GRAIN

Girona 25, pral., Barcelona E-08010, Spain
Tel: +34 933 011 381
Fax: +34 933 011 627
Email: seedling@grain.org
Web: www.grain.org

GRAIN is an international non-profit organisation which promotes the sustainable management and use of agricultural biodiversity based on people's control over genetic resources and local knowledge. To find out more about GRAIN, visit our website at www.grain.org.

Seedling

Seedling is GRAIN's quarterly magazine, published in January, April, July and October. It provides background articles, news, interviews and much more on the issues GRAIN is working on. *Seedling* is available free both in paper format and on GRAIN's *Seedling* website (www.grain.org/seedling). To receive *Seedling* in paper format or to inform us of a change of address, please contact GRAIN at the address or email above.

Seedling is published as a collective effort of GRAIN staff. Janet Bell is the editor. If you would like to contribute an article or other information to *Seedling*, please contact us. Outside contributions are attributed to their respective authors.

Printed on recycled paper
Deposito Legal No. B-25.166.92, Spain
ISSN: 1002-5154

Contents

Front cover picture: © Alvaro Leiva/Panos Pictures. Niger: Women winnowing millet.
Back cover picture: © Lorenzo Armendariz.

Community *or* commodity:

What future for traditional knowledge?

GRAIN

Do we need intellectual property protection to safeguard the continued development of traditional knowledge systems?

A number of developing country governments seem to think so. At an international meeting in March at the World Intellectual Property Organisation (WIPO), many of them pushed very strongly for the creation of a special (*sui generis*) system of intellectual property rights (IPR) adapted to traditional knowledge (TK).[1] What is more, they did so with the explicit support of the indigenous peoples' observers present at the meeting.

It is not difficult to understand how this idea has come up. Rich countries and large corporations have developed IPRs into a very powerful means of appropriation and control. Intellectual property is used to ruthlessly privatise and exploit traditional knowledge held by peasants and indigenous communities across the globe. Neither communities nor developing country governments have much defence against this, and feel equally powerless. From their frustration springs the idea to create a 'counter-IPR' specifically designed to protect the original TK holders. If corporations can have strong IPRs to use against communities, why not the other way around?

While perfectly understandable, this is a tragically misguided idea. Not misguided in the sense that it would be impossible to realise. There is nothing to stop governments from agreeing a treaty about a new *sui generis* form of IPRs for traditional knowledge. But misguided because even if it were realised, it could never achieve the kind of protection envisaged by its proponents. On the contrary, by resorting to IPRs, TK holders would lose just that which they were trying to salvage.

Many of the governments behind this proposal, in particular the African Group which initiated it,

[1] The WIPO Intergovernmental Committee on Genetic Resources, Traditional Knowledge and Folklore. See GRAIN, "The Great Protection Racket: imposing IPRs on traditional knowledge", *Seedling*, December 2003, p 13, for a full background and analysis of the TK *sui generis* proposals: www.grain.org/seedling/?id=260

no doubt share an honest concern for the future of traditional knowledge systems. They want to create the conditions for TK holders to continue to function and develop according to their own logic, protected from unfair exploitation and unwanted commercialisation. And so, of course, do the indigenous peoples' organisations who come to WIPO as observers.

What both groups seem to ignore or underestimate is how the introduction of IPRs will inevitably change the very nature of traditional knowledge – its community character. Both African governments and indigenous observers underscore that the IPR elements in a *sui generis* system must be complemented by a number of additional provisions in order to ensure respect for cultural and religious heritage. But no matter how much is added, the basic fact remains that intellectual property protection can apply only to *property*. In order for anything to be covered by an intellectual property right, it must first be made into property, into a commodity, into something that can be bought and sold. This is where IPR systems fundamentally clash with the notion of traditional knowledge as a community heritage, as something which by its nature cannot be sold or bought.

"Traditional knowledge holders will be pitched against each others as competitors, exactly like Western scientists, and the capacity of their knowledge systems to continue to develop will gradually cease"

What a *sui generis* IPR system for TK could achieve is to help TK holders to commercialise parts of their knowledge. *Sui generis* IPRs could be made more accessible to peasants or indigenous communities, less cumbersome and less costly to use than the industrial patent system. It would make it easier for them to extract some of the *content* of traditional knowledge systems and make it available in a marketable format, with clearly defined exlusive ownership rights and thus compatible with dominant legal systems. What would be lost is the *context* in which traditional knowledge has developed and thrived – and with that, its future. Should IPR-based commercialisation become widespread among TK holders, it is very doubtful if TK could continue to develop in a community context at all. The logic is that its further development would also move over into a market context, and much of it would cease to happen altogether. TK holders would win intellectual property, but lose their intellectual community.

The sad example of academic science is instructive here. Despite the obvious differences, the knowledge systems of Western academia have shared an important characteristic with the traditional knowledge systems of indigenous peoples, fisherfolk, pastoralists and peasants. In both cases, knowledge has been held and managed as a common good within a self-organised community, not as a privately owned commodity. But in the academic world, this is now mostly history, and that is a direct consequence of the proliferation of IPR protection inside scientific institutions.

It started in the exact same way as the TK IPR discussion. Scientists noted how their work was increasingly appropriated and commercialised by corporations with the help of IPRs. This led academics and universities to start seeking IPR protection themselves, originally mostly as a defensive measure, but before long with equally commercial intent as the corporations. In only a few decades, this development has fundamentally changed the way academic science is done. The institutions for cumulative knowledge building and sharing that had been continuously developed since the Renaissance are now in essence lost. The publishing of papers in academic journals or at scientific conferences is now a formality without real significance. The real event is the patent application. And even more strikingly, the continuous informal sharing between research groups which was so important for the efficiency of the system has all but ceased. Nothing can ever be shared for fear that a future patent might be compromised.

Sure, the occasional scientist has struck gold and made a few million out of a successful patent, and some university departments have greatly improved their finances in the same way. But the only real winners are the handful of large corporations which now control not only most of technology development, but most of basic science as well, directly or indirectly. They are the masters of the IPR system and it is their exclusively commercial logic which has taken over also within the academic world. Important to note is that the corporations could never have transformed academia so rapidly or completely as scientists have done themselves from within. By trying to beat the corporations at their own IPR game, they instead delivered the whole academic system on a plate for the corporations to control. Today, academic scientists struggle in fierce competition to produce the patent which will win them fame and fortune, in the form of a contract with one of the corporate giants, who need assume little of the risk or cost with basic science, but are free to pick and choose from the best results.

There is absolutely no reason to believe that traditional knowledge holders will be more capable of defending their intellectual community if they choose to play the IPR game. If the largest universities in the rich world have failed, what are the chances that poor peasants, indigenous peoples and developing country governments would do better? There will be a pot of gold for the lucky few, but the price will be an accelerated breakdown of traditional institutions across the board and the delivery of the corpus of traditional knowledge to the market. TK holders will be pitched against each other as competitors, exactly like Western scientists, and the capacity of TK systems to continue to develop will gradually cease.

There is certainly an urgent need for political action to strengthen the legal protection of TK systems, including in the international fora of the UN system. But this cannot be done by creating new forms of IPRs. Intellectual property is not only irrelevant to this goal, it is positively harmful. Its very nature is to promote commodity-oriented forms of organisation, based on exclusive property, and therefore it always undermines community-based systems which rely on other and broader driving forces. If we want to protect TK, what must be institutionalised is recognition and respect for the long-standing intellectual community of TK holders as a proven and viable alternative to commodified knowledge.

"When you sow maize, throw four seeds at a time: one for the wild animals, another for people with a taste for what's not theirs, another for festival days and another for the family. Maize is not a business but food for survival, our sustenance and our happiness. When we plant it we bless it to ask for a good harvest for all. But we have recently found out that native maize varieties have been contaminated with transgenic seeds. This means that what our indigenous peoples took thousands of years to develop can be destroyed in no time at all by companies that trade in life." **Aldo González Rojas, Zapoteco, Oaxaca.**

The day the sun dies

Contamination and resistance in Mexico

SILVIA RIBEIRO

Mexican peasant maize, the origin of life and culture, the essence of the flesh of peoples who create and cultivate it, has been contaminated by genetically modified (GM) maize. As described earlier in *Seedling*[1], this was an intentional crime. The 'scientists' who created transgenic maize were aware that maize plants cross openly with other maize plants, and that insects and the wind carry its pollen over long distances. Contamination is inherent to the presence of GM crops and is inevitable once they reach the field.

Maize is not the only crop to have been contaminated. In 2002, Agri-food Canada announced that Canada's canola foundation seeds had been contaminated.[2] Earlier this year, the Union of Concerned Scientists released a report on the transgenic contamination of conventional seed varieties in the United States,[3] which showed that at least 50% of maize seeds, 50% of cotton seeds and 80% of canola seeds contain transgenic DNA. The report warns of the risk of the future disappearance of GM-free seeds and of the threat of contamination of the food chain with plants modified to produce pharmaceuticals and industrial chemicals.

Industry's strategy is clearer than ever: deliberately contaminate our fields and our food, and then hope that when the damage becomes obvious, it will be too widespread and people too impotent to overcome contamination. To make things even worse, the same companies, now with support from governments, have launched a new stage in

[1] GRAIN, "Poisoning the Well: the genetic pollution of maize", *Seedling*, January 2003, p 4: www.grain.org/seedling/?id=219; GRAIN, "Confronting Contamination: Five reasons to reject co-existence", *Seedling*, April 2004, p1; www.grain.org/seedling/?id=280

[2] RK Downey and H Beckie, "Isolation Effectiveness in Canola Pedigree Seed Production." Internal Research Report, Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, Canada, 2002.

[3] Margaret Mellon and Jane Rissler, *Gone to Seed: Transgenic contaminants in the traditional seed supply*, Union of Concerned Scientists, Washington DC, 2004. www.ucsusa.org/food_and_environment/biotechnology/page.cfm?pageID=1315

their attack in the legal field. In Canada, where transgenic canola – which cross pollinates even more readily than maize – has contaminated most canola crops, farmers are being warned not to use their own seeds or to save any for the next planting season, because companies may sue them for 'abuse' of their patented genes.

In Mexico, the centre of origin for maize and many other crops, the situation is even worse and more complex. The potential impact of contamination is multiplied by the huge number of local maize varieties, as well as wild and semi-domesticated relatives, plus many other species of fauna and flora in ecosystems and agro-ecosystems. But most serious is the profound cultural significance – in the broadest sense – of maize that is at stake.

The maize people

Maize is the most important agronomic achievement in the history of humanity. From a mere grass (*teocintle*), indigenous peasant peoples in Meso-America created a very nutritious and tremendously adaptable plant which could be grown in many different ecosystems and for multiple uses. It does not grow wild, and it is always linked to its creators, whom – according to foundational myths throughout Meso-America – it also created, in a process of mutual care.

