Africa is in danger of becoming the dumping ground for the struggling GM industry and the laboratory for frustrated scientists. The proponents of GM technology sell a sweet message of GM crops bringing the second green revolution and the answer to African hunger, but a closer look makes it clear that GM crops have no place in African agriculture.

12 reasons for Africa to reject GM crops

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The push to bring genetically modified (GM) crops into African agriculture is not letting up, even as (and partly because) the GM industry is faltering in much of the world. A growing list of organisations, networks and lobby groups with close ties to the GM industry are working to promote GM agriculture on the continent. GM crops are so far only commercially available in South Africa, but there have been field trials in Kenya, Egypt and Burkina Faso, and also in Senegal and Zimbabwe where there was no public knowledge or regulatory oversight. At least12 African countries are carrying out research on GM crops, including Egypt, Uganda, Morocco, Nigeria, Tunisia and Cameroon, and a long list of GM crops are in the pipeline for introduction in various African countries (see map). There's also concern that GM crops are coming in by way of food imports and seed smuggling, even for countries that have taken measures to prevent imports of GM food, such as Zambia, Angola, Sudan, and Benin.

In short, Africa is in danger of becoming the dumping ground for the struggling GM industry and the laboratory for frustrated GM scientists. The proponents of GM technology sell a sweet message of GM crops as the second green revolution and the answer to African hunger, but the reality is quite different. A close look at GM crops and the context under which they are developed makes it clear that GM crops have no place in African agriculture. Here are twelve reasons why:

1 GM Crops will contaminate non-GM crops; co-existence is not possible

GM crops are plants and, as such, they cannot be easily controlled. Pollen can travel long distances by way of wind and insects. Human error and curiosity or simply regular farming practices also help seed to spread. GM crops can therefore never co-exist with non-GM crops of the same species without the risk of contaminating them, especially in Africa where tight controls over seeds and

farming is unrealistic. This contamination would have serious implications for small-scale farmers. For instance, it would endanger the indigenous seeds that these farmers have developed over centuries and that they trust and know. Farmers with contaminated fields could also end up being forced to pay royalties to the companies that own the patents on the GM crops that contaminated their fields.

2 GM crops will foster dependence on a corporate seed supply.

Most GM seed manufacturing companies prohibit farmers from saving their on-farm produced seeds for the next season and from sharing them with their neighbours, relatives and friends. This is imposed through elaborate contracts, agreements, and conditions, which are imposed by the multinational GM seed companies. More than 80% of the small-scale farmers in Africa today save their on-farm produced seeds for the next season. Farmers sometimes do this because they do not have enough money to buy new seeds and sometimes because they value their own seed. Also, seed sharing (with neighbours, relatives and friends) is a cultural norm in many African communities. The introduction of GM seeds will jeopardise these traditional and vital practices.

3 GM crops will usher in 'Terminator' and 'Traitor' technologies.

'Terminator' and 'Traitor' technologies are two examples of Genetic Use Restriction Technologies (GURTs). 'Terminator' seeds are genetically modified so that the plants that they grow into produce sterile seeds (seeds that are infertile cannot germinate in the next season or any other time). 'Traitor' technology produces GM crops that need to be sprayed with certain chemicals in order to grow properly. It is important to note that these technologies are targeted specifically at developing countries but offer no positive benefit to farmers at all. GURT technologies will cause African farmers to become wholly dependent on companies for their seed supply and for the costly chemicals that their seeds will not be able to grow without. The technologies promise rich rewards for the multinational companies, but they spell doom for small-scale farmers in Africa.

4 GM crops will increase the use of chemicals

More than 70 % of all the GM crops currently grown in the world are genetically modified to resist certain herbicides. Farmers that grow these

GM Sweet Potatoes: misspent millions

Virus resistant sweet potatoes are being developed jointly by the Kenyan Agricultural Research Institute (KARI) and Monsanto, with additional funding from USAID and the World Bank. The initiative was not the result of farmers' priorities or preferences, but, rather, resulted from pressure and existing technology of Monsanto and American scientists. This inattention is understandable given the poor links between researchers, extensionists, and farmers in Kenya. Indeed, many farmers already have virus-resistant sweet potatoes, and for many others, different problems like weevils, are more important.

