



Assuring Agricultural and Food Safety  
of Genetically Modified Organisms (GMOs)  
in Southern Africa

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## Letter from the Editor

A highlight for several role players from Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zimbabwe was the Application of “-omics” to Biosafety Workshop that was held in October.

The workshop exposed delegates to some of the challenges experienced by their counterparts in other countries, and included practical demonstrations in each of the partner institutions’ laboratories to explore aspects related to genomics, transcriptomics, proteomics and metabolomics as they apply to biosafety.

Copies of the presentations are available on the GM ASSURE website if you are interested.

**Ella Nyakunu**  
Editor

# Demonstrating the use of scientific techniques for biosafety regulation

GM ASSURE hosted a two-week Application of “-omics” to Biosafety Workshop in Pretoria and Johannesburg, South Africa, in October 2015.

The purpose of the workshop was to support scientists and policy makers in Southern Africa to increase their knowledge of “-omics” technologies, focusing specifically on the application of genomics, transcriptomics, proteomics and metabolomics to genetically modified (GM) crops.

The workshop was attended by delegates from Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Tanzania and

Zimbabwe. Delegates benefited from the expertise of facilitators from the Agricultural Research Council (ARC), the University of Pretoria, the Council for Scientific and Industrial Research (CSIR) and the University of Johannesburg.

The modules presented provided information on gene expression profiling, “next-generation” sequencing, protein profiling techniques and metabolomic analyses of food products.

The workshop was opened with an introduction to a genome-wide analysis of crops, and a discussion of genetically modified organisms (GMOs) developed for Africa.

Each of the modules included lectures to explain what each of these techniques entailed, followed by practical demonstrations in each of the partner institutions’ laboratories.

The two-week workshop provided ample opportunity for delegates to network and learn of the challenges experienced by other countries in the region with regard to legislation and regulations governing GMOs, as well as the status of GMOs in the various countries represented at the workshop in terms of risk assessment and biosafety considerations, research, processing, general release and trade.

On the final day of the workshop, Dr Dean Oelofse of the ARC’s Crop Protection Unit delivered a presentation on the role of the Organisation for Economic Cooperation and Development (OECD), especially with regard to biosafety considerations internationally. Dr Oelofse is a member of the OECD Task Force for Novel Foods and Feeds, as well as the OECD Working Group on Harmonisation of Regulatory Oversight in Biotechnology.



*Delegates of the Application of “-omics” to Biosafety Workshop learnt more about proteomics from Dr Stoyan Stoychev (far right) at the CSIR Biosciences laboratory in Pretoria.*



# Exciting activities to look forward to

With the launch of the GMASSURE action in July 2014, a number of exciting activities were planned to support the objectives of this action of the African, Caribbean and Pacific (ACP) Science and Technology Programme. Several of these have already been successfully completed with the support of the partner institutions, while a number of exciting initiatives are being planned for the year ahead.

## Workshops successfully facilitated

A most insightful workshop was the two-day Science Communication Workshop held in Pretoria in September 2015. This workshop made scientists, regulators and other stakeholders aware of

the value of communication, especially in terms of countering misinformation about GMOs.

A highlight for many delegates from Botswana, Lesotho, Mozambique, Namibia, Swaziland, Zimbabwe and even Tanzania was the intensive two-week Application

of “-omics” to Biosafety Workshop that was held in Pretoria and Johannesburg in October 2015.

## Upcoming events

Delegates who have registered for the Food Safety Training Workshop to be held in November are looking forward to an informative event that will focus on methods for determining food and nutrition safety in a GMO context.

## Future activities

A number of exciting activities are being planned for the year ahead. The first is a workshop to address cultural and religious issues. This has been identified as a topic of particular interest.

Another interesting activity that is being planned for 2016 is the Workshop on the Impact of New Biotechnologies, which will be presented by the University of Pretoria, in conjunction with the Agricultural Research Council of South Africa.

A series of interactive workshops is also being planned in South Africa, Namibia and Zimbabwe. These workshops will provide a forum for biosafety, and information about GMOs will be disseminated to various stakeholders by researchers.

Information on these and other upcoming events will be available on [www.gmassure.org](http://www.gmassure.org) as they are finalised.