Among the hundreds of traditional maize varieties used every day by peasants and indigenous people in Mexico, there is a large diversity of colors (white, red, yellow, blue, black, spotted), with ears ranging from a few centimetres up to 30 centimetres, with different shaped ears and varying numbers of kernels. A few of these varieties, for example, are known as: *bolita* (little ball), *reventador* (popper), *palomero toluqueño* (Toluca popcorn), *palomero de Chihuahua* (Chihuahua popcorn), *celaya, dulce* (sweet), *serrano de Jalisco, olotillo, tuxpeño, chapalote, tabloncillo* (plank), *zapalote chico, zapalote grande, conejo* (rabbit), *nal tel, cacahuancintle, chalqueño, arrocillo* (little rice), *tepecintle, comiteco, pepitilla, ancho* (broad), *tablilla de ocho, otaveño, apachito, dulcillo del noroeste* (northeast sweet), *ratón* (mouse), *vandeño, olotón, tehua, jala, zamorano.*

Maize in Mexico is much more than a crop. It is a central element in rural and urban culinary habits and lies at the heart of the history and the daily lives of the peoples of Mexico, their economy, their religions and their worldview. The cycles and the uses of maize give rise to festivals and to aesthetics, they create furniture and specific utensils, they influence architecture. For indigenous and peasant peoples, it is the basis for their identity and for their autonomy. So the transgenic contamination of the peasants' maize is no small event. As Alvaro Salgado, from the Centre for Indigenous Missions (CENAMI) put it, *"This is an act of aggression against the deepest identity of Mexico and of its original peoples. Our communities and organisations have therefore decided to take this problem into our own hands."*[4]

"This is an act of aggression against the deepest identity of Mexico and of its original peoples. Our communities and organisations have therefore decided to take this problem into our own hands."

Civil society responses

GM contamination in Mexico gave rise to a collective discussion on the issue, involving indigenous and peasant communities and organisations as well as civil society organisations, which has brought out the complexities of the problem as well as the complexities of the resistance against contamination. In clear contrast to the resignation and *"surrender"*[5] the industry hoped for, Mexico's people have risen to the challenge.

Once the contamination had been demonstrated, many civil society organisations protested in Mexico and internationally. Amongst the demands raised were stopping the causes of contamination, for governments and international agencies to step in to monitor contamination, for impact studies to be done and contingency plans prepared, and for liability suits to be drawn up against the multinationals. Some also raised the need for national and international biosafety regulations. We demanded transparent proof from the Food and Agriculture Organisation and the Consultative Group on International Agricultural Research (see p13) that they had not been contaminated as well, nor could be in the future, and called for

[4] "Contaminación transgénica del maíz en México: mucho más grave" Collective press release by indigenous and peasant communities with civil-society organisations. Oct. 9, 2003, Mexico. www.etcgroup.org/article.asp?newsid=407

[5] Don Westfall, a consultant to biotechnology companies, said in 2001: "The hope of the industry is that over time the market is so flooded [with genetically modified organisms] that there's nothing you can do about it. You just sort of surrender." *Toronto Star*, Canada, Jan. 9, 2001.

Lorenzo Armendariz

One fifth of Mexico's population lives on small farms where the main crop is maize

Lorenzo Armendariz

Thanks to the NAFTA agreement, US maize is now sold to Mexico at 25% less than cost price, which has made growing maize uneconomic for Mexican farmers.

a moratorium on planting GM crops. Mexico's indigenous and peasant communities, meanwhile, have gone much further and deeper. Their experience is invaluable to understanding the issue of contamination and to go on building resistance in other parts of the world.

Causes of contamination

The primary cause of contamination of maize in Mexico is the importing of unsegregated maize from the US. From being self-sufficient in maize till the late 1980s, the birthplace of maize has become an importer, because of national farm policies that discourage small-scale production. These policies were intensified with the signing of the North American Free Trade Agreement (NAFTA) in 1992. Today Mexico imports about a third of the maize it consumes from the US, and has placed no restrictions in relation to GM imports. Since over 40% of US maize output is genetically engineered and authorities refuse to segregate GM and non-GM maize, at least that percentage is flowing into Mexico. The percentage is likely to be even higher, since other major importers (like the EU and Japan) have refused US maize, creating a glut.

Meanwhile, Mexico disassembled its public system for supplying and marketing nationally-produced maize. It used to buy the maize from farmers and then sell it country-wide through a system of 23,000 rural stores known as DICONSA. Spread through the most remote corners of the Mexican countryside, these stores are often the only point of sale for cereals and other supplies. After dismantling the national supply system, the market was taken over by a handful of companies dominated by a few multinationals like Cargill, ADM and Maseca, which prefer to import their maize from the US (where prices are kept artificially low) and sell it through the DICONSA system, in competition with Mexican maize growers. Although the great majority of Mexican peasants do not plant store-bought maize seeds, distortions in the economy mean that it is cheaper to buy maize than grow it, thus reducing and depleting their own seed supply. Moreover, out of normal peasant curiosity – which has been critical for the development of the world's agrobiodiversity – they plant some of what they buy, just to see what happens. They also buy at the DICONSA stores when they lack seed for other reasons, such as floods or droughts that leave them with no harvest. Even when that maize grows out poorly, as is often the case because it is not adapted to the peasants' fields, they grow enough to produce pollen to contaminate their and their neighbours' fields.

Another cause of contamination has come from farmers replanting some of the grain provided as food aid from the World Food Program and foreign NGOs. In addition, field trials were undertaken in Mexico with GM maize without adequate supervision to ensure that contamination could not take place prior to the establishment of a moratorium in 1999. And finally, while there has never been any authorisation in Mexico for the commercial planting of GM maize crops, given that even much of the seed considered non-GM in the US is actually contaminated, large-scale Mexican maize growers may also have become unwitting vectors of contamination, just like their peasant compatriots. There are many ways in which GM maize has infiltrated the country, but the main cause is that a few huge transnational companies saw no problem in genetically modifying an open-pollinated crop of great economic and cultural importance and had no concern for the many and diverse impacts this would have.

The official response

When the contamination of Mexican maize came to light, Mexican government officials with few exceptions[6] first denied the facts, then played them down and threw a blanket of silence over the subject. The government maintained imports and even suspended the moratorium on growing or importing GM maize. NAFTA stripped the country of any rights it might have had to refuse GM imports under the Cartagena Protocol on Biosafety (see p13.). Under one NAFTA accord signed in November 2003, Mexico agreed to allow shipments from Canada and the US to dispense with identifying contamination by GM grain when its presence is *"adventitious"* or does not comprise more than 5% of the grain. This is an arbitrary and

[6] With the minority exception of the Institute of Ecology and the National Biodiversity Commission, which took samples that confirmed the contamination, released the results and held dialogue with peasants and with civil-society organisations.

absurdly high threshold, whose supervision is the responsibility of the companies themselves.

Meanwhile, representatives of the Mexican Academy of Science drew up a bill of law on 'biosafety', which ignores the precautionary principle and offers a clear framework to promote GM crops and to legalise contamination in Mexico. Based on the argument that the bill is *"science-based,"* it was approved by all parties in the Senate and is now under discussion in the Chamber of Deputies. Indigenous and peasant communities describe it as *"shameful and offensive to peasants and indigenous people and to all citizens of Mexico in general."* They say that *"We are not asking for a 'better' law. We believe that Mexico, centre of origin of maize, does not need to take on the social, economic and environmental risks posed by transgenic crops. It should simply forbid them."*[7]

Attacks on the maize people

In sharp contrast with the official position, the news of contamination of Mexico's maize shocked the country as a whole, and raised tremendous concerns for millions of peasants and indigenous people. Just months after the discovery of the contamination of maize made by Ignacio Chapela and David Quist[8], in January 2002, more than 300 indigenous, peasant, civil society, academic and religious representatives met in Mexico City at the First Forum in Defence of Maize. The meeting's conclusions included a declaration, policy demands and proposals, strategies for action and an analysis of the context for understanding the contamination.

> *"Maize is the heritage of mankind, the fruit of domestication done by Meso-American indigenous and peasant peoples for over 10,000 years, not by transnational corporations. The transgenic contamination of native maize varieties is a loss of genetic memory of traditional Mexican agriculture, and it may be irreparable. Agricultural and trade policies undermine national maize production, which is the core of the peasant economy and organisation, as well as food sovereignty. Maize represents more than 10,000 years of culture and is the legacy of Mexico's Indian and peasant peoples. Maize growing is the heart of community resistance."*[9]

From the outset, it was clear that this was more than an isolated event of contaminated maize, an environmental or a health problem, or even just a 'genetic engineering' issue. It was part of a broader phenomenon, which became known as *"the attack on maize people"* in the Second Forum in Defence of Maize. One key realisation at the First Forum was that we did not need a campaign as such, but a process. This process would neither be linear nor short-term, but would be defined through a broad, diverse, collective and horizontal effort. Its objectives, methodologies and norms would change continuously, as a result of the self-managed and culturally diverse nature of the process.

Without maize we are nothing

As Ramón Vera Herrera expressed in an excellent reflection on the various aspects of the process unleashed by the contamination of maize,[10]

> *"The first steps involved information and analyses, marches and protest letters, lobbying activities and many regional workshops. There was and still is a real concern at the very idea of contaminating the most sacred element of their lives and the foremost source of their food, what makes them be and provides the identity that has been forged for millennia. When the Wixaritari (or Huichole) community members found out, one of them immediately and incisively observed that 'Without maize, we are nothing; we would not just be dead, we would cease to exist'."*

A Tzotzil view of contamination

"We are from the Chiapas Highlands, we are people made of maize and clay. We are Tzotziles, but our true name has been transformed on the tip of the tongue of the invaders. We have been indigenous people ever since our Mother Earth gave birth to us and we will continue to be, until the same Mother Earth swallows us up.

"Our struggle is for what we have been, what we are today and what we will be tomorrow. We struggle to know our history, to recover our culture, because we know very well that if a people knows its history it will never be condemned to repeat it and will never be defeated.

"We have learned that agrochemical companies patented our maize. They are putting in genes from other living beings and many chemicals to completely put an end to our natural maize, so we'll have to buy nothing but transgenic maize. We know about the serious impacts caused by this kind of maize they are creating, which affects our culture because for indigenous people maize is sacred. If these agrochemical companies try to do away with our maize, it will be like putting an end to part of the culture that our Mayan ancestors bequeathed to us. We know that maize is our main staple food. We know that our first fathers and mothers brought us up on maize and for that reason we are called women and men of maize. Our indigenous peasant grandparents gave their labour and their hearts; they cried as they asked protection from our Creator for their work to bear fruit.

