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Hungry Corporations:

Transnational Biotech Companies Colonise the Food Chain

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Chapter 8:

Opening Up the South

The end is control. To properly understand the means one must first understand the end. A farmer who doesn't borrow money and plants his own seed is difficult to control because he can feed himself and his neighbours. He doesn't have to depend on a banker or a politician in a distant city. While farmers in America today are little more than tenants serving corporate and banking interests, the rural Third World farmer has remained relatively out of the loop – until now.[1]

As the tables that follow show clearly, most GM crops to date have been planted in the North, primarily the US. Argentina is the only country in the South that grows them on a large scale; GM soya has been grown there since 1996. China is growing Bt cotton commercially, and a comparatively small amount of tobacco. However, the push into the South is beginning to accelerate. As noted earlier, 60 per cent of Indian farmers, 80 per cent of farmers in the Philippines and 90 per cent of African farmers still save their own seed. In Africa, small farmers are fundamental to food security at household level, both saving and breeding their own seed. Most of the smallest farmers are women. The green revolution never really reached them and their use of inputs has remained small. Capturing new constituencies and markets is an essential part of corporate strategies. The millions of small subsistence farmers in the South who rely on farm-saved seed and do not use agrochemicals are seen as a largely untapped market with massive potential. Critics have often noted that GM agriculture does not address the real needs of the South and the companies recognise that they need to adapt their presentations accordingly, in order to find ways to reach this important constituency. Not surprisingly, considering that its traits are in 91 per cent of the GM crops planted worldwide, Monsanto is at the forefront of this search. Pioneer also features strongly, a reminder of the agreement in 2002 between Monsanto and DuPont, owner of Pioneer, to share their technologies for mutual benefit. With combined seed sales of $3.5 billion out of total commercial seed sales of $30 billion for 2001 (see Chapter 4), they are also the biggest seed players.

In order to progress, the companies are looking for allies and networks they can use, such as the CNFA (see pp. 126–9). It is also important to influence the governments and institutions (such as universities and extension services) of countries in the global South, so that their funding and activities can support the foundations, the Syngenta Foundation and the Novartis Foundation, while Monsanto has the Monsanto Fund; these 'non-profit' arms can help to broker and fund projects with universities and research institutions in both North and South.

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Farmers may have no money to purchase company products: micro-credit schemes can help here, by providing loans, collecting debts and helping to link the farmers into industrial agriculture networks. Moreover, credit schemes can be linked to the use of GM technology, so there is a potential captive market here. Monsanto's proposed partnership with the Grameen Bank may have been prevented, but the intention is clear. Extension services provide a ready-made network for promoting products packaged with shiny presentations.

As will be shown in this chapter, the corporations, in particular Monsanto, have made good use of existing institutions such as micro-credit agencies, rural extension networks and development aid to reach into this uncharted territory. Talking about Monsanto's strategy, the World Bank commented explicitly that 'many of these transactions were designed specifically to help the company move more rapidly into emerging markets'.[2] The overseas development agencies of the different Northern governments, especially the US government, provide plenty of support. The World Bank and the World Trade Organisation, backed by the US government in particular, are promoting the drive towards the harmonisation of laws that facilitate the activities of the corporations, such as intellectual property rights or investment and biosafety regimes. Disasters, meanwhile – whether floods, droughts or famines – provide an opportunity to unload subsidised US agricultural produce on stricken countries. This destroys local markets, weakening local economies and undermining self-reliance.

The importance of reaching women is a recurring theme. Monsanto, for example, promises that its technologies will benefit women in developing countries, because they will need to do less weeding and spraying. They can spend more time with their children, while girls will have more time for education. Increased productivity will provide women with surpluses to sell and improve their quality of life.[3] It is difficult for audiences in the developed world to respond critically to such persuasive arguments, especially if they lack experience of the lives of women in the Third World. Microcredit schemes have also targeted women, who have been shown to be reliable payers of their debts, even though interest is often set at high levels.

The corporations wish to ensure they control the technologies they introduce, using 'growers' contracts' where appropriate patent legislation is not yet in place. Several corporations have been continuing with the development and introduction of technologies to control the germination of seeds or the expression of traits. These genetic use restriction technologies or GURTs, such as the Terminator and Traitor technologies, were first developed to increase company profits by preventing seed saving and restricting access to the genetically engineered characteristics, so as to gain more from emerging markets.

This chapter presents some particular cases, with a case study on Argentina, a section on GM aid in Africa, and a look at the underlying GM strategy for Africa, using Uganda as an example. There is also a section on conservation tillage, used to promote herbicides, plus two cases of resistance to Monsanto's attempts to force its products into the key countries, India and Brazil.

