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***Wandile Sihlobo's technocratic support for GM and related technology misses the mark*:**

Southern African civil society responds to false claims about benefits to food and nutrition security

by Glenn Ashton[1]

Wandile Sihlobo, chief economist of AgBiz, an influential association of Southern African agribusiness,[2] has recently shared a number of his views around matters related to genetically modified (GM) and gene drive crops. He has unfortunately failed to engage carefully and properly with issues related to land and food security or with the extensive body of knowledge and evidence in this field. This is largely due to his optimistic perspective on the potential of GM technology to increase food production, which he presumes will enhance regional and national food and nutritional security. While his views echo those within the GM crop industry, such perspectives are far from universally held. We feel that he has failed to provide sufficiently balanced or nuanced positions able to suitably explore this important topic.

The first article which requires analysis titled "To achieve food security, Africa must not shy away from new technology,"[3] was published in *Business Day* on 4 May 2021. It was echoed by similar article published by *Project Syndicate* titled "A New Chance for Genetically Engineered Crops." [4] In each Sihlobo unabashedly states that yield gains in South Africa's maize crop from 2.4 tonnes/ ha to 5.9 tonnes/ ha "… are therefore largely attributable to the adoption of GE maize." This bold claim cannot stand unchallenged.

Unpacking gains in maize production

Since South Africa adopted GM maize in the late 1990s the grain seed sector has seen considerable consolidation and concentration of expertise in breeding and germplasm management. The lucrative maize seed industry is now dominated by large multinational corporations. This consolidation has driven some significant advances in breeding over the past 20 years, related not to GM technology but instead to improved germplasm (seed quality). These advances have also been assisted over several recent maize seasons by ideal weather conditions for maize production, as well as a notable increase in irrigated production. While irrigation can double maize yields compared to dry land farming, agricultural irrigation uses more than 60% of our scarce water resource.

Additionally grain farming, particularly maize, has seen significant consolidation in farm size over this period. Smaller farms have been bought out, leased or consolidated. This capital intensive, high input farming has also shifted toward control by large and increasingly corporate owned entities.[5] These have enhanced mechanisation and infrastructure to create economies of scale. The average farm size, according to Sihlobo,[6] has increased from around 1400 ha to 2300 ha, with a proportional drop in the number of farms. Each of these realities run counter to stated South African government land policy.[7]

The actual contribution of GM crops to our increased yields remains spurious. Even the most recent studies (Ala-Kokko et al. 2021)[8] provide projected rather than actual yield increases. Even these projected increases provide, at most, an advantage of 0.6 tonnes/ ha increase above conventional

maize. This is far below the 3.4 tonnes/ ha increase (from 2.5 tonnes to 5.9 tonnes/ha) Sihlobo claims in his article, a number which is disputed.[9] More relevant is that the Ala-Kokko paper explicitly states that "…it is naive to think that increasing food supply is the only element of food security," let alone nutritional security.

Narrow GM crop focus undermines necessary food system change for healthy and nutritious food

This statement is borne out by the reality that even with increased maize yields, food security – and more importantly nutritional security (a lack of sufficient nutrients for a healthy life) – have deteriorated since the introduction of GM crops into South Africa. It is remarkable, and noted by Ala-Kokko and other sources,[10] that health indicators like stunting and obesity – both indicators of malnutrition – have worsened over the same period.

A strong counter-argument can be made that such a narrow focus on GM crops, rather than addressing nutritional challenges, has diverted our attention from the real changes required in the food system to address food and nutritional insecurity meaningfully. The reality is GM maize contributes primarily to a commodity value-chain focused on bulk processed foods and exports rather than on the appropriate affordable, diverse, fresh and whole foods required for improved nutrition and health. Additionally, these processed commodity foods have seen, and continue to see sharp price increases.[11]

If we are to address food and nutritional security, food sovereignty should be a key objective of our food system. Central to this concept is the value that in a democratic society the people who produce, distribute, and consume food should also control the mechanisms and policies of food production and distribution. Such control is directly undermined by GM seed technology, which perniciously undermines farmers' own seed selection and saving systems while locking farmers into a high cost input regime. The loss of access to open-pollinated landraces that have been developed over time by farmers themselves is usually irreversible.

It is equally important that government actively supports practices such as food sovereignty and agroecological production in order to ensure stable, diverse local food economies, particularly around the cities where more than two thirds of our population now live. These must enhance the availability of culturally appropriate, nutritious and sustainable food, as well as ensure broader control of the mechanisms and policies of food production and distribution, all assisting the means to access food.

Conflating GM and riskier gene edited crops

Another, perhaps more worrying aspect to Sihlobo's apparent fixation on GM crops as a solution to food security and an adjunct to economic growth is his conflation of GM crops (both in Business Live 4 May 2021 and Project syndicate on 26 May 2021)[12] and gene edited crops, also known as gene drive crops. GM crops are older products, already in fields around the world. Gene edited crops on the other hand are a novel, yet to be deployed technology, where no foreign DNA is inserted into crops. Instead this new technology edits existing genes within organisms without adding foreign DNA. This is managed through technologies such as CRISPR/CAS (clustered regularly interspaced short palindromic repeats), TALEN (transcription activator-like effector nucleases) and zinc finger

nucleases. These genetic editing tools enable technologists to cut, copy and splice the DNA of any organisms, similarly to the cut and copy text on functions on computers.

