regions had a problem of animal diseases such swine fever and foot and mouth, particularly in the Limpopo province.

**BIO Africa Convention**

“The enterprise of science has been — and remains — complicit in systemic racism, and it must strive harder to correct those injustices and amplify marginalised voices”. This editorial was written in *Nature* magazine more than a month ago, as protests against institutional racism raged around the world. As we are writing during Women’s Month, it is important that we examine ourselves and challenge the racism and sexism we know resides in science.

Our continent, especially South Africa, has only recently emerged from a history of formal and legislated racist discrimination. Sexism continues unabated; one only has to look at the statistics of female representation, not just in science and innovation, but in industry and society’s highest structures. It is only natural that our institutions still carry the lingering legacies of the past. For some it will be subtle, often unseen, forms of prejudice; in others it is more overt, with racist or sexist agendas still being applied. While it is easy to reduce everything to race, we would be remiss if we ignored aspects of gender and class perspectives in this phenomenon. It is not only impossible but foolhardy to separate gender and race issues from the class ones.

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In the context of the BIO Africa Convention, its responsibility is to promote and facilitate dialogue between the global North and South. This is to provide a viable alternative to the phenomenon of ruling elites, whose power is predicated on ownership and control of resources, which allows them to hijack the science and innovation agendas and skew them to their own priorities. Borrowing from Thomas Kuhn’s seminal work on the historicity in the scientific enterprise ‘The Structure of Scientific Revolutions’, we argue that agenda setting remains a construct firmly in the hands of those with power and voice. It is therefore not surprising that the challenges of the developing world and women are often relegated to the margins, mainly to be picked up by benevolent philanthropies. While this is commendable, it creates another unhealthy relationship.

Perhaps a more troubling development in our midst is the presence and even dominant voices of those whose class interests intersect or are aligned with racist ones. It is one thing to address, with international solidarity, the issue of inequality based on race and sex, but it becomes a doubly daunting task if the battle also has to be fought at home. A sinister part of this agenda is that it fundamentally seeks to condemn the African continent to a cycle of perpetual dependence on international supply chains. It prevents us from building and leveraging our science and innovation potential, in the form of Africa’s predominantly young population.

Biotechnology is a big part of the knowledge economy, meaning that a significant part of its fundamentals rely on human and intellectual capital. The disruption of international supply chains due to Covid-19, and the fact that most developing countries (including all of Africa) bear the brunt of the shortages, ought to be a call to arms for the continent and the international solidarity movement to hasten the speed with which the Africa innovation agenda is prioritised. The convention is a platform to co-create solutions based on knowledge sharing strategies driven by solidarity, among other tactical options.

The 2018 and 2019 BIO Africa Conventions were a promising start to this international solidarity movement, with the participation of the World Health Organisation and the International Centre for Genetic Engineering and Biotechnology, among other partners.
A significant portion of the convention is devoted to the areas of agribiotechnology for food security. Significantly, indigenous knowledge systems and natural products will be given a voice that should lead to them becoming legitimate and established components of the science enterprise instead of esoteric step-siblings. As recent developments show, indigenous genetic resources are likely to become a source of increasing value.

Lastly — mainly for reasons of emphasis — the 2020 convention will happen when the global solidarity movement is taking a firm stand against racism. This includes peoples of all races, creeds and persuasions, whose simple statement is that the world can no longer tolerate this type of prejudice. While the recent protests were triggered by the physical violence of the security forces against George Floyd and countless others, other forms of violence must be recognised and addressed. This struggle needs to be broadened to address all forms of violence including economic, professional and scientific exclusion. It is a continuous sabotage of people who do not belong to the elite classes, most of whom happen to be black.

It is clear that we must address the problems of racism and sexism in their entirety, understanding society’s power relations, and the racial and class nature of the problem. The class dimension may allow us to understand why some in our midst often choose to side with those intent on sabotaging our advancement, while others from the elites actively support the struggle for a new dawn for humanity through science and innovation. We must pay attention and focus on balancing the resources, agenda and benefits of science and innovation across the entire spectrum. In the 2020 convention, we are taking a firm stand against all forms of prejudice. We are giving meaning to this position by dedicating a very large portion of the convention to women’s issues, including mechanisms to create a pipeline that attracts girls to STEM and arms them with resources.

**BIO Africa Convention 2020**

For the third consecutive year, South Africa has successfully hosted the BIO Africa Convention, Africa’s premier biotechnology conference. This year’s event was hosted digitally, with over 1,228 registered delegates from more than 20 countries. The convention featured tracks in agribiotech, health biotech, zoonotics, indigenous knowledge systems, cannabis industrialisation and related medicinal uses, investment and financing biotechnology ventures as well as technology transfer and commercialisation.

The BIO Africa Convention is a collaboration between AfricaBio, South Africa’s Department of Science and Innovation, Ethekwini Municipality and the Technology Innovation Agency. The 2020 edition received sponsorship and support from Telkom, the Independent Development Corporation and the Development Bank of Southern Africa.
The South African government has long been a supporter and proponent of the use of biotechnology in responding to national challenges. South Africa adopted a national Bio-economy Strategy in 2012, seeking to mainstream the use of biotechnology in various sectors of the economy such as health and agriculture and driving the contribution of the bioeconomy towards national economic growth and development.

This year’s convention featured no less than three ministers. Minister of Health Dr Zweli Mkhize was a keynote speaker at the opening plenary on Monday 25 August; Minister of Agriculture, Rural Development and Land Reform, Minister Thoko Didiza, addressed the conference in plenary on the second day, looking at how biotechnology can advance the social objectives of providing nutritious foods for all; and the Deputy Minister of Human Settlements, Water and Sanitation David Mahlobo facilitated of a session titled “Water, Sanitation and Hygiene (WASH) and Covid-19: Africa’s response to Covid-19 and Beyond” on August 26.