8.1 GM crops worldwide

The tables which follow show in which countries GM crops were planted in 2001 and 2002 and in what quantity; they also show which GM crops were grown and their share of the total hectares planted with that type of crop. What shows up most clearly is that the vast majority (66 per cent in 2002) are planted in the USA and that GM soybeans formed by far the largest proportion of the GM crops planted.

Table 8.1: Countries planting GM crops in 2001 and 2002

Rank	Country	million ha		as % of world GM crops		annual growth rate	
		2001	2002	2001	2002	2001	2002
1	USA	35.7	39.0	68	66	18%	9%
2	Argentina	11.8	13.5	22	23	18%	14%
3	Canada	3.2	3.5	6	6	6%	9%
4	China	1.5	2.1	3	4	300%	40%
5	South Africa	0.2	0.3				50%
	TOTAL	52.4	58.4	99	99		

based on ISAAA figures

While looking at these figures, it helps to remember that Monsanto dominated massively, with 91 per cent of GM crops carrying its patented traits, representing 48 million out of a total of 52.4 million hectares in 2001.[4] In 2002, GM soybeans used mostly for animal feed constituted more than half the world total for the first time. GM corn remains a fairly small percentage of the global crop total and most of the increase for 2002 took place in the US.

8.2 Agricultural research and development

Agricultural R&D as it is known today has its roots in the public agricultural 'experiment stations' of the 1800s, set up by agricultural societies in various European countries to explore science-based solutions to agricultural problems. Over time such stations were spread through the South by the process of colonisation. Indeed they were an essential part of ensuring that the colonies developed food supplies (plus new consumer commodities such as coffee, tea, chocolate, sugar, etc.) for their colonising countries.

However, countries that were the object of this process were not always receptive:

> To overcome the biases against the development and diffusion of agricultural technologies among developing countries, agricultural research that was internationally conceived and funded began in the mid-1940s. It expanded through the 1950s as the Ford and Rockefeller Foundations placed agricultural staff in less-developed countries to work alongside scientists in national research organizations on joint-venture research.[5]

The international agricultural research centres (IARCs, see Chapter 5) are part of this development and were central to spreading green revolution technologies and high-bred crop varieties in the South, thus eliminating local systems of farmer innovation, varieties, and knowledge in many regions.

Whilst the level of publicly funded agricultural R&D in the North was already at $7.1 billion in 1976, the South was at $4.7 billion and yet to increase its investment. As detailed in the International Food Policy Research

Table 8.2: GM crop areas and percentages (of total crop and total GM planted globally) in 2001 and 2002

Crop	Land planted globally with crop (m ha)	Land planted with GM		GM crop as % of world crop		GM crop as % of total GM	
		2001	2002	2001	2001	2001	2002
Soy beans	72	33.3	36.5	46	51	63	62
Cotton	34	6.8	6.8	20	20	13	12
Canola	25	2.75	3.00	11	12	5	5
Corn	140	9.8	12.4	7	9	19	21
TOTAL	271	52.65	58.7	19	21.6	100	100

based on ISAAA figures

Table 8.3: Traits expressed by GM crops planted worldwide for 2001 and 2002 as areas and percentages

Trait	Percentage		Land use (million ha)	
	2001	2002	2001	2002
herbicide tolerance	77	75	40.6	44.2
Bt – toxin (insect resistance)	15	17	7.8	10.1
stacked genes: herbicide tolerance & Bt-toxin	8	8	4.2	4.4

Institute (IFPRI) report in 2001, between 1976 and 1995 global public expenditure on agricultural research and development nearly doubled from about $11.8 to $21.7 billion a year:[6] $10.2 billion of this was spent in the North and $11.5 billion in the South. However, during the 1990s, growth in global public expenditure slowed drastically to 2 per cent. By 1996 China still reported a growth of 5.5 per cent, yet Africa's budget was actually shrinking by 0.2 per cent annually and the North stagnated to near zero. In each region expenditure was dominated by a few countries: in the North, by the US, Japan, France and Germany, and in the South by China, India and Brazil.

The amount available to the Consultative Group for International Agricultural Research (CGIAR) system has also been on the decline, representing just 1.5 per cent of the 1995 global public-sector agricultural research spending.

By the mid-1990s, the private sector was spending about $11 billion on agricultural research and development, roughly equal to half the global public sector spending on agricultural R&D, and 94 per cent of the private sector budget was spent in the North. Private expenditure tends to be less farm-focused and more focused on machinery, post-harvest research, food and food processing. There is also a strong focus on chemicals, as most herbicides and insecticides have been developed by the private sector. During the 1990s, 40 per cent of private research expenditure in the UK and US has gone into chemicals, while in Germany it is up to 75 per cent. Plant breeding and veterinary and pharmaceutical research have become increasingly important as well. Private research outputs are generally more suited to capital-intensive, value-added farming. They are no substitute for publicly funded research.