"We are worried that our maize may disappear, so in our schools we want to create a seed bank to conserve our maize, so that later we can promote the creation of seed banks in every community. To defend our natural maize, we are carrying out a project in our school called *"Mother seed in resistance in our Chiapaneca lands."* We are against transgenic maize, and together and with all the people of Mexico we hope to save part of our life that they want to take away."[11]

[7] Collective document by indigenous communities from Oaxaca, Puebla, Chihuahua and Veracruz, CECCAM, CENAMI, ETC Group, CASIFOP, UNOSJO y AJAGI, October 2003, Mexico. www.etcgroup.org/article.asp?newsid=408

[8] See the interview with David Quist in the April 2003 issue of *Seedling*, www.grain.org/seedling/?id=232

[9] Conclusions from the First Forum In Defense of Maize (*En Defensa del Maíz*): www.ceccam.org.mx/ConclusionesDefensa.htm

[10] Ramon Vera Herrera, "En defensa del maíz (y el futuro) – una autogestión invisible". May 2004, IRC, www.americaspolicy.org/

[11] *Ojarasca*, in *La Jornada* 58, February 2002.

All around the country, people found a voice. This contribution from Aldo González, from UNOSJO, summarises the concerns of many:

> *"Native seeds are a very important part of our culture. The pyramids may have been destroyed, but a handful of maize seed is the legacy we can leave to our children and grandchildren. Today they are denying us this possibility. The process of globalisation that our country is going through and the undermining of governmental authority are keeping indigenous communities from being able to pass on this age-old legacy, which represents more than 10,000 years of culture. For 10,000 years our seeds have proven they don't harm anyone. Today they're telling us that transgenic seeds are harmless. What proof do they have of this? Five or six years of planting transgenic maize seeds in the world gives no indication that the seeds or this grain are harmless to humanity. We have every reason to doubt their seeds."*[12]

The Tzotzil people of Chiapas made a strong statement about the contamination of their seeds (see box on p. 7).

With indigenous meetings held around the entire country, a strong, invisible movement began to emerge to defend maize and to understand the implications of its contamination. For example, at the National Indigenous Congress (CNI) Assembly for the Central Pacific Region held in Jalisco in July 2002, contamination became such an issue that the delegates from the Wixárika, Purépecha, Ñahñú, Huachichil, Chichimeca, Nahua and Amuzgo peoples from various states of Mexico, stressed among their final resolutions that:

> *"We demand that the Federal Government cease the introduction into our country of maize that is transgenic or of doubtful origin. We call on all indigenous and peasant peoples, and on maize consumers throughout the country, to defend our seeds and to unite behind our demand."*

Interestingly, the CNI made the direct link between the defence of maize and the importance of maintaining biodiversity and their traditional knowledge, and of preventing biopiracy. They further extrapolated this issue to the protection of traditional medicine. Two months later, the communities and organisations that make up the CNI held a National Forum to Defend Traditional Medicine, which drew together countless traditional medicine practitioners, authorities and delegates from indigenous communities and organisations from 20 different states. Those present represented the following peopels: the Tohono O'odham, Mayo, RaráMuri, Cora, Wixaritari, Nahua, Huachichil, Tenek, Chichimeca, Purhépecha, Mazahua, Tlahuica, Matlatzinca, Hñahñu, Tepehua, Amuzgo, Tlapaneco, Mixteco, Huave, Zapoteco, Mixe, Mazateco, Maya Peninsular, Tzeltal, Tzotzil, C'hol, Tojolabal, Mame, Zoque, Chuj and Mochó peoples, along with civil society organisations.

After demanding respect for indigenous territories, natural resources, biodiversity, and both the ancient and modern knowledge of indigenous peoples; after refusing to submit to the validation of traditional medical practices by public health authorities; after demanding autonomy and self-government; after declaring a moratorium on bioprospecting in the territories of the peoples signing the document, those present at the conference also made a striking call on the issue of transgenic contamination:

> *"As part of our defence of Mother Earth and of everything to which she gives birth, we repudiate the introduction into our country of transgenic maize, because Mother Maize is the first foundation of our peoples. To this end, we demand that the federal government declare an open-ended moratorium on the introduction of transgenic maize, regardless of the use which it may be given".*

Turning the tables

Through the complex and multifaceted process that has taken shape, it has become clear that the defence of maize and even its decontamination cannot be understood in isolation from the web of life in which it is enmeshed. The Wixárika people, for example, put it this way:

[12] *Ojarasca*, in *La Jornada* 58, February 2002.

This Wixárika farmer travelled more than a thousand miles to Oaxaca - where contamination was first discovered - for a meeting on how to protect native maize.

– OK: let's defend maize.
– Defending it means replenshing the soil.
– Which means returning to planting without chemicals ...
– ... and making sure there are no mudslides.
– That means we have to rebalance the water.
– Which means taking care of the forest...
– Holding back erosion, bringing rain...
– ... and refreshing the air.
– To do that we have to defend our territory
– ... and our rights to land and as a people.
– That means our representatives must really obey the community's mandate...
– ... and we must strengthen the community assemblies.
– So we have to have maize, so that people in office don't have to take other jobs, and can keep their roots in the land, like other villagers.

For the Wixárika people, the world is a kind of magic circle in which nothing can operate alone. The Wixárika are working for the holistic replenishment of its communities, stressing community organisation and maize as the heart of their resistance. Ultimately they are working towards full autonomy in their territories in all respects, from geography to the sacred, embracing the wealth of relations between humanity and everything else, since everything is alive.[13]

Sampling, banks and learning

In addition to the many meetings and workshops, a diagnostic process was also carried out to detect the presence of transgenic maize in different communities. With support from Mexican and overseas civil-society organisations and from biologists at the National Autonomous University of Mexico, and with the direct participation of the communities, samples of peasant maize were collected for analysis from 138 indigenous and peasant communities in nine states of Mexico. The startling results were that there was transgenic contamination in all nine States and in 24% of the participating communities.[14]

These results were discussed at Second Forum in Defence of Maize in December 2003. Among the communities' first reactions were calls for more sampling and analysis. But they soon realised that even if they could afford to sample more communities – and they would never be able to sample all the thousands of communities in Mexico – the process would have to be repeated with each new planting season, since contamination would be ongoing. Even if that were possible, it would lead to a technical and economic dependency that would alienate them ever further from their own ways of life. Worse still, the entry of technicians into their communities might mean more threats to their way of life, and to their crops and seeds.

Curt Carnemark/World Bank

"Maize growing is the heart of community resistance."

The communities recognised that what made them vulnerable to contamination were a series of national and international economic and political factors (free-trade agreements, massive migration, cultural and food erosion, urban and rural poverty, etc.). They came to the conclusion that they could only defend maize by defending the wholeness of peasant and indigenous life along with their rights and resources. As they started to perceive the issue from a different angle, their goals began to shift. Among the new measures proposed were to:

- Declare and implement a unilateral moratorium on transgenic plants, refusing to use seeds whose origin and history are unknown and refusing to eat food made from unknown maize.
- Emphasise or return to the planting of native seeds, promoting local and community exchange systems. The appropriateness of seed banks was questioned, since they require the creation of new, centralised structures that demand specialised labour, administration, centralised surveillance, etc. This recourse was not discarded for all situations, but the priority is now for the traditional habit of storing seeds in which each family and community sows and stores their own varieties as they had always done in the past, taking even greater care now to use only well-identified seeds.
- Strengthen and reaffirm cultural processes involving maize, recovering local cooking habits, traditions, myths and ceremonies, as well as community processes involving planting, harvesting, consumption, exchange, etc.

[13] Quoted from Ramón Vera Herrera, "En defensa del maíz (y el futuro) –una autogestión invisible". May 2004, IRC, www.americaspolicy.org/

[14] Collective press release by indigenous and peasant communities from Oaxaca, Puebla, Chihuahua, Veracruz, CECCAM, CENAMI, ETC Group, CASIFOP, UNOSJO, AJAGI, Oct. 9, 2003, www.etcgroup.org/article.asp?newsid=407

- Launch a process of consultation and investigation amongst communities and peoples to find new ways to identify the contaminated maize, for example by observing abnormalities or other traits, including different perceptions that peasants may pick up on in their day-to-day contact with the seeds and the land. On this basis, attempt to establish and share decontamination processes, for example through partial exchanges of seeds in cases when this is deemed necessary, etc., but always within traditional circuits.
- Continue discussing the threats to maize peoples and how to resist them, including more dissemination and learning within rural and urban local communities, as well as denouncing governmental measures that increase or legalise contamination.
- Strengthen and expand links with urban and neighbourhood groups to promote the consumption of native maize and the patronage of local markets, wherever possible and appropriate.

The contamination of maize – or any other crop – is a huge and immoral new burden that transnationals and their loyal governments have placed on the shoulders of peasant men and women of the world. It is an ironic form of 'payment' for the rich legacy of crops these peoples have provided for centuries, to the benefit of mankind. Peasant farmers are also the only ones who can decontaminate it, because even if the political will existed, there is no centralised or top-down approach that could possibly do this. Only those who have profound and intimate knowledge of the crops and their setting are up to taking on this enormous task.

This is no short-term process we are undertaking. As Aldo González said in his conclusions on the Second Forum, *"We are heirs to a great treasure that is not measured in money and that they want to take away from us. This is no time to beg for alms from the aggressor. Every Indian and every peasant knows about the transgenic contamination of our maize and we proudly declare: I plant and will continue to plant the seeds that our grandparents bequeathed to us, and I will assure that my children, their children and the children of their children continue to grow them. I will not allow them to kill the maize, because our maize will only die the day the sun dies."*

Silvia Ribeiro is a Mexico-based researcher and programme manager for ETC group (www.etcgroup.org), and a member of GRAIN's board. She has a background as a publisher, journalist and environmental campaigner in Uruguay, Brazil and Sweden.

Silvia has extensive experience in social and environmental advocacy. As a civil society representative, she has attended and followed the negotiations of several of United Nations environmental treaties. She has been invited to speak at many events around the world on biopiracy, transgenics, intellectual property, corportate control, and indigenous/farmers' rights.

Silvia has produced a number of articles related to biodiversity, genetic resources, intellectual property and biopiracy, among other issues. From 1994-1999, she was the editor of *Seedling*'s Latin American sister publication *Biodiversidad, sustento y culturas* (www.grain.org/biodiversidad/). Sylvia can be contacted at silvia@etcgroup.org.

What's in a name?

(More than you might think)

GRAIN

Many of us often have to struggle with words and concepts that are used as though they have one single and simple meaning, while in reality they hide strong bias and very specific worldviews. Not surprisingly, they are usually biased towards the worldviews of those in power. There have also been words and concepts which were well-intentioned when coined but that have been corrupted over time through inappropriate usage, thereby acquiring more complicated connotations and implications. When we use these words, we often unwillingly but unavoidably become trapped in political and philosophical frameworks which block our ability to challenge the power that backs those views.

