

# South Africa: Biotechnology for Innovation and Development

---

*Bongiwe Njobe-Mbuli*

This paper briefly reviews the South African experience in biotechnology, identifies the challenges, and thereby may stimulate positive debate and lend strength to the African voice in global debate.

What is often pointed out in reference to biotechnology in developing country agriculture is the food security problem, a poverty eradication challenge, and a rapidly growing population. All of these challenges are magnified in sub-Saharan Africa, and biotechnology may be a viable option to meet the needs of the people.

Can a new type of Green Revolution happen in Africa as it did in Asia? Could it work in a different sociopolitical context, and even economic context? Would African farmers adopt new technologies and hope for the same dramatic outputs?

Biotechnology is a reflection of a quantum leap in agricultural scientific endeavor, and we should not lose sight of that fact. We are in an era of declining funds for public sector agricultural research, so there is pressure to develop private-public partnerships.

Ethical issues surrounding biotechnology, including consumer or environmental issues, are largely a concern of industrial countries. Often overlooked is the fact that the African continent sees itself in the process of renewal. There is a strong sense of renewal, and of hope. There is a new energy emerging and a new frankness in dialogue. People are starting to look at political and economic constraints that have often limited opportunities for agricultural development, particularly public investments in research. This is an opportunity that must not be overlooked.

The African continent, particularly sub-Saharan Africa, has been moving rapidly on trade liberalization. There is also a heightened awareness of the cultural and biological diversity that exists in sub-Saharan Africa, which is being seen as an asset for the continent.

There is increased consumer awareness, but this varies from country to country. This level of awareness has a major impact on the way we discuss biotechnology. A negative consumer reaction to genetically improved (GI) products puts us on the defensive, rather than allowing us to deal with the contextual issues and needs.

## **Crop Improvement in South Africa**

South Africa's crop improvement experience may parallel that of many other African countries, which have long experience in plant breeding and particularly genetic modification of plants.

Plant breeding research in South Africa was established about 1950, and the first gene bank was established in 1960. Legislation on plant breeders' rights was passed in 1964 and put into place in 1966. It was largely to support the established commercial sector, and was therefore part of a government instrument supporting large-scale commercial grain and related industries. Most plant research was therefore aimed at those enterprises.

In 1977, South Africa ratified UPOV as part of the overall support for plant breeders' rights, and field trials on GIOS started in 1992. In the intervening years, there was an increasing awareness of the fact that the agricultural challenge in South

Africa was not just about large commercial entities, but that it included a broad group of stakeholders.

With the growing emphasis on strong plant breeders' rights, and the appearance of G1Os in the 1990s, particularly in terms of our markets because the push came from the private sector, there was increased awareness that we needed to reassess the government approach to plant breeding.

The first conditional commercial releases of GM varieties came in 1997. Considerable work has been done on G1Os in South Africa, mainly with cotton, strawberries, and pest management issues. We also did some experimental work in animal breeding.

Over the last ten years South Africa has put in place institutional structures to support appropriate controls in agricultural plant breeding. Opportunity exists for a quantum leap in terms of using new technologies. We are looking at the combination of biotechnology and information technology, without going through the whole process of learning how to deal with resource-limited farmers through improving extension and other activities. We are trying to find something more dynamic that will propel farmers into a new era where they will be able to increase their incomes per unit of land.

The private sector in South Africa is quite active in biotechnology, and has been doing this without government involvement. A private sector NGO watchdog was a strong lobby group on the pro-biotechnology side, leading to the actual drafting and the promulgation of the G1O Act.

The public sector attitude is understood at the political level as being in support of good science, responsible behavior, and access to quality information. That is a framework within which one could garner support from consumers and other interest groups.

On a more cautionary note, we have learned that in this debate we need to recognize that there is a need to balance the interests of the breeders, the farmers, and the consumers, and those interests are not always in harmony.

There is a high cost in both technology development and in technology transfer. It is not a simple issue of developing a technology and simply giving it to the poor farmers. There is a high cost in technology development and meaningful

transfer, which can then result in an increase in incomes at the resource-poor farmer level.

When private sector dominance is debated, it usually refers to the U.S. private sector. Very little mention is made of the small businesses that are starting up in South Africa and other African countries. The dynamics of the different levels of private sector involvement in this debate mean that as we structure public-private partnerships, we realize it is not a simple issue of getting into a partnership with the CGIAR centers and two or three large conglomerates. Instead we need to take into account the fact that, in areas where poverty is dominant, there are other types of entities within the private sector.

### **The Challenges**

We need short, medium, and long term strategies. In the short term, we should identify the issues, and deal with any conflicts of interest. In the longer term, we should look at sustainability of whatever kind of partnerships may emerge. We must ensure information for and communications with all stakeholders.

Risk assessment and the management techniques and capabilities must be in place to support the introduction of G1Os, and to deal with the conflicts of interest that may emerge, particularly from environmental and consumer groups. The biosafety protocol that the scope of definition of G1Os and the applications of ALA procedures is critical in determining whether or not one starts to facilitate the free flow of G1O products. The reality is that very few countries actually have the institutional capacity to manage risks and inspire consumer confidence that these products carry no risk, and that we have done the necessary work to support our position. We also need to declare persuasively that there is no problem with the use and propagation of these materials.

Sub-Saharan Africa will probably need to be the starting point for risk assessments, changing management techniques in the scientific and regulatory areas, and also at the field level to be able to accommodate the number of applications that will be made to test G1Os.

Another challenge is to answer: Innovation for whom? Who innovates? What is the nature of the innovation? If it is a scientist who innovates, does

it necessarily translate into development when it goes into the field? That question needs to be dealt with because there is no equity in the technology transfer options that are currently on the table.

No matter how successful social development programs of Monsanto are on the continent, the reality is that when commercial production is achieved, you do get into a conflict of interest.

Certain of our cotton producers in Guazu, Natal, are using improved GI seed, but this has happened in an ad hoc manner, with seed not readily available on the market. The farmers did have yield increases, and one of them won a Female Farmer of the Year Award because her yields went up so high. We have not, however, been able to play this out for the large numbers of resource-poor farmers who would need to benefit from the application of such technologies.

What about the future? In sub-Saharan Africa we need to improve our awareness and our institutional capacity to develop biotechnology-linked products. Inherent in our ability to plan for technologies and advanced technologies is our ability to articulate an African scientific agenda, because if that is not articulated, then we will always be on the receiving end rather than being part of the creative process.

We must have greater involvement in critical debates on trade and economic growth, because the subtleties of understanding biotechnology and its application are tending to confuse what are essentially trade and other economic interest

debates at the global level. The African voice must be stronger in future.

### **The CGIAR Can Help**

Much of what the CGIAR centers are doing is good, and it should continue to promote informed opinions for all. The proceedings of this conference should be made widely available to research institutions, to government officials, and to decisionmakers worldwide.

The CGIAR needs to disengage from what I think is a simplistic equation of food security as a factor of poverty eradication and declining research funding, plus biotechnology equals development. I think it goes beyond that equation. The CGIAR is a system whose research, fraternity, and leadership must go deeper into the issues, and actually come to grips with the conflicts and help find strategies to deal with those conflicts. Only then will we have meaningful development in sub-Saharan Africa.

The CGIAR centers have a challenge to move beyond the current emphasis on the U.S.-based private sector issues and to look for other alternatives, identify other options. It is not necessarily true that the kind of public-private partnership that would emerge out of a CGIAR-linked process would be of benefit to poor people across the world. This presents a major challenge, as we strive for equity, sustainability, and development through biotechnology innovation.