Productive research tends to be cumulative, with people building on previous findings to create a growing stock of knowledge. In Africa, for example, wars have many times disrupted research and infra-structure profoundly. Now the rush for intellectual property is helping to interfere with the accumulation of knowledge by blocking the exchange of information. Complicated labyrinths of patent protection may have to be negotiated in order to access vital knowledge, for which licences may have to be obtained. 'Moreover, the needs of industry are yet to be properly reconciled with the rights of indigenous people and poor farmers who maintained many of the landraces on which today's improved varieties depend.'[7] Even though patents may not yet be obtainable in many countries, databases of knowledge may increasingly require fees for access. With current pressure to extend patenting regimes rapidly to the South, we may also be faced with a 'tragedy of the anti-commons', caused when too many individuals have rights of exclusion in a scarce resource.

It seems therefore that not only is public agricultural research in decline, but that agricultural research itself is becoming increasingly removed from and irrelevant to those closest to the soil, those who are still working as farmer breeders, continuing to innovate as they have always done, developing and maintaining living knowledge and seed stock on which we all depend and which we risk losing at our peril. Some would say, in fact, that the effect of agricultural R&D and its promotion has largely been to destroy the existing innovation systems and knowledge of farmers, making the latter dependent on outside actors.[8]

Much could be achieved through developing more publicly funded collaborative research led by farmers, something which has been called for constantly by critics of the CGIAR and by NGOs such as MASIPAG and SIBAT in the Philippines, which actually practise it.

8.3 Promoting technology to farmers

Rural extension work was developed as a service offered by governments on aspects of farming. Like agricultural research and development initiatives, its beginnings can be traced to colonialism and it was instrumental in the promotion and spread of the green revolution. All too often, rural extension work involved people from the North, trained in college rather than on the land, teaching farmers with far more experience than themselves. Increasingly around the world, corporate-funded foundations, NGOs and companies are privatising the formerly publicly funded rural extension networks. The public funding often came from Northern donors like the World Bank or USAID, who now encourage and support privatisation and collaboration with corporations – as in Uganda, for example.[9]

Privatisation of rural extension work systems provides companies with a perfect opportunity to promote their products to farmers, who thus become familiar with their brands and may begin to trust them. In this way a new cycle of dependency begins. It is difficult for farmers who have once adopted new seeds and inputs to return to their former methods, and farmer varieties quickly disappear if they are not maintained.

Trial seeds or pesticides may be issued free at first to attract farmers. Credit may be offered on condition that farmers use certain products. Companies may work with local credit facilities to tie in their packages with

credit given (see below, pp. 196–9). Slick presentation by the companies of modern technologies in shiny packaging, promoted with videos, helps to convince farmers that the companies have superior knowledge, especially when the confidence of farmers in their own knowledge and calling has been undermined and they have been made to feel outdated and out of touch. Presenting the farmer with only herbicides at first (glyphosate or glufosinate, for example) lays the ground for introducing GM herbicide- resistant seed later. It has been alleged in India and Thailand that farmers have been given GM seed to try without being told what it is.

Monsanto's *Sustainability Report 1999–2000* shows how the corporations operate, revealing the links between the different players and the central involvement of the Sasakawa–Global 2000 Programme (SG 2000, see below, pp. 194–5):

> The primary classroom is the demonstration plot. Extension workers enlist farmers who agree to provide labour and a piece of their land for an 'experiment'. Farmers gain a realistic idea of what labour and costs the new technology entails. They almost invariably harvest two to three times the yield they formerly enjoyed at less cost and labour. Farm families in the area are invited to field days and the ideas and technology are taken up by more smallholders every year. Then SG2000 moves on. During the last 14 years SG 2000 has helped national extension personnel and small-scale farmers to establish 600,000 demonstration plots in more than a dozen African countries.[10]

This section looks at some of the different entities involved, including company foundations, and one example of a government using taxpayers' money to assist a corporation.

Monsanto and PEACE

In June 1999 Monsanto announced that it would jointly develop rural initiatives with generic pesticide manufacturer Rallis, which operates local promotion agencies – the Pesticide Efficacy Advisory Centres (PEACE) – throughout India. According to Agrow, the agrochemical industry analysts, 'the company will provide technical inputs, farm management training and other services to improve farm productivity and incomes'.[11]

As noted above, this kind of practice provides a vehicle for the introduction of GM by promoting herbicides as precursors of herbicide-resistant seeds, which can be added later.

Zeneca

Zeneca (now Syngenta) has a similar programme to promote the use of pesticides widely.