In the following pages, GRAIN takes a critical look at some such key concepts related to agricultural research. This follows an earlier effort to look at key concepts related to knowledge, biodiversity and intellectual property rights that we undertook in the January 2004 *Seedling*. Many of the following words and phrases look innocent enough at a first glance, but on deeper examination, we can see how they are used to serve particular agendas. Some are used to constrain us and lock us into a particular way of thinking, and others are used against us. This is not an exercise aimed at drawing final conclusions, but an invitation to deconstruct some definitions and start the search for new terminology and ways of thinking that may help us untangle some of the conceptual traps we are stuck in. Your comments are welcome.

GENE

Genes are the hereditary material or information found in the cells of living organisms. But the actual material form of the gene is elusive; no one has ever actually seen one. And our understanding of its role in biological function is constantly evolving; the models are getting more complex, and the simple, founding ideas, which paved the way for the biotech industry, are no longer credible.

The central dogma of the Life Science industry was first put forward by Watson and Crick in the

1950s. It says that our genes, aligned on a double helix of two chains of nucleotides (DNA), can be read like the code of a computer programme. The code is said to be simple and universal, with each trait determined by one or more genes: one gene one protein one function. But recent advances in molecular biology, in particular the mapping of the genomes of humans and other organisms, have not revealed the *"secret of life"*, rather they have revealed our ignorance in the face of life's profound complexity. We now know that biological function results from a much more complex model of genetic interactions taking place within the cell and between the organism's genome and its larger (virtually limitless) environment. Yesterday's so-called *"junk DNA"*, the large amount of DNA that does not code directly for a protein, is now recognised as playing a critical function in modulating gene function[1].

But as molecular biology moves towards a more ecological understanding of living organisms, in which the gene hinders the understanding of biologists, the gene continues to dominate scientific and popular discourse. Scientists and industry, clinging to outdated, linear genetic determinism, still speak about genes as the wellsprings of cures for disease and hunger. Every week comes a new announcement about the 'discovery' of some gene for some application. Money changes hands and stock prices go up. While the gene's currency is declining in scientific circles, it remains the centerpiece of a multi-billion dollar industry, whose future depends on a clean cut, predictable gene. Acknowledging the true complexity of genes and heredity would mean opening a Pandora's box of regulatory and biosafety nightmares, and death to the industry.

PLANT BREEDING

Plant breeding is the process of creating new plant varieties or populations through deliberate crossings and the selection of existing varieties. It is the process by which Pioneer and Cargill obtain new hybrids, and Burpee gets new flowers and ornamental plants. It is also what allowed the tremendous transformation of some weak and often poisonous weeds into important crops like corn, rice, wheat, beans, quinoa, teff, potatoes, cassava, and many others long, long before Cargill and Monsanto made an appearance. Every plant we eat and every crop that is sown is the product of plant breeding.

Throughout almost all the 10,000 year history of agriculture, *"plant breeder"* was synonymous with *"farmer"*. The patient and careful work of millions of farmers produced an endless wealth of crops and varieties, with their myriad colours, flavours, needs, uses, adaptive characteristics, sub-products, growth habits, and so on. Then, around one hundred years ago, scientists decided that farmers did not know a thing and claimed a monopoly over plant breeding. Farmers were told they were ignorant and their seeds worthless, while seeds bred by scientists (using the very same seeds of farmers they said were useless) were presented as all that were worth planting.

The result of this systematic undermining of farmers is well known: thousands of varieties have disappeared, agriculture has become deeply dependent upon irrigation, machinery and agrochemicals, farmers around the world disappear by the minute, hunger continues to grow, and the food we eat has lost flavour and diversity. Does this mean that scientists do not know how to breed? No, but breeding always has a purpose set by the breeder, and there is no single breeder or group of breeders that can respond to the needs of millions of farmers and people working under millions of different conditions and aiming at millions of different objectives. Drastically reducing the number of breeders will unavoidably result in limited choices, and *"scientific breeding"* unavoidably breeds homogeneity. In addition, as breeding is increasingly funded by private corporations, it increasingly serves the interests and objectives of those corporations.

So, it comes as no surprise that the actual and potential products of current 'scientific' plant breeding look like a list of weapons against farmers and consumers: seeds that force you to use a certain agrochemical, seeds that do not germinate, crops that yield drugs and poisons, crops that will not survive unless farmers apply huge amounts of agrochemicals, crops that can be shipped around the world but taste awful, crops that have unknown effects on other living beings, and so on. If we are ever going to eat what we need, as we like it, with a wide range of alternatives, without chemicals, and – most important of all – if farmers are ever to regain all the rights and responsibilities associated with being a farmer, plant breeding will have to be reborn as the task and art of millions around the world.

[1] For a more detailed discussion on gene function and the failure of the dogma, see Barry Commoner, "Unravelling the DNA myth", *Seedling*, July 2003, p 6. www.grain.org/seedling/?id=240

BIOFORTIFICATION

You would think that the nutritional content of crops would be a standard consideration in plant breeding. But, in the blind quest for yield, the scientists of the green revolution forgot that nutrition mattered. Now, suddenly, nutrition is on the agenda, fancily packaged as *"biofortification"* and linked to the glamorous technology of genetic engineering. The very institutions that stripped the nutritional content from farmers crops and fields are now getting millions of dollars to try and put the nutrition back in. Yet again, the complex problems of poverty and undernourishment are reduced to simple technological fixes – like enriching potatoes or rice with vitamins – that do little to help the poor, but breathe new life into the cash-starved research centres of the CGIAR.

The CGIAR has initiated a ten-year Biofortification Challenge Program to deal with *"micronutrient malnutrition"* of iron, zinc and vitamin A. Work towards this is designed as a global research project, HarvestPlus, focused on fortifying rice, wheat, maize, cassava, sweet potato and common beans. The project is coordinated by the International Centre for Tropical Agriculture (CIAT) and the International Food Policy Research Institute (IFPRI), with the participation of other CGIAR centres like IRRI, CIMMYT, CIP, ICRISAT, IITA and ICARDA. HarvestPlus also involves national agricultural research bodies and seeks partnerships with private seed and biotech companies to help distribute the seeds. All this in the name of the UN's Millennium Development Goal to halve the number of the world's undernourished by 2015. The first 4-year period of this project, which started in 2003, seeks funding of $50 million. Half of this has been donated by the Bill and Melinda Gates Foundation; the rest will come from World Bank, The US Agency for International Development, the Danish Government, the Asian Development Bank and others.

It is hard to feel optimistic about this high tech, high cost, piecemeal approach to enriching the food system. What really needs to be fortified is small farm agricultural systems and their diverse cropping systems that guarantee wholesome food. Likewise, local traditional systems of medicine need to be strengthened for health care. We need a holistic approach to addressing problems of hunger and malnutrition that face up to the root causes of poverty. Moreover, nutrition is not about merely filling empty stomachs with calculated doses of proteins and vitamins: it is nurturing the mind, body and soul; it is about respecting life.

Jargon buster

CGIAR: the Consultative Group on International Agricultural Research. A group of donors established the CGIAR in the early 1970s to fund agricultural research around the world. It does this via 16 International Agricultural Research Centres, which now call themselves "Future Harvest" centres comprising more than 8,500 scientists and support staff working in more than 100 countries. The CGIAR is the biggest institutional force guiding research and development for the crops that feed people in the South. As government funding is drying up, the CGIAR is increasingly looking to partnerships with industry to keep itself alive: hence its growing interest in research into GM crops.

FAO: The United Nations Food and Agriculture Organisation. Founded in 1945, the FAO's mission is to lead international efforts to defeat hunger. In the 70s and 80s, the FAO seemed to take a real interest in the concerns and needs of small farmers, and was the only international forum to seriously take on the issue of Farmers' Rights. But more recently, it has lost any credibility it had amongst farmers' groups around the world for its public backing of the agricultural industry as a force to overcome hunger. It has recently come under serious attack for coming out in favour of genetic engineering as a useful tool to combat hunger around the world.

Cartagena Protocol on Biosafety: the first international treaty dealing with the movement of genetically modified organisms (GMOs) across country borders. The protocol was drawn up under the Convention of Biological Diversity and came into force in September 2003. So far, 103 countries have ratified the agreement. Although the biosafety protocol was pushed for by the South and drafted as a promise of legal protection *against* the introduction of GMOs, the weakness of its provisions means that the protocol and the national biosafety laws that have been born of it are being steadily turned into tools to facilitate the introduction of GMOs.

Green revolution: the name given to the agricultural modernisation programme that swept across the South, and Asia in particular, in the 1960s and 1970s. Initiated by Northern institutions and powered by the CGIAR, it encouraged countries to shift to monoculture farming dependent on chemical fertilisers and pesticides with the purported goal of increasing yields and agricultural profitability. The 'gene' revolution is merely the latest incarnation of the green revolution.

CONTROLLED CONDITIONS

The scientific method tells you that if you want to test the effects of any factor, you must keep all other conditions fixed. It also rules that any condition that changes must do so in a way that is measurable to the researcher. This is possible only if you work under so-called *"controlled conditions"*. To determine the effect of a fertiliser on crop yield, you must maintain a controlled and uniform level of water availability, a set distance between plants, uniform soil conditions, and so on. You also have to spread the fertiliser in such a way that every plant gets the same amount.

Any farmer will tell you that this is impossible. So, what do scientists do? They either create highly artificial conditions by using very small plots, or work in greenhouses or growth chambers, and/or compensate for irregularities by setting up conditions which are way over saturation levels. If the water permeates unevenly, then saturate the plot, even if it means wasting water. If you can´t spread fertiliser evenly, then use up to ten times what is needed, to ensure that every plant gets at least as much as it can handle.

"This means that research is done under conditions that no or very few farmers will be able to – or want to – reproduce, making the value of the research meaningless or extremely limited".

Any farmer will now tell you that it may be possible to farm this way, but it is very expensive, inefficient, wasteful and most often impractical. This means that research is done under conditions that no or very few farmers will be able to – or want to – reproduce, making the value of the research meaningless or extremely limited. But here comes the second part of the alchemy. Farmers are told that good farming implies creating the same conditions as those created by the researcher. The message is that if scientists fail to imitate real farming, then farmers have to imitate the lab. Never mind that on the way there, farmers destroy their soils, poison themselves, contaminate the environment, lose income, and – worst of all – become indebted and dependent. 'Controlled conditions' lead to controlled farmers.

Farming is by definition the art of dealing with the unpredictable. What scientists define as uncontrolled conditions are the web of relationships that make agriculture, productivity and sustainability possible. Sound research should learn about those relationships, not delete them.

HIGH YIELDING

For half a century, *"high yielding"* has been the catchphrase for many in the business of fighting hunger and poverty. The logic goes like this: We need to produce more food for more people around the world. With only so many more forests and savannas to plough, we need to increase yields on existing farmland. For this, we need scientists to breed high-yielding seed varieties for farmers. This is the rationale for the 'green' and 'gene' revolutions that have been pushed into farmers' fields over the past 40 years.