**Do you have a concern surrounding GMOs that you would like GMASSURE's online panel to respond to? Post it at <http://www.gmassure.org/blog/>.**

## Meet GMASSURE's partner from UJ

Prof Ian Dubery represents GMASSURE's partner institution, the University of Johannesburg (UJ). Delegates at the Application of “-omics” to Biosafety Workshop held in Pretoria and Johannesburg in October benefited from his expertise during the Metabolomics module, which was hosted on the University of Johannesburg's Auckland Park Campus.

Prof Dubery is based in the Department of Biochemistry in Faculty of Science at the University of Johannesburg, where he has been teaching various Biochemistry modules to undergraduate and postgraduate students for the last 30 years.

He obtained his PhD degree at the erstwhile Rand Afrikaans University (RAU) and has worked as a visiting scientist at the Salk Institute for Biological Studies in California,

USA, the Max Planck Institute for Plant Breeding in Cologne, Germany, and the Centre for Plant Molecular Biology at the University of Tübingen, Germany.

His research focuses on molecular plant-microbe interactions, innate immunity and inducible defence responses in plants, where he uses complementary transcriptomic, proteomic and metabolomic approaches. He is an internationally recognised

scholar and has published more than 100 authoritative research papers in international journals. He has a B2-rating from the National Research Foundation (NRF).

Currently, he is a research professor at UJ, a Council member of the South African Society for Biochemistry and Molecular Biology (SASBMB) and a member of the editorial board of the journal *Physiological and Molecular Plant Pathology*.





# Application of “-omics” to Biosafety

## Workshop feedback

Participants in the Application of “-omics” to Biosafety Workshop that was held in Pretoria and Johannesburg from 19 to 30 October 2015 hailed from as far afield as Tanzania and Zimbabwe. The delegates were keen to share their opinion of the workshop on the final day.



**Participants in the Application of “-omics” to Biosafety Workshop: (back from left): Dr Charles Hefer (ARC, South Africa), Dr Ronnie Bock (University of Namibia), Dr Wilna Jansen van Rijssen (GMO researcher, South Africa), Dr Liezel Gouws (Biosafety SA, South Africa), Filemon Shindume (Ministry of Agriculture, Water and Forestry, Namibia), Maboi Mahula (Ministry of Tourism, Environment and Culture, Lesotho), Charles Mazereku (Ministry of Agriculture, Botswana), Dr Eliosha Hajari (ARC, South Africa), Dr Derick George (Ministry of Agriculture, Botswana), Dr Stoyan Stoychev (CSIR); (front from left): Nicky Olivier (University of Pretoria), Janine Smit (GMASSURE editorial consultant), Ramadhan Kilewa (Tropical Pesticides Research Institute, Tanzania), Nyasha Mutsau (National Biosafety Authority, Zimbabwe), Dr Petrina Kapewangolo (University of Namibia), Marcelino Xavier (Ministry of Science and Technology, Higher Education and Professional Training, Mozambique), Phindile Shongwe (Africa Cooperation Action), Rose Masekesa (University of Zimbabwe), Rudo Mazarura (National Biosafety Authority, Zimbabwe), Dr Emmanuel Nepolo (University of Namibia), Prof Ian Dubery (University of Johannesburg) and Dr John Becker (University of Pretoria).**

The delegates were asked to reflect on their experiences during the past two weeks. They were unanimous in their commendation of the workshop and felt that it had surpassed their expectations.

Ramadhan Kilewa of the Tropical Pesticides Research Institute (TPRI) in Tanzania felt that the workshop had improved his knowledge and skills. He has access to some of the instruments demonstrated during the workshop at the TPRI, and will now be able to make better use of them in his research.

Charles Mazereku of the Ministry of Agriculture in Botswana is confident that he will be able to apply what he has learnt to a

particular challenge in Botswana: finding ways to acclimatise the *Jatropha curcas* tree.

Maboi Mahula, who is involved in the development of a Biosafety Framework in the Ministry of Tourism, Environment and Culture in Lesotho, felt that he benefited from the knowledge he gained on the use of “-omics” techniques, particularly in terms of determining the unintended effects of GMOs.