To date, one unpopular variety has been genetically modified with a protein protecting against a US strain of the virus. The variety has not been tailored to meet farmers numerous site-specific preferences for sweet potatoes (there are more than 89 different sweet potato varieties in Africa). Sweet potatoes are an important food security crop, particularly for women, and are grown predominantly in East Africa (Uganda, Rwanda, Burundi, Kenya, and Tanzania). Poverty in these areas, however, does not result from inadequate sweet potato varieties, but rather from corruption, HIV/AIDS, declining migrant incomes, declining commodity prices, armed conflict, and large inequalities in land, wealth and income. Kenya, for instance, reportedly loses 180 times more money to corruption than to sweet potato viral disease. In the face of these constraints, the benefits of the new sweet potato are relatively insignificant. While econometric evaluations forecast a significant rate of return on the project (using a maximum projected yield gain of 18%), it did not consider opportunity costs. The sweet potato project is now nearing its twelfth year, and involves more than 19 scientists (16 with PhDs) at a cost of an estimated $6 million.

In contrast, conventional sweet potato breeding in Uganda was able in just a few years to develop a well-liked virus-resistant variety with yield gains of nearly 100% with a small budget. In terms of environmental sustainability, as with the examples below, GM-resistance in sweet potatoes is conferred by one gene, and hence one would expect, according to the principles of evolutionary ecology, that new resistant pests would evolve. Evolution of pest resistance will depend however on the extent of selection pressures (which depends partly on how widely distributed the GM varieties become).

The dependence on Monsanto for funding lowers the institutional sustainability of the project. The project has resulted in considerable training of KARI scientists in biotechnology transformation methods, and in bio-safety testing. However, such discipline-specific capacity building in biotechnology may produce a 'lock-in' effect diverting resources from other potentially productive issues and methods.

Source: Aaron deGrassi, *Genetically Modified Crops and Sustainable Poverty Alleviation in Sub-Saharan Africa: An Assessment of Current Evidence,* Third World Network – Africa, June 2003. www.twnafrica.org/docs/GMCropsAfrica.pdf?twnID=377

GM crops must use the herbicides sold by the very companies selling the GM seeds. Not surprisingly, studies show that these crops are increasing the use of herbicides, especially as certain weeds develop resistance to the herbicide. Once again, the GM seeds promises huge profits for multinational corporations, but only increasing costs for small-scale farmers in Africa.

5 GM crops are patented

Transnational corporations own nearly 100% of the agricultural biotechnology patents and the majority of these patents are controlled by a handful of pesticide corporations. These companies will use their patents to block research that does not suit their interests and to trap farmers into paying them royalties every year on seeds and into a never-ending dependence on their chemical inputs.

6 GM crops favour industrial agriculture systems

They are designed for agricultural systems characterised by

- **Large farms:** In Africa, 80% of the population are small-scale farmers with 0.5–3 acres of land. Appropriate agricultural technologies should help small-scale farmers to diversify and intensify their on-farm enterprises.
- **Monocropping:** Due to the small size of farms and challenging environmental conditions, monocropping is not favourable to African agriculture.
- **Subsidies:** While the farmers in the west are highly subsidised, African farmers do not get any subsidies and cannot even recoup the cost of their crops production.
- **Mechanisation:** While farming in the developed countries is highly mechanised, most African farmers depend on human and animal power.
- **Reliance on external inputs:** African farmers cannot afford the high cost of inputs that accompany the growing of transgenic crops. This is one of the main reasons for the failure of the green revolution in Africa.