It seems so simple and straightforward, but a few salient questions show that things are not that simple. The first one is: what is *"high"*? Under which conditions do we get high yields, and with what consequences? The 'miracle varieties' of the green revolution were not inherently high yielding; rather they were highly responsive to chemical fertilisers. They were bred to produce more grain than traditional varieties and with shorter stems so that they didn't fall over with the extra weight they bore. But they were also more susceptible to pests and diseases, requiring heavy doses of pesticides. They also needed lots of water, and good soil. Without these conditions, there was nothing high yielding about them. And even under such conditions, the high yield was offset by the high cost of chemicals that ended up undermining the very productivity they were meant to promote.

The other question is: what is *"yield"*? An agronomist will tell you that yield is the number of kilos that you harvest from a hectare of a given crop. But from the perspective of many farmers, the answer is a much more complex. First, typical yield statistics only reflect the yield of the main produce. In the case of cereals, it's all about grain. But what about the straw that is so important to keep the soil in shape and the animals happy? And how valuable are all those extra kilos if they come at the price of decreased nutritional content and less taste? The yield factor gets even more skewed when you consider that most farmers in the world inter-crop. They might plant maize and beans together, harvest fruit from the trees in the field, collect weeds to weave baskets from, and grow vegetables and medicinal plants. The maize yield statistics of these farmers might be miserable, but there is plenty of food.

The simplistic and narrow 'high yield' approach ignores many complex productivity issues. Because of this, it undermines food production and food security by promoting monocultures and doing away with everything else that people use or eat.

IDENTITY PRESERVATION

Identity preservation is all the rage in multinational agribusiness circles these days, even though it has yet to make much of a dent in the agricultural and food systems outside North America. The term refers to a system of certification that keeps a crop of a certain variety segregated from other varieties from the farm to the consumer. Identity preservation systems are not organic certification systems; they are concerned with maintaining a 'pure' product, whereas organic certification is concerned with the farming process.

There are three major forces driving the growth of identity preservation systems. The first is the corporate restructuring in the agri-food industry. With the growing concentration and power of the retail food sector over the past few decades, other players are looking for ways to leverage themselves against the retail giants. Their main strategy for doing so is vertical integration (mergers and alliances) with upstream and downstream companies, based on the control of key proprietary technologies, such as seeds. The idea is to create supply chains, managed by a system of contracts at every stage of production.

The second driving force behind identity preservation is the popular rejection of GM crops. Food companies are interested in identity-preservation systems in North America because they offer a way to segregate GM and non-GM crops. But unlike the co-existence systems proposed in Europe, identity preservation systems put the added costs for segregation on the non-GM stream.

The third force is the seed industry. In a recent survey, seed industry leaders in Canada listed hybrid seeds and identity-preservation as the best ways of preventing farmers from saving seeds. When farmers enter an identity preservation system they must sign a contract that prevents them from saving their seeds. The seed industry also sees identity preservation as a way to extract downstream royalties. They imagine that one day food products will have to indicate the variety name and that consumers and food processors will have to pay royalties to them accordingly.

Identity preservation is being sold to farmers with promises of premiums and set prices. But the bigger picture is of more contract growing controlled by transnational corporations, further criminalisation of seedsaving, and GM-free food as a niche market exclusively for the very rich.

PARTICIPATORY RESEARCH

Behind the attractive epithet of *"participation"* usually lurks the all-too-familiar patterns of dominance and control shaped by the mantras of *"modern"* and *"progressive."*

The first questions we should ask in agricultural research are *"What for?"* and *"How?"* But these two central questions are almost always answered in research centres and most of the time 'participation' is limited to the execution of tasks already determined in other places, and to very limited aspects of the research. It is often reduced to an almost passive role of processing the analysis and evaluations of research undertaken by others. While it may start out with the best of intentions, participatory research often merely perpetuates old practices and power relationships that contribute nothing to communities' autonomy and food sovereignty.

Participation cannot be addressed without facing up to the question of power relationships between researchers and the community. Other prerequisites for participatory research are a clear intention from the community to take on the research, its involvement in determining what levels of external support are needed, and a leading role in formulating all the stages of the research process.

We must never forget that people all around the world have generated the immense biological diversity that nurtures and sustains us. Research is nothing new to farmers and communities – and their approaches have been much more participatory than anything on offer from today's technicians. Maybe the latter should start by learning about these practices to change the dynamics of current research.

Carinne Pionetti

Successful participatory research starts with communities, not from outside.

SOUND SCIENCE

When George W. Bush and members of his administration talk about environmental policy, the phrase *"sound science"* rarely goes unuttered. Sound science is the foundation of the US' risk assessment policy for genetically modified foods. So far, so good. Who can argue against sound science? Well, the EU, for one. A US State Department press release from March 2003 criticised the European Union for making decisions on agricultural biotechnology based on *"fear and conjecture, not science."* Fear maybe, but fear of US sound science more than fear of GM foods themselves. The EU finds more comfort in the precautionary principle than the US' less-than-reassuring murmurs about sound science.

Sound science is part of a growing lexicon used to put a pro-science veneer on policies that most of the scientific community tends to be up in arms about. It is a completely subjective term invoked to mean requiring an extremely high burden of proof before taking government action to protect public health and the environment. As such, it is not a scientific position at all.

A short history of the phrase *"sound science,"* and its development into a mantra of the political right, clearly demonstrates its anti-regulatory, pro-industry slant. Strategic uses by the business community trace back at least to Dow Chemical's 1983 launch of a $3 million program to allay fears of dioxin pollution that would use sound science to *"reassure"* the public - i.e., downplay risks. The term gained further repute in 1993 when tobacco giant Philip Morris created a non-profit front group called The Advancement of Sound Science Coalition to fight against the regulation of second hand smoke. Since then, many other industry groups have invoked sound science to ease government restrictions.

If the climate change debate is anything to go by, sound science means howling at a waning moon. In 2002, Republican congressional candidates in the US received a memo from strategist Frank Luntz telling them that *"The most important principle in any discussion of global warming is your commitment to sound science."* Most intriguing was what sound science actually meant to Luntz with respect to climate change. *"The scientific debate is closing but not yet closed,"* he said. *"There is still a window of opportunity to challenge the science."* What he was calling for was paralysis by analysis – to delay political action – and nothing to do with science at all.

SUBSTANTIAL EQUIVALENCE

Substantial equivalence is the subjective concept underlying the regulation of GM crops and food in the name of *"sound science."* In practice, it might be more appropriate to characterise the concept as: 'If it looks like a duck, walks like a duck, quacks like a duck and tastes like a duck, then it must be duck. But don't ask what it has been fed.'

The concept was first introduced in 1993 by the Organisation for Economic Cooperation and Development (OECD), and was endorsed by the FAO and World Health Organisation in 1996. The 1993 OECD document says that, *"The concept of substantial equivalence embodies the idea that existing organisms used as foods, or as a source of food, can be used as the basis for comparison when assessing the safety of human consumption of a food or food component that has been modified or is new."*

Behind the undefined concept of substantial equivalence lies the dilemma of the biotech industry when it was preparing to introduce GM crops and foods to farmers and the public. The industry needed its products to be regulated in order to gain public acceptance, but it did not want regulation to impede the marketing of its products. At the same time, it needed to establish the novelty of its products for patent purposes.

So instead of describing GM seeds and foods as such, the compliant regulators came up with the delightfully vague term, *"novel foods,"* to describe the products of genetic engineering. It is important to note that the assessment of these novel foods was of the product only. The process by which they were produced (and became *"novel"*) was conveniently ignored. In this way, genetic engineering became characterised as just a marginal extension of traditional genetic modification of plants, as plant breeding was renamed.

These novel foods could then easily be characterised as substantially equivalent to traditional foods because neither concept had any concrete definition and the questions that should have been raised by the genetic engineering process itself were not even asked. Thus the question of unintended side (pleiotropic) effects caused by the *process* of genetic engineering is simply ignored. This is topped off with the adamant refusal to label the products of genetic engineering, thus eliminating the possibility of identifying cause-and-effect if there are unexpected and deleterious effects.

All the companies had to do then was describe for the regulators the particular genetic trait they had added to the product submitted for approval on the discredited grounds that each gene is responsible for a single distinct trait (see the 'gene' discussion above). The companies simply had to characterise what they claimed to be the isolated gene for the desired trait, ignoring the essential genetic companions of the genetic trait itself; the vector (the insertion vehicle), the genetic switches and promoters, markers (genes for antibiotic resistance) and quite possibly other unidentified genetic material, such as viruses.

Quite apart from these huge oversights, even the rudimentary characterisation of the altered or added gene construct that is required has not always been honest or complete. In the case of recombinant Bovine Growth Hormone, Monsanto got approval for a construct which was not identical to its natural counterpart, differing by three amino acids. It was definitely not substantially equivalent, even by the regulatory authority's crude assessment. Monsanto also got approval for RR soybeans that were mischaracterised, as the company later admitted. The regulators simply took the company at its word when they declared the plants substantially equivalent.

Substantial equivalence is a very forgiving tool. Does it look and taste like a duck?

BIOTECHNOLOGY

A popular definition of biotechnology is "*any technique that uses living organisms or substances from these organisms to make or modify a product for a practical purpose*"[2]. This rather meaningless definition is so broad that it could even include agriculture itself. Usually the description carefully points out that this technology has been around for many millennia, ever since people started making bread and wine – this is important in making the term seem benign. It then continues with a long list of possible benefits biotechnology could deliver to farmers: raising yields, improving resistance to pests, diseases, drought and cold, and so on ….

The comment then follows that genetic engineering is just one technique in a whole toolbox of new and not-so-new biotechnologies that could help farmers, pointedly including conventional plant breeding. And the assurance follows (almost as an afterthought) that biotechnology complements other approaches to achieve a productive and sustainable agriculture, and a better living for poor farmers. Technology alone cannot solve hunger, it concludes, but we should use all the tools at our disposal. This definition is tidy, politically correct, and designed to keep everybody happy.

But this way of defining biotechnology does two things that confuse and mislead. On the one hand it buries the key concerns about genetic engineering and corporate control in a hazy heap of techniques and considerations – very cleverly used by those who stand to gain from this technology. And on the other hand, despite all the talk of toolboxes and choices, virtually the only kind of biotechnology being practiced and dumped on farmers worldwide is genetic engineering. Less than a handful giant corporations are pushing a handful of transgenic crops on farmers and consumers around the world.