While these technologies are claimed to be more accurate and less random than the older GM technology, published research has raised increasing questions around genetic disruption of off-target genes which were not meant to have been altered.[13] [14] [15] These changes can have potentially serious negative impacts as shown by a number of concerns[16] raised about the possibility of genetic disruption.[17]

Because of these concerns, those engaged in animal and human gene drive experiments propose to carefully monitor for any possible negative impacts for many years after the event. On the other hand those pushing for the acceptance of gene drive crops and foods seek to release them into the market without labelling, tracking or monitoring. This means that any possible negative impacts may only be identified once they have spread, which will be too late. Civil society and knowledgeable specialists have warned against such hasty deregulation of this contested technology.[18] It is strongly opposed in the EU[19] and elsewhere, contrary to Sihlobo's claim of a push toward review or deregulation.

It is concerning that Sihlobo's conflates these two distinct technologies without meaningfully engaging with the differences, risks and requirements for regulation or with public concern with this new technology. It is disturbing such novel technologies are so glibly promoted without sufficient research, combined with an apparent pro industry bias. This is especially so given Sihlobo's influential position as chief economist with AgBiz. We argue that we should rather enhance our understanding of the issues at stake in order to responsibly regulate these novel and as yet not fully understood technologies rather than promoting them as a panacea.

Even if gene editing does provide a positive contribution, it stands to make certain corporations and individuals extremely wealthy. We would prefer a precautionary approach which must include careful, broad public engagement, especially in light of the pressure to deregulate and profit from these experimental technologies exerted by powerful commercial interests.

The hubris of those such as Bill Gates[20] who wish to impose technological "solutions" like GM and gene edited crops into Africa needs to be balanced against consideration of locally applicable, proven and accepted solutions. Gates has directed billions dollars of scarce research funds toward African agriculture over the past 15 years with little appreciable impact.[21] This focus has diverted attention from the real issues and from proven, locally appropriate solutions to food and nutritional security.

GM wheat concerns for South Africa

We must also raise concerns with Sihlobo's equally ill-considered letter supporting the adoption of GM wheat (*Business Day* 29 April 2021),[22] titled "GM wheat would be welcome in South Africa." Firstly it is not clear who would welcome GM wheat, beside Sihlobo. It is doubtful whether it would gain wide public or farmer support. Sihlobo bases his support on the "astonishing improvement in yields since the adoption of genetically modified seeds," a spurious claim already dealt with.

GM wheat was briefly considered for adoption in North America by Monsanto, the company responsible for the development of the majority of existing GM crops. However worldwide public resistance to the genetic alteration of a global staple crop like wheat forced Monsanto to shelve this project. Despite this, traces of Monsanto's GM wheat have subsequently inexplicably emerged at

least four times in various locations in North America. This demonstrates how it is near impossible to put the GM genie back into its bottle once released.

The GM wheat Sihlobo refers to was developed in Argentina for drought resistance as well as being able to withstand application of the herbicide Glufosinate ammonium, a toxic, persistent and mobile pesticide. Its links to human reproductive system toxicity have led to its withdrawal from France. The EU considers Glufosinate as highly toxic and is contemplating a ban. Herbicide resistant crops are linked to increased chemical use in South Africa and elsewhere.

South Africa would also put its world-class wheat breeding programmes at risk by introducing a GM strain of wheat, as shown by the experience of GM wheat in North America. It is also questionable whether the South African public would appreciate having this crop foisted upon them. It appears presumptuous of Sihlobo to suggest this product would be welcomed here.

GM technology – who benefits?

Let's rather focus on these two central questions: Firstly has the adoption of GM products proven, over the past 20 + years, to address food and nutritional security in South Africa? Secondly has the widespread adoption of these industrial commodity crops advanced urgent matters of national development, such as land reform and agricultural diversification?

While South Africa has increased its production of some staple crops, these increases in production are not linked to the technology, but rather to improved germplasm, economies of scale, increased irrigation and to a large extent in recent years, ideal weather conditions. Recent data shows the economic advantages of GM crops remain marginal[23] with the real winners being the agricultural input companies such as the seed and pesticide companies – members of AgBiz – rather than the farmers.

As far as advancing the national interest, we have seen food and nutritional security deteriorate even though commodity crop production has increased. What good is more food if people cannot afford it? Further, high carbohydrate diets are linked to non-communicable diseases like obesity, diabetes and cardiovascular disease,[24] all on the rise here. We have seen a consolidation within the grain sector and diminished focus on the production of high nutrient row crops like pulses and horticulture crops like vegetables amongst emerging small and medium farmers.

As far as addressing national priorities, such as land reform and restitution, commodity crops have played a central role in increased consolidation of prime agricultural land into private, mostly white owned hands as economies of scale have been pursued. High entry barriers run counter to meaningful agricultural diversification and change. The primary beneficiaries are those who control the technology, along with large agricultural enterprises, rather than those in sectors where change is most urgently required.

If anything, Sihlobo's various articles illustrate the risks of evaluating technologies through a narrow econometric lens. While GM crops may have shown marginal improvements from an economic perspective they have poorly served our priorities of addressing sections 25 and 27 of the constitution. For instance they have not improved access to sufficient food and have arguably hindered citizens' ability to equitable land access and restitution.

Our over-arching takeaway message is this: agricultural governance is not best served through the pursuit of a narrow economic or technocentric perspectives, nor of continuing to enable the dominance of neo-liberal, industrial, extractive policy formulation. Rather we need an

interdisciplinary approach to create a suitably nuanced governance model for resilient and sustainable national food and nutritional security practices.

This response is written on behalf of and is supported by the following organisations and independent individuals:

Abelimi Bezekhaya, South Africa

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Dr Stephen Greenberg, individual

References

[1] Glenn Ashton holds a Masters in Environmental Management and is a PhD candidate in food systems governance. This response is written on behalf of and is supported by the organisations and independent individuals listed on page 5.
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