7 GM crops threaten organic and sustainable farming.

Most of the farmers in Africa practice organic agriculture (by default or by choice). Genetic engineering poses a great threat to such farmers in several ways, including the following:

- Many farmers in Africa rely on *Bacillus thuringiensis* (Bt), a microbe found in the soil that farmers can use as a natural insecticide. The toxin-producing genes of Bt have also been genetically modified into certain crops so that these GM crops constantly express the Bt toxin. The widespread growing of GM Bt crops will encourage the development of resistance to Bt among important crop pests, thus rendering this natural insecticide useless.
- Organic farmers practice mixed cropping and crop rotation. These practices will be threatened by herbicide-tolerant GM crops, which use broad-based herbicides that kill all plants, not just the weeds that farmers may not want.
- Natural fertility is a key factor in organic/ sustainable agriculture. The herbicides encouraged by GM crops kill fungi and bacteria essential to soil fertility management.

8 The biosafety systems required are unrealistic for African countries

African nations lack the expertise, equipment, infrastructure, legislation and regulatory systems to implement effective biosafety measures for GM crops. They also lack the funds to build these up and will therefore have to look for outside funding, which will increase their already heavy foreign debt loads. Should the development of GM agriculture really be a priority for African governments at this point in time?

9 GM crops will not reduce hunger in Africa

Hunger in Africa is not due to a lack of food; there is enough food for all. The main problem is the poor purchasing power of the population because of poverty. This poverty is exacerbated by trade liberalisation in the context of deep global inequality. With trade liberalisation, African farmers have to compete directly with the heavily subsidised and marketed agricultural products from the West. It's like a soccer match with the small scale farmers playing uphill.

10 GM crops will not resolve problems with pests

GM crops encourage the prolonged and continuous use of herbicides and pesticides, including the pesticides expressed by GM plants. As a result, pests and harmful weeds inevitably develop resistance, forcing farmers to use more pesticides and more toxic mixtures. Attempting to overcome pests by the selective use of pesticides

GM Africa

Sudan: In May 2003 Sudan banned the import of GM food, but issued a series of temporary waivers enabling food aid shipments to the country to continue while alternatives were found. But the US response was to suspend food aid shipments to Sudan and exert enormous pressure on the government to rescind the ban. The government relented, and ended up extending the waiver for six more months, allowing the distribution of GM food to continue until January 2005.

Algeria: In December 2000, Algeria introduced a ban on the *"import, distribution, commercialisation and utilisation of GM plant material".*