Now that *"biotechnology"* has softened the image of genetic engineering, the term *"modern biotechnology"* has been establishing itself in the lexicon. The Cartagena Protocol on biosafety, for example, only addresses the products of modern biotechnology, by which it means only those techniques that overcome natural reproductive barriers and are not used in traditional breeding and selection, meaning genetic engineering and cell fusion. The hope of the GM lobby is that by using the term *"biotechnology"* we will view genetic engineering as merely a sophistication of the techniques developed thousands of years ago for wine and cheese making, instead of the crude, revolutionary and risky experiment that it is.

[2] FAO, *The State of Food and Agriculture 2003-2004: Agricultural biotechnology meeting the needs of the poor?*, FAO, Rome, 2004, p 8. www.fao.org/docrep/006/Y5160E/y5160e00.htm

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

ZACHARY MAKANYA

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".*

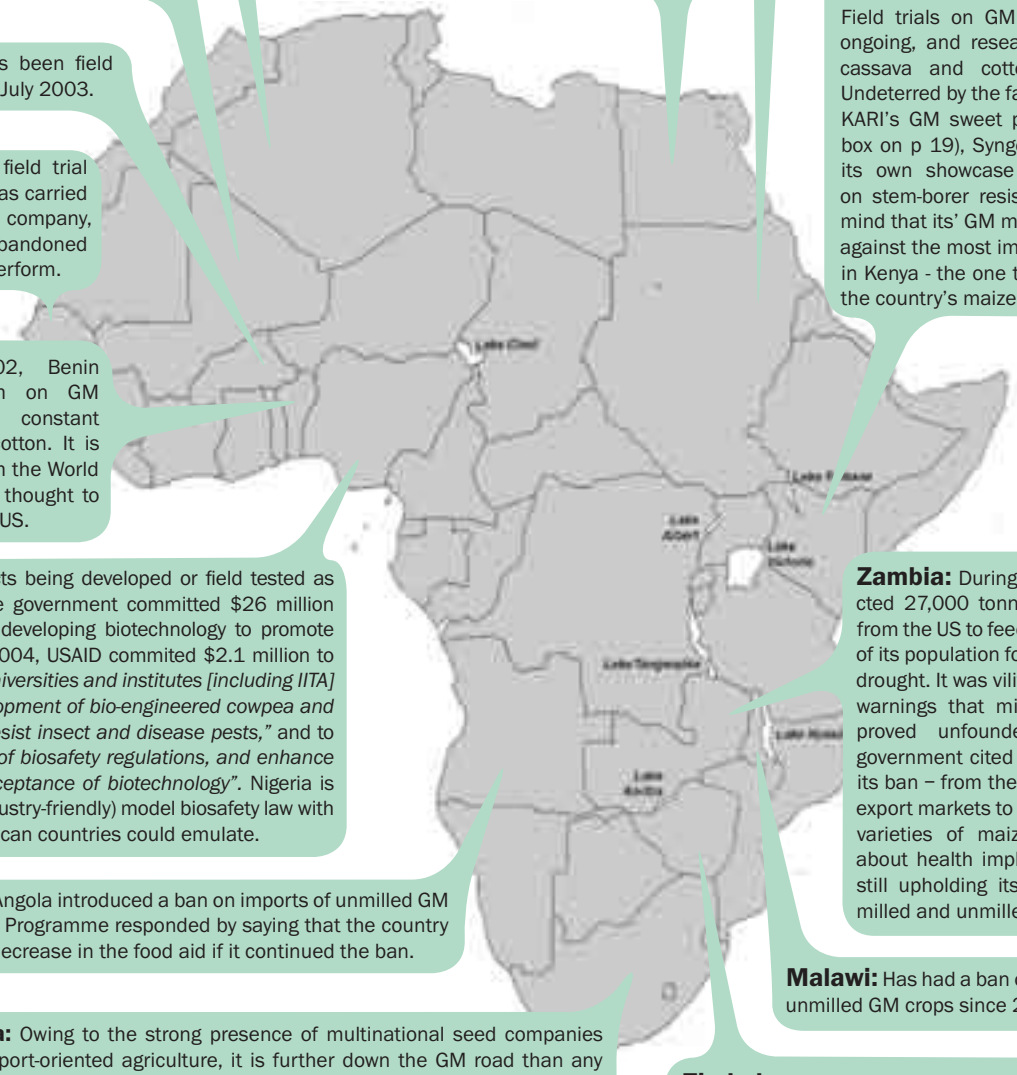
Egypt: Has a pro-GM policy developed with support from USAID. GM canola has been commercialised, and field trials are underway with GM melon, cucumber, maize, potato, squash, sugar cane, tomato, cotton and wheat. Many others are in experimental stage, including GM bananas being developed with ICARDA.

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.

Zachary Makanya works for the PELUM (Participatory Ecological Land Use Management) Association, a network of 170 NGOs in ten countries of East and Southern Africa: Kenya, Uganda, Tanzania, Rwanda, Zambia, Zimbabwe, Malawi, Lesotho, Bostwana and South Africa. PELUM helps to build the capacity of member organisations to work with small scale farmers to improve their livelihoods through ecological land use and management. PELUM is also involved in campaigning, advocacy and lobbying on policies and issues that affect the livelihoods of small scale farmers.

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.

Sprouting Up...

Hawaii's bold bid for a bioprospecting bill

GRAIN

The US – home of many of the world's biggest and brawniest biopirates – is the last place most people would expect to see drawing up bioprospecting legislation. But that is exactly what is going on in Hawaii. Because of its geographical isolation, Hawaii has a high level of unique biological diversity, which makes its lands, waters and indigenous peoples appealing targets for bioprospectors. The Hawaii Audubon Society states that of more than 22,000 known species on the islands, 8,850 are found nowhere else in the world.

This fact was not lost on Diversa, a US corporation involved in bioprospecting activities all over the world and its oceans, and it wasted no time in drawing up a bioprospecting agreement with the University of Hawaii in 2002. Under the agreement, Diversa was given exclusive rights to discoveries based on genes drawn from existing material collections at the university and from new samples isolated from ocean resources in the future.

This agreement, set against a backdrop of a legal vacuum regarding rights to biological resources in the state, prompted a number of native Hawaiian and other civil society organisations to push for legislation governing bioprospecting. The first bioprospecting bill, HB 2034, was passed by the House of Representatives on March 9, 2004. This Bill calls for a three-year prohibition on conveyance of rights, interests, and title to Hawaii's genetic resources on all public lands, to allow time to develop more permanent regulations. Parties pushing the bill were initially hoping for a full moratorium, but were relatively happy with the compromise agreed. While the bill wouldn't prohibit bioprospecting research or contracts, it would prevent the transfer of rights to those resources.

Meanwhile, the Senate was considering a different bill (SB643) in which the wording had been amended (under pressure from the University of Hawaii) to exempt the university from the prohibitions outlined in the house bill and to specifically exclude ocean resources from the definition of trust lands. According to Le`a Kanehe of the Native Hawaiian Legal Corporation, these changes make the bill completely ineffective, especially as the University of Hawaii is by far the biggest actor in the state with respect to bioprospecting. In early 2004, The House Water, Land and Hawaiian Affairs Committee removed these exemptions, but within one week, the Economic Development and Business Concerns Committee put them right back in.

This action was based on testimony from the agriculture industry that the bill would negatively impact on sales of genetically modified (GM) food crops, despite the fact that the bill has no impact on agricultural research or operations whose products are neither indigenous nor endemic to the state. Hawaii is viewed as something of a GM playground by industry, because its geographical isolation makes contamination less of an issue than in other places and because of its year-round growing cycle. The only GM crop that could be affected by the bill is taro, 300+ varieties of which are grown on the island. Research is being undertaken at the university on GM taro, and local groups are concerned about its impact on local varieties of this traditional staple. Native Hawaiian rights advocates who had spent many months successfully negotiating mutually agreeable language with the University of Hawaii in relation to the bioprospecting bill, were dismayed by the agriculture industry's power to influence the legislation.

Taro (Colocasia esculenta) being harvested from pond fields in Hawaii. Taro is thought to be one of the earliest domesticated crops, originating in Malaysia. It spread widely but has many secondary centres of diversity, Hawaii being an important one.

With no agreement between House and Senate, at the end of the legislative session, all that was agreed was to create a commission to review the issue of bioprospecting in the light of existing laws, and taking into account traditional and indigenous knowledge. But the House bill can be reintroduced next session and local groups are hoping that they will have sufficient influence to prevent the Diversa contract from being renewed by the University of Hawaii in 2005.

Main sources: Personal communication with Le`a Kanahe of the Native Hawaiian Legal Corporation; Jennifer Hamilton, "State sees 'green' in bioprospecting", *Pacific Business News*, May 7, 2004, http://pacific.bizjournals.com/pacific/stories/2004/05/10/story3.html; latest version of Senate Bill SB643: www.capitol.hawaii.gov/sessioncurrent/bills/sb643_hd3_.htm; and House Bill HB 2034: www.capitol.hawaii.gov/sessioncurrent/bills/HB2034_HD2_.htm.

Sprouting Up...

ICRISAT leads the charge to the private sector

Over the past few years, the only consistent message that has been coming out of the CGIAR is that its International Agricultural Research Centres (IARCs) need to take creative measures to keep themselves afloat. Declining public funding for agricultural research, increased private sector investment in the seed industry, the potential of the 'gene revolution' and the expansion of monopoly controls on genetic resources are all pushing them in this direction. Unfortunately, these 'creative' measures boil down to partnership with the private sector, which, since the development of genetically modified (GM) crops, has become much more interested in developing country seed markets.

None of the 16 IARCs has moved more boldly into the realm of *"private sector partnerships"* than the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the recent happenings at ICRISAT provide a telling picture of just where the IARCs are heading

As would be expected, the private sector's interest in partnering with ICRISAT revolves around hybrid seeds and GM crops. Thirteen seed companies are now involved with the hybrid sorghum programme and 16 with the pearl millet hybrid breeding programme that ICRISAT began in 2000. Companies like Advanta India, Mahyco-Monsanto, Proagro Seeds (Bayer), Syngenta India, Zuari Seeds, JK Agri-Genetics, Monsanto India and Mahindra Hybrid Seeds pay an annual fee of around Rs 2.5 lakh (US$5,000) per crop to participate in the programme and access the varieties developed. In 2003, ICRISAT launched a hybrid pigeonpea breeding programme with two seed companies, and in 2004 it intends to double the annual fees for all crops. ICRISAT has built up its technical capacity for GM research, and transgenic groundnut and pigeonpea are currently under field tests. Transgenic varieties of chickpea, pigeonpea and sorghum are in the pipeline, but nothing has yet been brought to market. As with its hybrid research, ICRISAT is embarking on a partnership strategy with the private sector to 'transfer' its GM technology to the poor.