> Zeneca's 'Farmer Education and Training Team' has developed cartoon comic papers for distribution in schools under the title of the 'Adventures of the Grow Safely Team'. Children learn to link pesticides and agriculture and are unlikely to receive balanced material on participatory-IPM [Integrated Pest Management], organic and other ecological approaches.[12]

Once again, this is a scenario which leads readily to the promotion of GM technology.

The Novartis Foundation for Sustainable Development (NFSD)

Before spinning off its agribusiness in November 2000, Novartis was keen to point out that it was 'more than a typical Life Science company'.[13] One of the ways it differentiates itself from the others is through the Novartis Foundation for Sustainable Development. 'Development cooperation is not a vehicle for public relations,' the website stresses, 'it is difficult work that demands long-term commitment.'

The NFSD is a development organisation funded entirely by Novartis which 'supports efforts made by poor people themselves to satisfy their basic needs'.[14] But critics say that the company has little interest in serious reform to meet the needs of poor people and that the new image has only been superimposed on existing activities. In such circumstances it is always important to ask who decides and who designs the projects. Are the local people in control of what happens? Do local people or the company benefit most from these activities?

One project organised by the NFSD is a centre for the training and education of small farmers in Negros, the Philippines. The project was initiated in 1995 by an organisation called Provincial Advocates for Sustainable Agricultural Development (PASAD) to assist farmers to break out of dependency on large landowners, food companies and chemical farming. Another is an agricultural extension service in Laos. The Novartis Foundation is at pains to point out that there is no commercial link between Novartis and the NFSD. Since October 2001 many of these agricultural projects have been moved to the Syngenta Foundation for Sustainable Agriculture (see below), including the goal to support poor people in their efforts to survive.

The executive director of the Foundation, Professor Klaus M. Leisinger, is one of Novartis's main spokespersons for biotechnology. He argues that sustainable agriculture is not possible without what he refers to as 'green biotechnology', and he accuses the

movement against genetic engineering, which he refers to as 'bio-McCarthyism', of delaying nutritional improvements that could save thousands of lives.[15] Before joining the Foundation in 1990, Klaus M. Leisinger was the manager of Ciba Pharmaceuticals in East Africa and thereafter the head of the Department of Relations with Developing Countries at Ciba in Basel.[16]

The Syngenta Foundation for Sustainable Agriculture

The Syngenta Foundation was officially launched on 12 October 2001, with Klaus Leisinger as interim executive director in addition to his position at the Novartis Foundation. Its stated goals are very similar if not identical to the agricultural programme section of the Novartis Foundation for Sustainable Development. AgBioWorld reported:

> In his presentation at the founding ceremony, Dr David Evans, Head of Research & Technology at Syngenta, underscored the role of modern technology in agriculture: 'With sustainable agriculture as the framework, research and development can help developing countries control pests and fight plant diseases while increasing yields and improving crops. In addition to selling its products, Syngenta is making available at no cost a number of innovative technologies to subsistence farmers.[17]

The foundation has three African projects: insect-resistant maize in Kenya; millet and sorghum improvement in Mali; and land and resource management in Eritrea.

Syngenta and IRMA: Bt maize for Africa

The Kenya project, Insect-Resistant Maize for Africa (IRMA), involves working on maize genetically engineered to resist the attacks of the corn borer by expressing a version of bacterial Bt toxin. It brings together CIMMYT(the International Maize and Wheat Improvement Centre, with headquarters in Mexico and 17 branches in developing countries, including Kenya), KARI (the Kenyan Agricultural Research Institute) and the Syngenta Foundation, which is providing the financial support for the project. CIMMYT is providing expertise and training to KARI in genetic engineering technology. The project aims to introduce insect-resistant maize and avoid the problem of rapid development of resistance to Bt toxin among maize pests by designing appropriate refuges (places where non-Bt maize is planted). Intercropping with other useful non-GM plants which also are host to or attract maize pests is regarded as the most acceptable form of refuge for small farmers. There are, however, non-GM methods of combating the corn-borer which Syngenta does not fund. These include growing napier grass around the field to attract the pest away from the crop, and intercropping *Desmodium* with the maize to repel it. *Desmodium* is a nitrogen fixer and suppresses the parasitic witchweed, while all the plants are good fodder.

Syngenta Foundation and public–private partnerships

The Foundation's Mali project provides further evidence of how its activity benefits Syngenta agribusiness. The United Nation's International Fund for Agricultural Development (IFAD) sees poverty eradication as linked to economic growth. It provides loans to more than 100 governments for projects providing 'economic opportunities for rural dwellers' and sees its role as promoting equitable partnerships between smallholders and agribusiness.