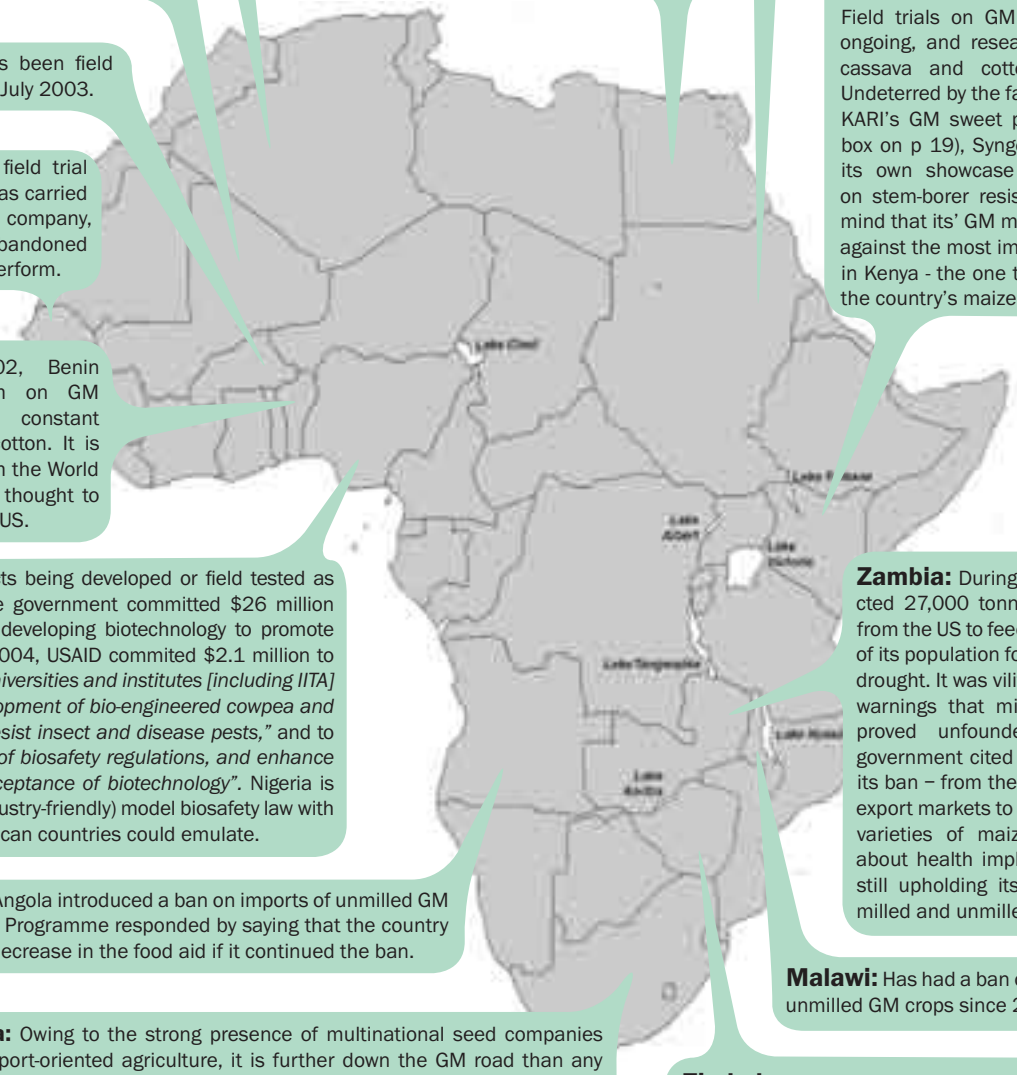
Egypt: Has a pro-GM policy developed with support from USAID. GM canola has been commercialised, and field trials are underway with GM melon, cucumber, maize, potato, squash, sugar cane, tomato, cotton and wheat. Many others are in experimental stage, including GM bananas being developed with ICARDA.

Mali: The national agricultural research institute (IER) has been negotiating with Monsanto and Syngenta for field trials of Bt cotton.

Kenya: Home of a number of new and proliferating GM-pushing research institutes, including the Africa Harvest Biotech Foundation International, ISAAA's Africentre, the African Agricultural Technology Foundation and the African Biotech Stakeholders Forum. Field trials on GM sweet potato are ongoing, and research on GM maize, cassava and cotton are underway. Undeterred by the failure of Monsanto/KARI's GM sweet potato project (see box on p 19), Syngenta has launched its own showcase project in Kenya on stem-borer resistant maize. Never mind that its' GM maize fails to protect against the most important stem borer in Kenya - the one that affects 80% of the country's maize crop.

Burkina Faso: Has been field testing Bt cotton since July 2003.

Senegal: An unofficial field trial of Monsanto's Bt cotton was carried out by the national cotton company, but further efforts were abandoned after the cotton failed to perform.



Benin: In March 2002, Benin announced a moratorium on GM products, but is under constant pressure to introduce Bt cotton. It is also importing food aid from the World Food Programme, which is thought to contain GM maize from the US.

Nigeria: No GM products being developed or field tested as yet, but in July 2003, the government committed $26 million (N3.2 billion) annually to developing biotechnology to promote food production. In May 2004, USAID commited $2.1 million to *"assist leading Nigerian universities and institutes [including IITA] in the research and development of bio-engineered cowpea and cassava varieties which resist insect and disease pests,"* and to *"improve implementation of biosafety regulations, and enhance public knowledge and acceptance of biotechnology".* Nigeria is working on a (no doubt industry-friendly) model biosafety law with South Africa that other African countries could emulate.

