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Letter from the Editor

This issue places more emphasis on the production of genetically modified (GM) cotton, as an increase in its uptake could result in massive economic improvements for Southern African countries.

Although it is not a food crop, the adoption of GM cotton could give rise to strides forward in the adoption of food crops in countries that desperately need to increase their food production.

Ella Nyakunu
Editor

Improving livelihoods through the production of GM cotton

Zimbabwe should seriously consider the adoption of genetically modified (GM) cotton to revive production and improve rural livelihoods, Chief Fortune Charumbira, President of the Chiefs' Council in Zimbabwe, has said.

Speaking at GMASSURE's Cultural and Religious Issues Workshop in Harare on 25 July 2016, Chief Charumbira said that there has been a lot of misinformation about the potential risks and benefits of GM crops and products.

Chief Zama Ngungumbane Mkwanzani from Mberengwa in Zimbabwe's Midlands Province said there was a lot of mistrust and suspicion among scientists, government and the general public when it came to the controversial issue of genetically modified organisms (GMOs).

He said that a lack of information stalled the progressive debate about the potential benefits of GM crops. He also said that Zimbabwean scientists should demonstrate the potential benefits of GM technologies so that the government and the general public could make informed decisions.



The production of GM cotton in Zimbabwe has declined over the years.

Religious leaders also attended the workshop and bemoaned the general ignorance surrounding issues related to GMOs.

Rev Samuel Sifelani of the Anglican Church said that there was a need for dialogue between scientists and Christians to address concerns surrounding GMO issues.

He said that, given the information he had gathered

from Zimbabwean scientists at the workshop, it was possible to use GM cotton to revive the clothing and textile industry, which was once vibrant in Gweru, Kadoma, Chegutu and Norton. A farmers' union official also weighed in and supported the cultivation of GM cotton.

Cotton production in Zimbabwe has declined sharply over the years due to uncompetitive prices, high input costs for farmers and other constraints.

Article adapted from a contribution by Sifelani Tsiko in *The Manica Post*. Available at: <http://manicapost.co.zw/traditional-leaders-weigh-in-on-gmo-debate/>.





Interactive workshops

GMASSURE is inviting interested stakeholders to participate in a series of interactive two-day workshops in South Africa, Namibia and Zimbabwe. The workshops will allow researchers to disseminate information about biosafety and GMOs. They will also provide a platform where all stakeholders can share their experiences and questions with other stakeholders with the aim of shifting mindsets, which in turn may lead to a common approach to GM crops and improved food security.

Who should attend?

The workshops are aimed at scientists, government officials involved in policy and decision making about GMOs, community leaders from the various cultural and religious groups, farmers, agro-processors and consumers.

What are the objectives?

The purpose of the workshop is to develop a shared understanding of the concepts of biotechnology and GMOs to help stakeholders appreciate the role of agricultural biotechnology and GM crops in food security and the national economy. The workshop will present and discuss the implications of the adoption or non-adoption and regulation of GMOs globally, regionally and nationally.

Participants will hopefully agree on a way forward for stimulating debate around the further development and application of GMOs and biotechnology in the country.

How will it work?

The workshop will be facilitated by a non-biased facilitator, which will allow for an interactive environment to enable participants to openly share and discuss key issues. Presentations will be kept to a minimum to allow for interaction between participants. Travel and accommodation will be sponsored by GMASSURE.

Workshop dates

South Africa: 6 to 7 October 2016

Namibia: 29 to 30 September 2016

Zimbabwe: 3 to 4 October 2016

Information about forthcoming events will be posted on the website as it becomes available.

Farewell message from the Project Manager

After an exciting and memorable two-year stint with GMASSURE, I am bidding adieu to the project to pursue other career opportunities. I have enjoyed working on the project and I appreciate having had this wonderful opportunity to work with you all.

Over the last two years, you all have provided me with support, and through your encouragement and guidance, I have been able to excel at the tasks presented to me.

With many of you, I have shared a unique camaraderie that I hope

will continue in the years to come, even though I will not be with the project anymore.

As I move on, I would like to take a moment to remember and cherish our times together. It has been great interacting with and getting to know each one of you. Even though I will miss all

the GMASSURE stakeholders, I am looking forward to the new challenge and phase of my career.

I wish you and GMASSURE every success in the remaining activities. This is not a goodbye, only "au revoir" or "see you later"!

Ella Nyakunu





Bt cotton can generate \$40 million a year in revenue for Zimbabwe

If the cultivation of genetically modified (GM) cotton is allowed in Zimbabwe, it could be an advantage for the country. Experts say the cotton can generate nearly \$40 million in incremental revenue every year through improved crop yields and reduced cost of production.

Edworks Mhandu, Managing Director of the seed company Quton, said that Zimbabwe stood to benefit significantly by adopting modern technologies, rather than totally banning them. He said that the estimated incremental figure of \$40 million a year was calculated after a study was conducted on the incomes and production costs for 72 smallholder farmers in Zimbabwe and 42 in South Africa in the 2013/14 season.

In the period under study, a Zimbabwean non-GM cotton farmer who sprayed his crop eight times on average, harvested 819 kg per hectare, fetching 56 c per kilogram and realising an income of US\$459 per hectare.

The production cost was US\$359 per hectare. The net income for the Zimbabwean farmers was US\$100 per hectare.

A South African farmer growing GM cotton who sprayed his crop twice, harvested 1 012 kg per hectare, fetching 56 c per kilogram and realising an income of US\$567 per hectare. The production cost was US\$306 per hectare. The net income for the South African farmer was US\$261 per hectare.