According to Nikolaus Schultze – coordinator of private sector and capital markets operations at IFAD – Mali presented a case where small farmers lacked access to adapted seeds and seed treatment packages. As stated on their website, the Syngenta Foundation helped to:

> convince the Syngenta-agribusiness to participate in our programme. This led us to engage in a public–private partnership that has proved fruitful for all partners and stakeholders involved: Syngenta-agribusiness, the Syngenta Foundation for Sustainable Agriculture, IFAD, and ultimately the smallholders the Fund supports through its projects.

From this one can see how the Syngenta Foundation works with Syngenta's agribusiness operation and how all the players are facilitating access to poor farmers for agribusiness, providing new markets for the latter which it would be difficult to reach without considerable expense.

Borrowing the points made by the opposition

Klaus Leisinger is at pains to state that biotechnology cannot solve problems without social and political reform but he sees it as an important tool and wants it to reach the poorest. Certainly, judging from this website, the initial, almost evangelical fervour in promoting GM crops has been moderated and some of the points put forward by development organisations and others sceptical of the benefits of GM have been adopted and incorporated into the language. All the information above was publicly available on the Foundation's website in June 2002.[18]

Monsanto Fund

> *'We must be the change we wish to see in the world' – Gandhi.*
>
> Monsanto Fund website.[19]

Founded in 1964, the Fund has four main areas of activity, which it calls: Agricultural Abundance, the Environment, Science Education and Our Communities. Its operating principles include the phrase 'Be humbled by and appreciative of our responsibility.'

Through the Agricultural Abundance programme, Monsanto aims to increase yields and nutritional values through improved technologies. It also aims to create partnerships among the private, public and academic sectors and it focuses on extension work and training.

Under the heading 'One of the projects that makes us proud' it gives a brief description of the Buhle Farmers' Academy, Delmas, South Africa, and says that small farmers are trained there in commercial and technical farming skills. In addition the Fund focuses on environmental and science education for young people in the US.

Sasakawa–Global 2000 Programme (SG 2000)

In 1985, the late Japanese philanthropist and billionaire Rioichi Sasakawa sponsored a workshop in Geneva to assess the possibilities of introducing the green revolution into Africa. The Sasakawa Africa Association (SAA) was registered as a non-profit, tax-exempt organisation in Geneva in 1986. At about the same time, former US president Jimmy Carter offered to engage national leaders in discussion of critical economic and agricultural policy issues. Subsequently SAA and Global 2000, a programme of the Carter Center in Atlanta, combined forces to form a partner-ship called Sasakawa–Global (SG) 2000. Since 1986 the Sasakawa Africa Association (SAA) has supported agricultural extension work, while Global 2000 provides information about the latest technologies and methods. Monsanto has cooperated with SG 2000 since the early 1990s, and in 2000 actively supported programmes in Ghana, Ethiopia, Tanzania, Malawi and Mozambique.[20]

SG 2000 works mainly with and through ministries of agriculture in Southern countries, primarily with national extension services, but also with national agricultural research systems (NARSs) and IARCs. Its main means of communication with farmers is through field demonstration programmes for small-scale farmers to introduce new food crop production and post- harvest technology.

According to the website in 2001, Ghana, the Sudan and Ethiopia have adopted the Global 2000 approach. There are now projects in Benin, Nigeria, Tanzania and Togo. Most recently, SG 2000 has been invited to begin work in Burkina Faso, Eritrea, Guinea, Mali, Mozambique and Uganda.[21]

The SG 2000 programme is funded by the Sasakawa and Nippon Foundations (the latter also founded by Ryoichi Sasakawa). The Nippon Foundation is proud to announce that it gets its revenues from the profits of legalised gambling on motorboat racing.[22]

Norman Borlaug is senior consultant for SG 2000 (see pp. 72–3).

SG 2000 Agribusiness Forum

SG 2000 has established relations with a number of major transnational agribusinesses to encourage increased investments in project countries. Beyond assisting at the policy level, they also collaborate at the grassroots level in various enterprise development activities. As seen in Table 8.4, all collaborating corporations focus on 'input dealer development'.

Winrock International

In 1985 the Winrock International Livestock Research and Training Center, founded by Arkansas governor Winthrop Rockefeller, merged with the Agricultural Development Council, founded by John D. Rockefeller and the International Agricultural Development Service, to form the Winrock International Institute for Agricultural Development.

Winrock International is a 'private non-profit' organisation which works in over 40 Southern countries with farmers, local organisations, research

Table 8.4: SG 2000 Collaborators

Corporation	SG 2000 Development activity
Monsanto	conservation tillage
Novartis	crop protection
Norsk Hydro	fertiliser
Cargill	field crop seeds, agro-processing
Seminis	vegetable seeds, market development
Pioneer Hi-Bred International	field crop seeds

and educational institutions, and policy makers to 'improve agricultural productivity, sustainability, and income in developing countries'.[23] Its stated focus is to promote new farm technologies and improved seed varieties, and to create market-driven agriculture, especially post-harvesting processing, to add value and create public–private partnerships.