Marcelino Xavier from the Ministry of Science and Technology, Higher Education and Professional Training in Mozambique was able to improve his network of specialists through the people he met at this workshop.

The Namibian delegates hailed from both government and academia. Filemon Shindume, an advisor in the Ministry of Agriculture, Water and Forestry, also mentions building a network of specialists as a value-added benefit of the workshop. Dr Ronnie Bock and Dr Emmanuel Nepolo of the University of Namibia agree that the collaboration between the different institutions that presented the modules was very impressive.

Phindile Shongwe, an economist from the Africa Cooperation Action Trust developed an interest in biotechnology. She now has a greater awareness of biosafety as it relates to GMOs, especially as a result of environmental changes.

Rose Masekesa, a lecturer in Plant Biotechnology at the University of Zimbabwe, enjoyed every aspect of the workshop, and found there to be a good balance between theory and practice.

Nyasha Mutsau and Rudo Mazarura from the National Biosafety Authority in Zimbabwe found the knowledge they had acquired would assist them in their work at the country’s points of entry, where their work involves the issuing of biosafety permits.

The facilitators agreed that the feedback received reflected the success of the intervention, and that good relationships were built among the different countries.

# Collaborating to ensure food security

GMASSURE strives to promote sustainable agricultural practices and enhance food security across the Southern African Development Community (SADC) region. As part of its mandate, the action supports various initiatives that aim to achieve the same outcome. The Water Efficient Maize for Africa (WEMA) project is such an initiative.

WEMA is a public-private partnership that is coordinated by the African Agricultural Technology Foundation (AATF) to develop drought-tolerant and insect-protected maize varieties.

The Agricultural Research Council (ARC) of South Africa – one of GMASSURE’s partner organisations – is WEMA’s South African partner.

The purpose of WEMA’s improved maize varieties is to produce harvests that are more reliable under moderate drought conditions and protect maize from insects.

In view of Africa’s proneness to drought and the fact that it is a staple crop, these varieties could benefit smallholder farmers so that they can feed their families and increase their incomes.

WEMA develops drought-tolerant and insect-protected maize

using conventional breeding, marker-assisted breeding and biotechnology, and aims to make these varieties available royalty-free to smallholder farmers in sub-Saharan Africa through African seed companies.

The benefits and safety of the maize varieties are assessed by national authorities according to the regulatory requirements in the partner countries (Kenya, Mozambique, South Africa, Tanzania and Uganda).

WEMA is currently conducting field trials in South Africa, Kenya and Uganda. In South Africa, field trials are conducted in Lutzville, Orania, Delareyville and Hopetown.

Projects like WEMA are crucial for the development of low-cost technologies that enable seed security, food security, poverty alleviation, job creation and improved livelihoods.



## Celebrating World Food Day

In recognition of World Food Day on 16 October 2015, AfricaBio, in collaboration with the United States Department of Agriculture, hosted a business breakfast.

A few of GMASSURE’s stakeholders, including Ella Nyakunu (GMASSURE Project Manager) and Prof Jasper Rees and Dr Kingstone Mashingaidze of the Agricultural Research Council in South Africa, attended the event.

The purpose of the event was to discuss the WEMA project and delivering on its

promise to African smallholder farmers. Among other topics, the delegates discussed the status of food security and the impact of drought in South Africa. One of the guest speakers, Prof Rick Goodman of the University of Nebraska-Lincoln, USA, focused on food and feed safety assessment of GM crops, allergenicity and toxicity, and food labeling.

## Did you know?

At the Application of “-omics” to Biosafety Workshop that was held in October, Dr Kingstone Mashingaidze of the Agricultural Research Council’s Grain Crops Institute in South Africa presented some interesting facts about crop production in sub-Saharan Africa.

- Maize is a staple food crop for about 650 million people in sub-Saharan Africa.
- Recurring droughts pose a continuous challenge to maize production in sub-Saharan Africa.
- The risk of drought prevents investment in best management practices.
- Climate change results in shorter seasons with more variable rainfall and high temperatures in Southern Africa.
- Yield stability is key to unlocking the value of basic inputs for increasing productivity.