According to Mhandu, "Bt cotton in India achieved an 83% increase in productivity from 300 kg of lint per hectare to 550 kg of lint per hectare". He said South Africa could realise US\$52 million every year in terms of economic benefits from GM cotton and increase yields by 193 kg per hectare, while Zimbabwe could realise US\$40 million a year in incremental benefits.

Proponents of biotechnology argue that cotton farmers in Zimbabwe, Malawi and most other African countries can effectively reduce input costs

and control damage from bollworms and other insects that frequently damage cotton by adopting cotton modified with *Bacillus thuringiensis* (Bt). Cotton farmers in Africa suffer huge losses due to pest problems. The most destructive pest is the African bollworm (*Helicoverpa armigera*), which biotechnology experts say can cause a 100% loss in severe cases, while pest damage can be as high as 90% in unprotected fields.

Prof Idah Sithole-Niang, a biochemist at the University of Zimbabwe, said farmers, religious and cultural leaders, policy makers, as well as the public, lack accurate knowledge of agricultural biotechnology and GMOs specifically.

She bemoaned the loss of skilled biotechnology experts and graduates to other countries, seeking better job opportunities.

Prof Christopher Chetsanga, Chairman of the Zimbabwe Council of Higher Education, said it was necessary to influence those involved in the adoption of the technology to remove barriers for biotechnological solutions that can address agricultural sustainability issues in the country. Prof Chetsanga said that the risks involved were not always due to the techniques used, but rather to their improper or excessive application.

At its peak, Zimbabwe produced more than 353 000 tonnes of Bt cotton, earning the country over US\$200 million. Cotton creates employment for some 200 000 people.

Article adapted from a contribution by Sifelani Tsiko in *The Sunday Mail*. Available at: <http://www.sundaymail.co.zw/bt-cotton-can-generate-40m-a-year-in-revenue-for-zim/>.





Imagining a world without GM food

Without genetically modified (GM) foods, we might have to give up certain foods and make peace with avian flu and more malnutrition. It was hailed as a radical move when more than 100 Nobel laureates sent a letter to Greenpeace (see article in GMASSURE Newsletter 10) urging the environmental group to stop blocking GM foods like golden rice from reaching those who need it.

Essentially, the letter and the ensuing press conference confirmed most scientists' claims that GMOs are safe, important to farmers, and can help solve some of the world's most vexing nutrition problems, like preventable blindness and climate challenges such as drought.

Despite a lack of regulations to provide for food labelling that allows for consumer preference, many products carry negative or positive labels with regard to genetic modification.

Greenpeace calls GMOs "genetic pollution", but if GMOs are to be completely removed from the picture, it might mean that there are no vegetables enriched with cancer-fighting chemicals, drought-resistant corn, allergen-free peanuts and bananas that deliver vaccines.

Saving the Florida orange

Oranges in Florida in the USA are under attack from a citrus-greening virus that threatens a \$9 billion industry. Despite generations of breeding, no citrus plant resists greening and, once infected, a tree dies. Erik Mirkov, a plant pathologist at Texas A&M University, has developed trees that, thanks to innovative

technology and spinach genes, can fight the greening tide.

Flu-free chicken

Avian flu devastated chicken and turkey flocks across the USA in 2015, affecting about 48 million birds, according to estimates of the United States Department of Agriculture. A team of UK researchers has developed a GM chicken – the Isa Brown – that does not pass the virus on to other birds. This could mean food for more people.

However, a solution to a problem that works in the lab does not always work in practice, and more research is needed to figure out the extent to which a GM bird can help protect the health of poultry flocks.

More fish in the sea

Fish populations in the oceans are not sufficient to feed the 9 billion people that are expected to be living on the planet by 2050. For years, scientists have been looking at ways to farm fish using these resources.

In 2015, after a lengthy review, the Food and Drug Administration approved salmon that are to grow to full size faster than regular salmon.

Along those lines, a Boston-area startup company is developing ways to feed farmed shrimp with lab-grown bacteria, rather than harvesting wild fish to feed them.

Fighting blindness and malnutrition

Then there is enhanced golden rice, which, along with sweet potatoes, has the potential to prevent vitamin A deficiency that affects up to 50% of the population in some countries and leads to blindness.

A handful of scientists have spent the last 15 years convincing Africans to swap white sweet potatoes for their more colourful and vitamin-packed cousins, orange sweet potatoes.

When sweet potatoes were first introduced to the African continent in the 1600s, starchy white and yellow varieties took hold in local food cultures, and became commonplace alongside other tubers like cassava.

However, pale sweet potatoes are significantly lower in vitamins than the damper, bright orange potatoes.

Golden rice, which is fortified with vitamin A, has won humanitarian

awards, but public outcry has largely blocked its use.

Meanwhile, the debate over whether GMOs are good or bad has been going back and forth for years.

Pamela Ronald, a University of California, Davis scientist, who has been working to develop a disease-resistant, drought-tolerant rice, laid out what is at stake in a *National Geographic* article in 2015:

"All this arguing about what's genetically modified is a big distraction from the really important goals. We need to produce safe and nutritious food that consumers can afford and farmers can make a profit from. And we need agricultural practices that enhance soil fertility and crop biodiversity, use land and water efficiently, reduce use of toxic compounds, reduce erosion and sequester carbon."

Adapted from an article by April Fulton in *National Geographic*. Available at <http://www.nationalgeographic.com/people-and-culture/food/the-plate/2016/06/what-would-a-world-without-gmos-look-like/>.