In 2003, it looked like ICRISAT's ventures with the private sector in India might come apart when, in the run up to the CGIAR's annual meeting in Nairobi, there was talk of moving its headquarters to sub-Saharan Africa and closing down the Indian operations, where there is little justification for an IARC given the strong national agricultural system. ICRISAT's upper management resisted, and in the end they were able to water-down the proposal into a promise of *"programmatic improvement"* and to use the discussion to find support for a more pronounced shift towards biotech activities in Asia. ICRISAT's Director General, William Dar, told India's *Business Standard* that the new focus in Asia will be on *"re-engineering and expanding the institute's breeding program, while concentrating on the generation of biotech-assisted germplasm enhancement and new breeding methodologies."*

The centerpiece of ICRISAT's biotech plans for Asia is its new Agri-Science Park, which ICRISAT sees as part of its *"social marketing plan"*. This venture brings together an Agri-Biotech Park (part of the Andhra Pradesh government's Genome Valley Project); an Agri-Business Incubator, (where fledgling biotech companies can get advice and technical assistance) and a Hybrid Seed Consortium. The latter uses *"the vast genetic resources available in the ICRISAT genebank (currently 114,000 land races and varieties from more than 100 countries) to develop improved hybrid parents, with market and farmer-desired characteristics"*. The market might get a bit more say than the farmers in this since membership in the Consortium gives the companies five years of exclusive access to ICRISAT's hybrid parental lines, after which the lines are made available to non-members. Another new initiative is ICRISAT's foray into agri-ecotourism via the SAT Eco-venture. The rationale for this rather bizarre venture is that *"ICRISAT's research has made it an expert on the rich biodiversity in India's varied climatic regions, placing it in a prime position to educate nature lovers about the semi-arid environment including its wildlife"*. Hey ICRISAT, remember those farmers?

Private partners participating in the Agri-Biotech Park gain access to ICRISAT's researchers and biotechnology facilities as well as ICRISAT's intellectual property management office. ICRISAT has also set aside 200 acres of land that the companies can use for GM field trials. At present there are only two private partners: the

ICRISAT - in its own words

ICRISAT is headquartered in the State of Andhra Pradesh in southern India but, with centers in Mali, Zimbabwe, and Kenya, it also has a strong presence in Africa. It is mandated to work on five crops – sorghum, millet, groundnut, chickpea, and pigeonpea – that are particularly important to the semi-arid tropics of Asia and Africa. According to ICRISAT, its vision is *"'Science with a Human Face', tailoring research to address and resolve real human needs: to reduce poverty, hunger, and environmental degradation –across the semi-arid tropics of the world."* It describes itself as *"a bridge for technology and information sharing between developed and developing countries; a neutral broker in helping developing countries find fair ways and means for exchanges of technologies and related assets; and a catalyst in bringing partners together to take on major research thrusts and initiatives that none could have handled on their own."*

Seghal Foundation and Aquas. The Seghal Foundation is run by Suri Seghal, founder and CEO of the Indian seed corporation Proagro Group, until it was bought out by AgroEvo (now Bayer CropsSciences), while Aquas, a spin-off company of Bangalore-based Avesthagen, develops GMO testing kits.

The Agri-Business Incubator was set up in 2002 with $600,000 in funding over five years from the Indian Department of Science and Technology. To date there are two private-sector clients: Rusni Distilleries, which is collaborating with ICRISAT in generating fuel alcohol from ICRISAT sorghum varieties, and Bioseed Research India, a subsidiary of the DCM Shriram Group, which is working with ICRISAT to develop GM cotton hybrids. Under the agreement with Bioseed, ICRISAT will provide technology assistance for using molecular markers, gene marker identification and genetic transformation and will provide Bioseed with access to ICRISAT's greenhouses, biotech labs and agricultural land for field tests.

ICRISAT thinks that with the Agri-Science Park it can kill two birds with one stone: finance its biotech research and deliver products to small farmers. It describes the Agri-Science Park as its *"technology commercialisation arm":* using private partnerships to bring the center's research to the market where small farmers can access it (by paying for it!). The logic is summed up in Dar's enthusiastic message to the delegates of BioAsia 2004 (the biotech industry's Asian get-together): *"Hitch your venture to the Agri-Science Park at ICRISAT! It is a place where agricultural innovations, partnerships and products for the poor converge."*

Chinna Narsamma, DDS

ICRISAT has about 36,000 accessions (samples) of sorghum varieties developed by farmers in its collection.

It is clear that this focus on private partnerships is now directing ICRISAT's research agenda. ICRISAT is working on those technologies that interest the private sector (hybrid seeds and GM crops) for areas of India where there is a strong private seed sector. The cotton collaboration with Bioseed shows that ICRISAT is even willing to take on research into crops that are not within its mandate if this rakes in additional funding.

ICRISAT appears to understand that the link between these projects and the needs of poor farmers is weak, so it has churned up other justifications. The public is told that partnerships with the private sector are necessary to meet funding needs, build-up biotechnology capacity in developing countries and generate jobs. The 'capacity-building' argument is nothing new. From the start of the CGIAR more than 30 years ago, the IARCs were supposed to focus on building national agricultural research capacity so that they could fade away over a few decades. Yet, as national public agricultural research continues its steady but imbalanced decline around the world, ICRISAT refuses to fade away even where the national agricultural research system is strong (India) and from an area of agricultural research (biotechnology) that is clearly over-invested when compared with other areas. As to job creation, since when is livelihood security for scientists and entrepreneurs part of the mission statement of the CGIAR?

There's no doubt where ICRISAT's new agenda for Asia will lead. The big corporations will swallow up India's nascent agricultural biotech sector and hybrid seed industry as soon as it shows any potential, as has happened elsewhere. ICRISAT is really just helping to feed the multinationals, not the hungry.

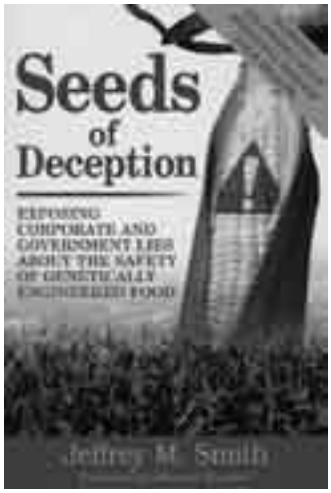
Sources: "Conventional breeding: ICRISAT plans biotech-aided crop improvement group," *The Hindu Business Line*, July 18, 2003; "First Person: William D Dar, ICRISAT – In the cause of poor," *The Business Standard,* December 10, 2003; "ICRISAT not to shift HQ from India: CGIAR meet in Nairobi puts an end to speculation," November 6, 2003; "ICRISAT scouts for private sector players in biotech," *Business Standard,* Feb 28 2004; William Dar, Presentation at BioAsia 2004, available at: www.agri-sciencepark-at-icrisat.org/default.htm; "Agri biotech park at ICRISAT," *Business Standard*, December 11, 2003

Seeds of Deception

Exposing corporate and government lies about the safety of genetically engineered food

by Jeffrey Smith

Green Books, UK, 256 pp.



We are told that eating genetically modified (GM) food is safe. Even amongst organisations and individuals campaigning against the planting of GM crops, there is little talk about the health implications of eating GM food because in these early years of GM releases, there has been little evidence that campaigners could call on (no coincidence). And yet, if it became clear that GM food does pose a danger to human health, that would be the end of it. Why is there so little information about the health implications of eating GM crops? Because there are no problems? Because the evidence is being sat on? Because no one has bothered to look?

Jeffrey Smith answers these questions and many more in his new book, *Seeds of Deception.* This book is easy to read, flowing effortlessly through seemingly well researched stories. It isn't sensationalist: it doesn't need to be. Although some of the stories about animals choosing not to eat GM products appear a little implausible, overall the evidence holds together very well. The main focus of the book is the US. But for our many *Seedling* readers this will be an important reference as it is the same US endorsement of GM products that is being used for the continuing planting of GM crops around the world.

At the heart of the book lie several recurring themes:

- The US Food and Drug Administration (FDA), the agency which controls the release of GM crops, is fraudulent and weak.
- Biotech corporations interfere in the regulatory process and use corruption to meet their aims.
- There is strong scientific evidence to show that GM can be dangerous.

The first chapter *Suppressing the evidence,* is the remarkable and well known story about Arpad Pusztai and his GM potatoes. After discovering a link between GM potatoes and a damaged immune system in rats in 1998, Pusztai was forced to retire by his institution, and his findings were suppressed. What is so frightening about this story is the obvious political interference both from high level politicians and 'eminent' scientists. Smith also tries to explain just why such institutions and individuals are so quick to condemn evidence like Pusztai's. The answers all point to money and the struggles scientists face in attempting to do unbiased research.

The second chapter asks "*What could go wrong?*" Although this chapter is scientifically accurate it is also easy to read and understand. Smith describes a number of aspects of GM technology which clearly show that GM food is potentially very dangerous. GM technology is a clumsy process and based on the false premise that one gene generates one unique protein (see p11). Now that we know there are under a third of the number of genes that there should be for this to be true, we havee been forced to recognise that one gene makes a variable number of proteins, sometimes several thousand. So inserting a gene may also lead to the creation of other foreign proteins, which will have many possible consequences. Smith discusses in details the role of spliceosomes, add-on molecules, chaperone proteins, insertion carcinogenesis, horizontal gene transfer, antibiotic resistance, where the gene is exactly located, gene silencing, environmental influences (which turn genes on and off), the use of promoters (forcing a gene to stay on all the time), sleeping viruses, and many other phenomena.

Smith examines the use of the recombinant (GM) bovine growth hormone (rBGH) which can increase milk production by up to 15%. The evaluation of rBGH by the FDA was a farce and rBGH was approved for commercial release in 1994. It is only after ten years of unofficial 'testing' on the public that the real health impact of rBGH is starting to leak out, and it looks like Monsanto (which has already cut production dramatically) may drop rBGH production altogether.

What is striking in this chapter is industry's heavy influence on the FDA (and also Health Canada - the Canadian equivalent). Scientists have been "*threatened, harassed, and denied promotions in retaliation*" for their work. Even farmers who sign pledges not to use rBGH have been threatened with legal action by Monsanto, which argues that labelling products as rBGH-free would *"deceive consumers"* by suggesting that one kind of milk is safer than another.