Zambia: During 2002, Zambia rejected 27,000 tonnes of GM food aid from the US to feed nearly one quarter of its population following a prolonged drought. It was vilified for doing so but warnings that millions might starve proved unfounded. The Zambian government cited various reasons for its ban – from the possibility of losing export markets to contaminating local varieties of maize to uncertainties about health implications. Zambia is still upholding its ban on importing milled and unmilled GM products.

Angola: In April 2004, Angola introduced a ban on imports of unmilled GM food aid. The World Food Programme responded by saying that the country would face a significant decrease in the food aid if it continued the ban.

Malawi: Has had a ban on importing unmilled GM crops since 2002.

South Africa: Owing to the strong presence of multinational seed companies and strong export-oriented agriculture, it is further down the GM road than any other country on the continent, and sixth biggest producer of GM crops in the world. In 2003, 400,000 ha of GM crops were planted to Bt maize, Roundup Ready soybean and Bt cotton. Nearly all of the GM crops grown in South Africa are sown on large commercial farms, but South Africa is presented as a showcase of the benefits of GM cotton for small farmers, overlooking the fact that the debt problems experienced by small farmers growing Bt cotton are so bad that the firms managing the project withdrew. The country is looking more and more like a dumping ground for GM crops rejected in the US and Europe. There was uproar in Feb 2004 when despite supposedly pulling out of developing GM wheat, Monsanto applied to South Africa for a permit to import it down the road. The country has also just approved field testing of Monsanto's Bt potatoes that were discontinued in the US after consumer rejection. Field trials ongoing on GM cotton, eucalyptus, canola, potato, soybean, strawberries and sugar cane.

Zimbabwe: Ban on importing unmilled GM crops. Monsanto conducted some unsupervised field trials of GM cotton a few years back but that crop was destroyed by the government once they found out.

targeted at one particular pest, is particularly short-sighted in tropical agriculture, because simply eliminating one pest allows space for secondary pests to proliferate and take over.

11 GM crops will encourage the arbitrary destruction of biodiversity

African biodiversity is rich and complex, but it is also fragile. GM crops could easily upset the ecological balance, bringing serious repercussions for farming and the surrounding environment.

12 GM crops are a threat to human health

Little is known about the impacts of GM crops on human health. Extensive and independent studies have simply not been done. But the risks are clearly real, especially for Africa, where diseases that are effectively controlled in the West still run rampant. HIV/AIDS, for instance, was first discovered in the West but it is now decimating the African population, and few Africans can afford the cheap retroviral drugs that can lengthen the lives of those who are infected. Today, every person in Africa is either infected or affected by the disease or both.

What is to be done?

Africa needs to apply the precautionary principle which advises to not proceed when there is no certainty for safety of health and the environment. Given Africa's constraints – lack of resources for effective biosafety measures and lack of awareness about GM crops among the public and farmers in particular – the only practical and appropriate position for African governments to take at present is to declare a moratorium on the commercialisation of GM crops. This must be upheld until adequate research has been carried out into the different socio-economic, environmental, and agronomic issues surrounding GM crops and until there is enough public awareness for proper public consultations to be carried out. The right of African governments to make their own decisions should be respected by other countries.

This does not imply that African countries should put agricultural research on hold. To the contrary, African countries should enhance their investments in agricultural research. But such investment must support farmer-driven research and it must focus on the specific and local problems that affect farming communities. It is time for African governments and their development partners to address the root causes of poverty and food insecurity. In line with this, much more can be done to support:

- fair trade and improved food processing and marketing systems,
- improved rural infrastructure,
- farmer-friendly credit schemes,
- low cost irrigation systems,
- rural training to sharpen the skills of local farmers in food production and food processing,
- rangeland management.

Only Africans can provide African solutions to African problems. Outsiders may help, but the insiders, those who are affected, must do the job. The best way to bring about sustainable development is to strengthen existing, local production systems, while protecting them from such threats as GM crops.

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GM technology has a direct impact on the small scale farmers and PELUM Association is determined to take the debate to the grass-roots and educate its members so that they farmers can act not from ignorance but from knowledge.