Monsanto is working as a partner with Winrock International in small- holder projects that promote the use of conservation tillage practices in Senegal, Mali, Ivory Coast and Indonesia. These partnerships include co-operation by Monsanto in Winrock's On-Farm Agricultural Resources Management (ONFARM) programme to help move selected parts of Africa and Indonesia from subsistence to market-driven agriculture. In 1998 Monsanto gave $225,000 for a four-year project promoting conservation tillage using glyphosate-based herbicide (see pp. 217–20) in West Africa and $300,000 to promoting conservation tillage in Indonesia.[24]

Winrock International board members include corporate stalwarts like Whitney MacMillan, former chief executive and chairperson of Cargill Inc.

Canadian Development Aid to Monsanto in China

In 1998 the Canadian government approved more than $280,000 to promote GM crops directly to farmers in China. Over objections from some government officials, including Canada's embassy in Beijing, the Canadian International Development Agency (CIDA) is funding rural extension work to encourage farmers to grow Monsanto's GM cotton and corn.[25] The Canadian government is thus actually funding a corporate rural extension programme that will help Monsanto reach new constituencies and gain profits. The Toronto Star reported in February 2001:

> 'The goal of the project is to be able to conclusively demonstrate to the government of China the production benefits derived by applying Bt cotton and weed control technologies, in combination with other management technologies,' states CIDA's project management report.
>
> 'The company (Monsanto) put $280,000 in goods and services into the project and was expected to invest another $20 million in a campaign to promote its biotechnology in China if the project proves successful,' another CIDA document states.[26]

The project is continuing under the sponsorship of Monsanto and IMC Global, an international mining, fertiliser and animal feed producer that operates potash mines in Saskatchewan, Canada, through a subsidiary, IMC Kalium.

8.4 Micro-credit agencies

> *Monsanto sees micro-credit ... as a way to develop new markets by helping the people in those markets participate in economic development.*
>
> Monsanto, Sustainability Report 1997 [27]

Micro-credit is commonly defined as the extension of small loans to entrepreneurs, especially women, too poor to qualify for traditional bank loans. Rather than being based on collateral, it is based on mutual trust that these loans will be repaid. Muhammad Yunus, who founded the Grameen Bank in Bangladesh in the mid-1970s, pioneered this idea of micro-credit.[28] The Grameen Foundation website states:

> The Grameen Bank was started in Bangladesh in 1976 as an action-research project that attempted to provide tiny loans to very poor people to allow them to start 'micro-businesses'. Twenty-five years later, Grameen Bank has 2.4 million borrowers, 94 per cent of whom are women, and has loaned more than $3.7 billion in amounts averaging less than $200.[29]

At the Micro-credit Summit held in February 1997 in Washington and opened by Hillary Clinton, a campaign was launched to globalise the micro-credit movement. More than 2,900 people from 137 countries met to found this nine-year campaign to provide small loans to 100 million of the world's poorest families by the year 2005. According to interim reports, 13.8 million 'poor clients' had already been served by the year 2000. Monsanto's website carried the following message about the Micro-credit Summit campaign in December 2002:

> The people of Monsanto are proud to participate in the Micro-credit Summit Campaign, a nine-year effort to reach 100 million of the world's poorest families, especially the women of those families, with credit for self-employment and other financial and business services, by the year 2005.... The solutions developed and offered to smallholder farmers are often a package of existing commercial technologies, including improved seeds, biotechnology traits where approved and applicable, conservation tillage practices, crop protection products and other inputs, as well as training and technical assistance.[30]

Monsanto's collaboration with micro-credit agencies is part of a deliberate plan announced in its 1997 Sustainability Report, which stated that it would have micro-credit operations in all the world's regions by the end of 1998. Monsanto has been for some years chair of the Council of Corporations for the Micro-credit Summit Campaign. The Grameen Bank and Muhammad Yunus are also involved in this project.

