BIOTECHNOLOGY FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT IN AFRICA: OPPORTUNITIES AND CHALLENGES

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(ST. LOUIS – MAY 03)

Theme: “A Clear African agricultural biotechnology agenda driven by an African strategy needs to emerge from the global biotech arena” to drive agricultural/economic recovery in Africa

Abstract:

The Green Revolution (GR) in Asia was started by the availability of high yielding pest and disease resistant varieties of wheat and rice from CIMMYT developed by Nobel Prize Laureate Dr. Norman Borlaug clearly showing research when well focus does pay major dividends. These improved varieties became catalytic to Green Revolution, but the overall success was achieved due to increased government funding to agriculture, policy development, peace security and good governance, increased use of inorganic fertilizers (organics were not sufficient), increased irrigation and mechanization through use of tractors and improved communication outreach to all relevant sectors. Currently Africa socio-economic status is similar to where Asia was fifty years ago and truly needs a “kind of agricultural revolution” to drive the growth of agricultural based economies of Africa, from hunger, malnutrition and poverty cycles to economic prosperity. The growing population demands are putting enormous pressure on environment causing environmental degradation, deforestation and serious loss to biological diversity, even in centers of origin. In this case, poverty has become the primarily main cause of “environmental pollution”. Other challenges in Africa include high incidence of HIV-AIDS patients and orphans that need additional resources for support. (Wambugu 2001)

On the other hand, biotechnology has demonstrated impact on increased productivity per unit of land through control of insects and pests and can help reduce environmental damage due to poverty. The endemic food shortages in most parts of Africa associated
with drought and floods as experienced in early 2003, where 15 million people were threatened with starvation in Southern Africa countries clearly indicates a new approach is needed to increase and stabilize agricultural biotechnology has demonstrated impact in both developed and developing countries and offers promise if driven by a clear “African agenda” (Wambugu 2001)

**Introduction and Background**

In Africa households spend, on the average, 60% of their earnings on food. In Europe the figure is 12% and in the US 5%. Food must be made cheaper so that money is available for other purposes: health care, housing and investments in activities that will increase family income. To reduce the cost of food, Africa need to use science and technology to reduce production costs and to increase productivity. This is illustrated by the fact that yields for major crops such as maize, sweet potato etc are on average less than half of global production in Africa compared to countries where use of biotechnology status is high.

Food distribution to Africa is not the solution: it implies costly transport on rural roads (where they exist), it does not take local food preferences into account, and it erodes human dignity. People want to produce their own food. Many see the possibility of lowering food priced by improving the yields of African food crops through biotechnology as a feasible solution. For instance, Pan African Organizations such as the New Partnership for African Development as tools for sustainable agricultural growth and development. The problem is that developing countries in Africa and elsewhere are caught between the US and European positions on GMOs.

**Divergent views on GMOs**

Generally in North America, USA and Canada there has been widespread acceptance of GMOs because of the commercial opportunities and environmental benefits they offer. Internal markets seem to have benefited greatly through meeting the demands of the local
economy successfully. Outside the US, there has been less agreement on the acceptability of biotechnology, particularly due to the moratorium imposed by the European Union which is generally seen as a trade protection. To date, the issue remains controversial and unresolved. (Nuffield Council 1999)

China, for instance has made strategic decisions similar to those of the USA. The country has invested heavily in gene technology, with an orientation toward developing a domestic and south/south export market. This choice has greatly influenced emerging economies. Policymakers in many ‘developing’ nations are exploring the benefits of biotechnology to improve food security and boost income generation. Countries such as Argentina, Brazil, India, South Africa, Kenya, and Nigeria are driven mainly by the potential for food security, and also by commercial opportunities. While most players recognize biotech crops as a means to achieve food security and improve income generation in their own domestic markets, African countries like Zambia are not willing to risk future trade problems with EU by meddling with GM foods. There is also considerable misinformation regarding the safety/dangers of GM technology the negative risk aspects having been mainly generated by anti-biotech NGO’S from which are greatly exaggerated.(Amman Klaus 2003).

Overall, African core issues on GM crops can be summarized as concerns on access and benefit sharing, i.e. opportunities to engaged in GM – trade; possible trade barriers with Europe and limited availability of local expertise in biotech with poor infrastructures i.e. local capacity development.