... cont'd on p 28

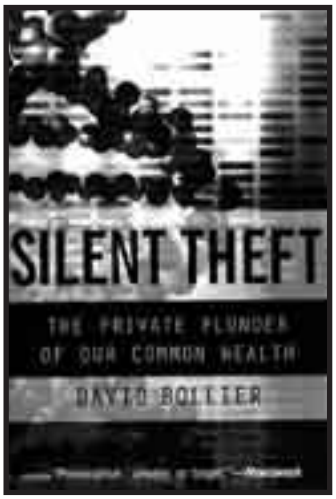
Silent Theft:

The Private Plunder of our Common Wealth

by David Bollier

Routledge, 2003, 272 pp.

reviewed by Brewster Kneen



"The leaves, the roots, the trunk, the orchard, and the ecosystem? It is our Western conceit to focus on the apple." - David Bollier

Little by little the ground we stand on – or thought we were standing on, both tangibly and intangibly – is being stolen from us, fenced off, and converted into private property. Under the corporate regime of market and trade, the elements of our environment, long taken for granted as being *public domain,* are being commodified and privatised. Ownership claims litter the countryside, the air-waves and even the 'genetic' codes of living organisms, seeds and software. They pollute forest tracts and arctic wilderness. Yet so mesmerised are North Americans with 'property rights' that we focus only on the apple: who owns it, its genes and its brand, and how it is marketed, while we ignore, or remain ignorant of, the wider context that makes the apple possible.

In *Silent Theft* David Bollier presents a highly readable and comprehensive (but far from exhaustive) survey of the broad and deep realm of public domain and of the contemporary processes of privatisation. He comments that the process of stealing the public wealth has gone so far, and so deceitfully, that *"we no longer see the commons, and thus no longer understand its meaning."*

Why the theft of public property goes largely unchallenged is a question that implicitly and explicitly pervades the book. Bollier's answer to this question lies in the individualism and materialism of the people of the United States to whom his book is clearly addressed: *"We are so accustomed to thinking about the individual and so focussed on 'property' as tangible things owned by individuals – this is* mine *– that we have trouble understanding some of the most important wealth we own is collective and social in character."*

The remedy, says Bollier, lies in developing *"a new language of the commons,"* and he uses the word *commons* to denote what James Boyle refers to as the *public domain*[1]. I much prefer *public domain* as I think it suggests a much broader range of possible ways of organising 'ownership' than does the word *commons*[2]. This distinction, which Bollier does not seem to recognise sufficiently, is a significant shortcoming of the book. On the other hand, I can understand why Bollier might want to simplify the argument for the sake of gaining a wider audience.

Clearly it is Bollier's hope that readers preoccupied with property and markets might be led to recognise that even in their own daily lives there are, in fact, experiences of exchange and relationship that defy the logic of the market. To do this he develops the notion of *"gift economy"*, giving rightful credit to Lewis Hyde[3]. Bollier's expression of a gift economy is less poetic than Hyde's: *"A market-dominated society is not likely to cultivate the sense of trust and shared commitments that any functioning society must have."* The point, of course, is that a market-dominated society ceases to exist as a society. The competitive individualism that is the foundation of the western notion of market, coupled with the dogma that everything can be owned, excludes the possibility of trust and shared commitment, to say nothing of gratitude. To the contrary, the acquisitiveness required by The Market mandates a corrosive dissatisfaction: there can never be enough.

"Because of the bonding power of gifts and the detached nature of commodity exchange, gifts have become associated with community and with being obliged to others, while commodities are associated with alienation and freedom. . . It seems no misnomer that we have called those nations known for their commodities 'the free world.' The phrase doesn't seem to refer to political freedoms; it indicates that the dominant form of exchange in these lands does not bind the individual in any way." (Hyde, pp 66-7)

As Bollier comments, *"Participants in the commons do not have a compulsion to produce and consume ever-growing quantities of output in order to sate culturally defined 'scarcities.' Social stability and interdependence are more urgent priorities."* (p.186)

Bollier has clearly set out to reach people who suffer a narrow and highly ideological social context and must be gently led to see that there is more to the world – even their own daily lives – than can

be contained within the notion of private property and market relations. In doing so, Bollier does an admirable job of illustrating just how much of 'American' life, culture and economic activity is now, in effect, consuming itself, along with the 'natural resources' upon which it relies, in a frenzy of privatising the commons. Bollier devotes a good half of *Silent Theft* to a survey of a variety of stolen public goods ranging from water, coal, minerals and other mining products, oil, forests and rangelands, to publicly funded military and university research, to airwaves (radio, TV internet), civic spaces and culture sold off (or appropriated) as commercial advertising vehicles.

To make his argument, Bollier goes so far as to describe generic drugs (off-patent, identified by composition not brand) as a commons in comparison with the patent (brand name) drug industry. I'm afraid this creates more confusion than sound argument, since both generic and patent drug industries are corporate in structure and dedicated more to profit than public good. This becomes quite obvious when the commercial drug industry, both proprietary and generic, is compared to traditional medicinals and healing practices, but then Bollier is writing entirely within the dominant culture of North America, not the diverse cultures within North America, much less worldwide, and this is one of my primary criticisms of the book. There are a multitude of non-commercial, non-ownership commons to be found throughout the world. On the other hand, the major imperial and colonising power in the world is the US, and the rest of the world cannot rest until the US understands itself as one society among many, not the model for the rest to follow.

I would argue that 'commons' refers to specific and limited-access public good responsibility/use regimes, while 'public domain' should refer to much broader unlimited access responsibility/use regimes. (Bollier introduces the helpful term *"social practice"* in reference to the management of unowned common assets.) Thus a well-defined coastal fishery or *ejido* farming community could be identified as a commons while a national park or a highway would be identified as public domain. However, at this time the public culture of North America is so far from being able to recognise the necessity and vast richness and diversity of what has historically constituted the public domain, that a start has to be made somewhere on reconstituting and language and validity of the public domain. As it is now, *"According to natural-rights traditionalists, there is private property (sole ownership) and there is commons (open access) and not much else in between."*

It is time to acknowledge that there are a wide variety of foundational myths upon which diverse communities and societies base their social practice. The primacy of individual property rights (corporate or personal) is the exception, not the rule. Bollier has provided a useful introduction to this major social issue for North Americans – as well as for other cultures struggling for survival in the face of the American Monoculture.

Footnotes

[1] "The Second Enclosure Movement and the Construction of the Public Domain", *Law and Contemporary Problems,* Vol 66, Nos. 1/2, 2003, www.law.duke.edu/jounals/66LCPBoyle; see also, James Boyle, *Shamans, Softwares, & Spleens – Law and the Construction of the Information Society*, Harvard Uni. Press, 1996.

[2] See Brewster Kneen, "Redefining 'Property': Private property, the commons and the public domain", *Seedling* January 2004, p 1, www.grain.org/seedling/?id=258

[3] Lewis Hyde, *The Gift – Imagination and the Erotic Life of Property*, Vintage, 1979, 1983.

Price: £17.99 hardback
Web: www.tandf.co.uk/books/
Email: book.orders@tandf.co.uk
Tel: +44 1264 343071
Fax: +44 1264 343005
Mail: Taylor & Francis, ITPS, Cheriton House, North Way, Andover, Hants, SP10 5BE, UK.

Also available online from Amazon, Barnes and Noble and others.

... a web of lies (from p 24)

The depressing corruption that permeates the FDA and its policies on GM foods is an ongoing theme. Smith brings the story down to individuals working in the FDA and their association with industry and highlights several examples of the FDA supporting biotech applications for new GM crops and products.

This book is about the US (and a little on its puppet state, the UK), but is of paramount importance to countries all around the world. The endorsement of a GM product by the US heavily influences others, usually to the tune of '*We are all eating it, so why can't you?*' Read this book and stop GM entering your country by rejecting US assertions that GM food is safe.

For more information, go to www.seedsofdeception.com

Available from Green Books for £9.95 paperback:
Web: www.greenbooks.co.uk/seeds.htm
Email: sales@greenbooks.co.uk
Tel: +44 1803 863260
Fax: + 44 1803 863843
Mail: Foxhole, Dartington, Totnes, Devon TQ9 6EB, UK.

GRAIN in Africa: building bridges and providing support

Africa's NGOs and farmers' organisations are increasingly looking at the local and sustainable management of biodiversity as a central element in the daily struggle for survival of rural communities in this region. Traditionally, the discussion on biodiversity in Africa was largely focused on parks and wildlife. This is changing, and now the importance of biodiversity-based agriculture and the central role of local communities in its management is increasingly recognised. However at the same time the region is being pushed to become the dumping ground of the genetic engineering industry with the argument that GM crops will help to feed this hungry continent.

It is in this conflicting environment that GRAIN's presence in Africa aims to help civil society organisations deal with the issues and promote local management and control over biodiversity. In this extremely large, diverse and complex region, we are doing that in a variety of ways.

Since 2000, GRAIN has been working with Jeanne Zoundjihékpon (right) from Benin to strengthen action and networking across Francophone Africa. As a researcher and policy maker, Jeanne has a longstanding involvement in the biodiversity discussion in the region. Initially as the regional coordinator of GRAIN's 'Growing Diversity' project in West Africa, and later as a staff member, Jeanne's main task is to help strengthen civil society action in the region. She produces a monthly newsletter *'Semences de la biodiversité',* organises meetings, supports NGOs and farmers' groups, and organises direct action to influence regional policy.

Recently GRAIN linked up with the regional NGO INADES–Formation to launch a coalition for the protection of the African genetic heritage in Francophone Africa, an advocacy and networking group that could be the embryo of sustained action across the region. In February this year, GRAIN rang the alarm bell when we received information that biotechnology companies were pressuring Mali and other countries in the region to open the floodgate for transgenic cotton (www.grain.org/briefings/?id=184). Later this year, we plan to launch educational kits on genetically modified organisms (GMOs) and on community rights for use by NGOs and farmers' organisations across the region.

In Anglophone Africa, GRAIN has oriented its work mostly towards supporting and strengthening the African Biodiversity Network (ABN). This young network focuses on a number of thematic issue areas, such as fighting the imposition of GMOs, promoting seed security in the hands of small farmers, reevaluating the cultural aspects of biodiversity and promoting legislation on community rights and biosafety. Henk Hobbelink, GRAIN's coordinator, helps to coordinate the network. With support of the ABN, coalitions fighting GMOs have been formed in Kenya and South Africa, and seed security networks in Zambia, Malawi and South Africa. Annual strategy meetings are held to build cohesion and strength across the network.

Lovemore Simwanda (right) of the Zambian National Farmers Union is on GRAIN's Board of Directors. His farmers' union was centrally involved in the debate in Zambia in 2002 that led to the country rejecting GMO food aid. He is concerned that farmers should have access to locally adapted seed, which forms the basis of seed security. Another GRAIN Board member very active in Africa is Bob Brac. Bob is director of the Montpellier-based NGO Bédé, and has been busy promoting biodiversity discussion in North and West Africa.

Everybody with experience of working in Africa will agree that communication, networking and continued active collaboration is extremely difficult to sustain in the region. But at GRAIN we believe that we can only make a lasting contribution through the patient building of such collaboration and strengthening information exchange. After all, over millennia farmers in Africa have developed a highly diverse and productive agriculture precisely through the creation of seed exchange networks and collaborative local knowledge systems. The successful future of Africa's agriculture lies in building on these seeds and further strengthening those knowledge systems.