Professor Salim Abdool Karim, who chairs the Ministerial Advisory Committee on Covid-19, in his address reflected on the experience in responding to the virus by leveraging off the platforms, infrastructure and learnings gained from dealing with pandemics such as HIV and tuberculosis. Mkhize reflected upon and lauded the responsiveness of the science and innovation system in responding to Covid-19. He stated that it has been gratifying to see how our local universities and science councils stepped up to the challenges during this pandemic. This should be maintained and sustained where necessary, and with increased funding. South African universities and science councils should partner with industry and service to achieve capability to serve their own needs in therapeutics and diagnostics and even extend this support to the broader African continent.

Two notable sessions that took place during the convention require further mention. First was an insightful discussion on Women in Science, Technology, Engineering and Mathematics (STEM), facilitated by Professors Karim of the Centre for AIDS Programme of Research in South Africa (CAPRISA) and Koleka Mlisana of the National Health Laboratory Services (NHLS). The session featured Dr Boitumelo Semete-Makokotlela, the Chief Executive Officer of the South African Health Products Regulatory Authority (SAHPRA), Dr Segenet Kelemu (the DG of ICEPI) and Marie Françoise Marie-Nelly of the World Bank. Building on this session, and to further showcase the mainstreaming of female representation across all sciences, future editions of BIO Africa Convention will strive for a 50% parity in women representation across all programmes.

BIO Africa Convention enjoys established and mutually beneficial partnerships with international players in the biotechnology space. These include the BIO Convention in the USA, the International Centre for Genetic Engineering and Biotechnology (ICGEB) based in Trieste, Italy (South Africa hosts one of three international chapters of the ICGEB), BIO Ventures for Global Health, Emory University, and Queensland Bio (Australia).
Sir Richard Roberts is a British biochemist and molecular biologist who received the Nobel Prize in 1993 for his work in gene-splicing. (Photo: The Reporter)

Drawing off these international partnerships, Dr Nhlanhla Msomi, President of AfricaBio, who is also South Africa’s representative on the Board of Governors of the ICGEB, hosted a discussion titled “A dialogue with global leaders in Biotechnology”. The panel featured world-renowned scientists, who shared special insights in a variety of areas in biotechnology:

- **Sir Richard Roberts**, 1993 Nobel Prize winner in Physiology and Medicine. Roberts is a strong advocate for accessible science through communication of STI (science, technology and innovation) developments in a manner that empowers ordinary citizens to make informed decisions. Science cannot be the purview of the elite and its benefits should be enjoyed by all of humanity.

- **Dr Ariel Pablos-Mendez**, a public health specialist and Professor of Medicine at Columbia University. He has worked as a Director of Knowledge Management at the WHO and MD of International Health at the Rockefeller Foundation. He served as President Obama’s appointee to lead the USAID’s bureau for Global Health.

- **Dr Ted Love**, a physician with a glorious career. As an African American who grew up in Alabama, Love’s research has focused on neglected diseases prevalent in the African American community such as sickle cell disease.

- **Dr Lawrence Banks**, Director General of the ICGEB. Banks elaborated on the platforms accessible through the ICGEB that could be leveraged by small biotech SMMEs in developing countries, and using these to develop diagnostics and therapeutics that will reduce their reliance on imported products and generate homegrown intellectual property in disease areas such as diabetes.

- **Dr Baty Dungu**, CEO of Onderstepoort Biological Products. Dungu stressed the need to learn from the Covid-19 experience on the innovation pivoting of zoonotics-based vaccines for application in human health in preparation for future pandemics that may arise.

- **Dr Giorgio Roscigno**, a renowned public health expert, who previously led the Global Alliance...
innovative assay that has been tested on Ebola, and is close to being completed on Covid-19.

Biotechnology innovation is a necessary step in improving accessibility of services and products across Africa. Covid-19 has accelerated the need for inter-disciplinary collaboration in responding to global challenges. Biotechnology is a critical tool in managing the convergence between various science disciplines, including ICT, as we approach a digital future through 4IR. The possible engagement of Telkom with BIO Africa is an exciting possibility, as is the launch of the BIO Africa Innovation Hub, a digital ecosystem addressing the different aspects of the value chain.

BIO Africa Convention 2020 also saw the launch of a Knowledge Resources Hub, Innovators Marketplace and the Biotechnology Start up Index to enhance the value proposition of STI in responding to current, relevant issues. Funding sources outside of government are the big step change necessary to accelerate the commercialisation of technologies. Government funding is a stimulus, but the conversion of innovations into real market products can only be achieved by accessing and leveraging other funding instruments and sources such as banks, venture capital and the like.

The Knowledge Resource Hub is an aggregate of knowledge resources required by researchers and innovators that will now be accessible in one place and on a digital platform. The launches from BIO Convention 2020 will be complimented by two additional dimensions towards the end of 2020. These are:

Communications hub, focused on civil society, by breaking down the complexity of science and making it accessible. The information will be provided in various African indigenous languages.

Training aspect in empowering innovators and SMMEs across the continent. Tools will be mainstreamed for access by universities, and SMMEs will bridge the gap for tech that is considered low tech but relevant to isolated communities.

To complete the ecosystem, there was a launch of the Science and the City. This is a partnership between BIO Africa and the International Centre for Genetic Engineering and Biotechnology. The primary objective is to demystify science and biotechnology for broader society. This is aimed at encouraging an empowered dialogue among all stakeholders to enable everyone to have a say in the agenda, without being diluted by powerful lobbies with vested interests.

For more information, visit: bioafricaconvention.com

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