Despite continued controversies, the global production of GM crops rose from 10 million acres in 1970 to more than 150 million acres in 2002. To date, not a single case of harm to human health or environment has been documented. (ISAAA brief Clive 2002).

**Biotech opportunities**

GM technology opens opportunities for insect/pest/disease control, food fortification with essential vitamins like vitamin A in cereals, micronutrients, like zinc and iron etc and
essential proteins like lysine, and for producing plants that are drought tolerant or otherwise capable of growing well in harsh environments. An important feature of GM technology is its user-friendliness as technology is: it is packaged in a convenient form of the seed. The ability to deliver new technology through the seeds opens a new user friendly access avenue for millions of small scale farmers in Africa. Over 3 million small scale farmers in China are also benefiting from Bt Cotton. Also, with a pest –resistant GM crops, farmers will not be handling and inhaling health-endangering pesticides. Many development projects fail because they do not fit in with local practices, such as the sharing of cuttings among farmers. This practice tends to spread a plant disease, but not if the plants from which the cutting are taken are disease resistant through GM technology. It gives delivery advantage to millions of small scale farmers in Africa and other developing countries. Despite all challenges, controversies and uncertainties surrounding biotechnology, the role of life science companies in making these technologies and products available globally continues to grow because of their successes. Most products have shown excellent performance, with demonstrated impact even on smallholder farms in South Africa, India, and China (Qaim M. 1999).

**Addressing concerns and Barriers**

The remaining issues to be addressed include affordability, Intellectual Property (IP) protection barriers, biosafety policies, private sector monopoly, capacity building in Africa, European moratorium and information outreach. There is a growing fear that biotechnology could give a few big companies a monopoly and control of the seed market. The solution is probably to develop a comprehensive strategy involving suitable local public and private partners with expertise and implementation capacity. This approach can bring about genuine benefit sharing, as it allows for the transfer of genes into local varieties preferred by local communities. In particular, local small-scale farmers are able to see the benefits directly. Involvement of local scientists is also important when it comes to assessing the environmental and health impacts of GM crops and new life science technologies.
Companies need a strong IP incentive to develop new products, but seeds and technologies must be made available to farmers in developing countries through strategic partnership. Several companies have shown a willingness to do this, and to participate in various partnership initiatives. For instance, the Rockefeller Foundation facilitated African Agricultural Technology Foundation (AATF) has provided ways for North/South partnerships to open the African market in a mutually beneficial and sustainable manner. Such efforts must be encouraged and nurtured as they offer new models of doing business within the changing environment.

Consequences of the EU moratorium

The EU moratorium on GMOs is having serious consequences for Africa: loss of collaboration links, loss of research links, lost trade (exports to the EU), diminished funding of biotech research. There are also consequences for the EU: decreased economic and political influence in Africa (this influence being shifted to the US, Canada and China), loss of scientific leadership to the US, delocalization of biotech companies to the US (and the resulting job losses) and a heavy moral responsibility when countries like Zambia decide to reject GM technology and products due to fear of losing trade with Europe.

An African strategy

For several diseases or infestations affecting African crops (such as banana, maize, or the sweet potato), there exists a GM solution but no conventional one. To develop and implement such solutions, we need to build African leadership in human and infrastructural capacity building. We need a good dialogue with the farmers, and to include them in the process so that they can accept new technology, with demonstrated benefits which they must see clearly for themselves. Farmers should also be involved in the trials to generate information they can use to make decisions.
Additional elements of comprehensive strategy for biotechnology in Africa include collaboration between public institutions (NGOs, universities, etc.) and the local private sector, a focus on food security and on indigenous African crops such as cassava, yam, banana, maize and the sweet potato. Funding of biotechnology by African governments where South African is taking the lead and countries such as Nigeria have started programmes, need to be increased. Internal trade between African countries need to be encouraged for food security to reduce over reliance on EU trades and concern on trade barriers.

Put succinctly, a clear African agenda driven by an African strategy needs to emerge from the global biotech arena, i.e. we need to move from debate to more constructive engagements that will result in sustainable agricultural development that is greatly needed – so as to stimulate the desperately needed “biotech agricultural revolution” in Africa. (Modifying Africa 2001)

References


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5. Clive 2002 – ISAAA brief No. 23