Whilst the schemes are praised by the North as the way forward to alleviate poverty, those affected by micro-credits do not always agree. Farida Akhter of UBINIG (Policy Research for Development Alternatives, Bangladesh) called it the 'women's indebtedness programme' and stated in a speech in Jakarta in 2000:

> The major development support that the poor people, mainly the poor women can receive today is Micro-Credit. It is seen as the solution for poverty. It has a magic capacity that the poor can be indebted and then they can overcome poverty. The impression that is given is that there is no need to develop the health sector, education facilities, or any other social support system for the poor; micro-credit alone can solve all the problems. While, since the 1970s, the Third World governments are failing to pay back the loans and increasingly becoming defaulters, the poor were lauded for their disciplined submission to the rule of credit money, that is the financial capital mediated through development agencies and the banks 'for the poor' like Grameen. Money circulated through the poor communities self-expanded often to 130 per cent, appropriating the remaining resources of poor in the form of interest. Indebting poor has become the new game of development and swept the development discourse and the practice.[31]

Monsanto and the Grameen Bank in Bangladesh

In June 1998, the Grameen Bank and Monsanto announced an unlikely alliance. Monsanto was offering US$150,000 to help set up the Grameen Monsanto Centre for Environmentally Friendly Technologies. This was intended to offer Bangladeshi farmers soft loans to buy hybrid seeds (including hybrid rice and cotton, both important crops for Bangladesh) and agrochemicals including Monsanto's own proprietary herbicides and. Other projects were to include demonstration farms and conservation techniques. Monsanto noted at the time that Bangladesh lacked the regulatory procedures adequate for the introduction of GM seeds.[32]

Grameen's alliance with Monsanto triggered an international wave of protest, initiated by women in the South. For example Vandana Shiva of the Research Foundation for Science, Technology and Ecology, India, stated in an open letter to Mohammad Yunus, President of the Grameen Bank:

> The micro-credit scheme linked to the Grameen Monsanto centre will create markets for Monsanto's products, not the products based on the creativity of Bangladesh peasants. They will not build on the skills and knowledge and resources which women of Bangladesh have; they will wipe out their knowledge and resources and destroy their livelihoods and food security.
>
> Monsanto's skills in agriculture are in the field of genetically engineered crops. These crops are designed to use more agrichemicals like Round-up which is a broad spectrum herbicide that kills anything green. Your micro-credit venture with Monsanto will directly finance the destruction of the green vegetables that women collect from the fields. Round-up also has negative impacts on fish which provide 80 per cent of the animal protein in Bangladesh.[33]

After worldwide protest, Grameen withdrew from the project.

Micro-credit and the enforced introduction of new technologies

The introduction of (F1) hybrid seed into Bangladesh is intimately connected to micro-credit. After the 1998 floods, private companies were for the first time allowed to import rice seed as part of the government's post-flood rehabilitation programme. Advance Chemical Industries Ltd (ACI) took the opportunity and imported Indian hybrid rice (Aalok 6201) from Hybrid Rice International, a subsidiary of Proagro owned by Aventis (now Bayer). Without informing farmers that they could not save seeds, ACI together with the Bangladesh Rural Advancement Committee (BRAC) – a large micro-credit agency – put the seeds on the market. Farhad Mazhar of UBINIG commented:

> Micro-credit is the only way that hybrid seed can be sold in countries like Bangladesh .... Immediately after the flood, BRAC aggressively promoted Aalok 6201 .... Farmers had to accept credit and pay very high interest, but at the same time had to accept the proprietary technology of ACI.[34]

8.5 Binding the farmer to the corporation

Growers' contracts

There are also more direct means of securing farmer dependence. Patent laws and contractual agreements can be marshalled to dictate practice to farmers, above all to prevent them from saving seed. In the US, Canada and, more recently, South Africa, Monsanto uses growers' contracts with its RoundUp Ready seeds. These agreements stipulate that farmers who save and re-use the harvested seed the following season will face potentially unlimited costs and fines. Farmers also agree to Monsanto sampling their crop to ensure that they are not violating the contract or the patent. Furthermore, the company may dictate most steps in the farming process and even control where the farmer sells the crop. The farmer generally has to pay a technology fee on top of the seed price.

By 1999 Monsanto had already accused 600 farmers in the US and Canada of violating its patents, even stating in advertisements that it was investigating farmers for saving seeds. It has since brought a number of cases against farmers, the most famous being that against Percy Schmeiser. However, the companies still have to maintain vigilance in order to prevent 'illegal' seed saving. Monsanto even hired detectives from the Pinkerton Agency to help with the task. In the South, where the biotech companies are now establishing themselves, surveillance would be far more difficult, due to poor communications, greater resistance and the sheer size of the problem: 1.4 billion people in the South depend on saved seed for their food.

Moreover, many developing countries do not yet have patent laws in place that allow the companies to punish seed saving. Faced by this difficulty, they may use growers' agreements, or (see Argentina case study below, pp. 203–6), they may be content to charge a technology fee, but still allow farmers to use, save and re-use GM seed, since this introduces the farmers to the company, ensures widespread use of the technology, promotes use of products such as herbicides, and begins to establish dependency – especially since farmers' own varieties and independence are rapidly lost once they begin to use the company's products. However, the corporations are developing another means of protecting their property – a technology built into the seed itself to prevent seed saving.

Terminator technology – technology protection system

> *The goal of the Terminator technology is 'to increase the value of proprietary seed owned by US seed companies and to open up new markets in Second and Third World countries'.*
>
> Willard Phelps, USDA spokesperson

> *My main interest is the protection of American technology. Our mission is to protect US agriculture, and to make us competitive in the face of foreign competition. Without this [patent] there is no way of protecting the technology.*
>
> M. J. Oliver, USDA, primary inventor of the Terminator technology

To deal with the threat of seed saving to company profits, the US Department of Agriculture (USDA) and the US seed company Delta and Pine Land developed and patented a technology protection system(US patent 5723765, 3 March 1998). It is designed so that if the farmer replants harvested seed, the seed will not germinate. This technology was rapidly nicknamed Terminator technology and the seeds 'suicide seeds' because they effectively commit suicide by producing a toxin when the germination process begins.[35] The Vice-President, Technology Transfer, Delta and Pine Land Company stated:

> Benefits include protecting the environment from gene escapes into other plant species; maintaining the integrity of refugia acres by eliminating the planting of saved seed and protecting the technology provider's investment against free use of technology. Protection systems help insure that individuals and companies developing new traits and technologies for commercial varieties have the ability to earn a fair return on their investment.[36]

There was a tremendous public outcry all around the world against the technology, so Monsanto and (Astra)Zeneca (holding Terminator patents WO9403619 and AU 687008) publicly vowed in 1999 not to commercialise Terminator seeds, and Monsanto still maintains this is its pledge (see Monsanto website). Governments and civil society organisations were thus lulled into thinking that the crisis had passed, but companies see the potential benefits for industry as too valuable to let go. So companies have continued to acquire Terminator patents. Syngenta holds eight patents, two of which were acquired by Novartis and five by Zeneca, the latest dated 26 March 2002. Delta and Pine Land gained two in 1999, after its initial patent in 1998. DuPont owns two terminator patents and BASF and Monsanto hold one each.[37] As Harry Collins of Delta and Pine Land said in January 2000,

> We've continued right on with work on the Technology Protection System [Terminator]. We never really slowed down. We're on target, moving ahead to commercialise it. We never really backed off.[38]

Could Terminator seed soon be on the market?

In August 2001 USDA announced that it had licensed Terminator technology to Delta and Pine Land after working with the company to develop the subject of its licence. USDA experienced internal opposition to issuing the licence, yet persisted. It claimed that use with heritage flower and vegetable seeds will be forbidden and that no plant on the market before 2003 would be engineered with the technology.[39]

Its attempt to justify the use of the technology includes the claim that it will prevent gene flow from GM plants. This line was also used by Delta and Pine Land (see quote above) and in the UK by the Royal Society and the Advisory Committee on Releases to the Environment (ACRE). However, scientists question whether Terminator technology will necessarily eliminate gene flow, especially as this would demand 100 per cent effectiveness and gene stability. Even if this could be achieved, it would not counterbalance all the potential threats to agricultural biodiversity and the broader environment, human health and food security. The consequences simply cannot be predicted from the current knowledge base.

Traitor technology

This is a variation on Terminator, designed to produce seeds that require the application of proprietary chemicals to 'switch on' desirable characteristics such as drought tolerance, salt tolerance, toxin production for pest resistance, and production of pharmaceuticals, or to 'switch off' undesirable ones, such as the production of allergens. The official name for this technology is 'genetic use restriction technologies' or GURTs. Chemical switches proposed and tested to date have included the plant hormone and gas ethylene (C 2H4) and the antibiotic tetracycline. Parts of a Traitor switching mechanism have been tested in the UK at Zeneca's Jealotts Hill Centre. 'Desirable characteristics' may prove more difficult to develop than the switches, and switch mechanisms may prove to be unreliable and unstable.

However, genetically engineered 'Traitor coffee', designed to make all the berries on the bush ripen simultaneously with the spraying of ethylene, to enable the mechanical harvesting of all the coffee beans at one time, is already being developed. Production costs would fall, leading to even lower market prices and potentially out-competing those who could not afford the technology. It would inevitably encourage large-scale monocultures of open field varieties as opposed to shade varieties grown under trees in mixed plots, which is the pattern more often followed by the smaller farmer. If allowed to continue, this could effectively mean the final destruction of the small coffee producer in Africa, Asia and South America, already suffering from the collapsing world price of coffee, and would put even more control into the hands of the large coffee companies.[40]

Perhaps most threatening are the patents on Traitor technology which relate to plants with compromised immune systems, said to be developed for research purposes, to examine the effects of pathogens. The spread of such traits to staple crops could cause a major disaster. Syngenta (Novartis) holds three such patents, DuPont one.

8.6 Lack of choice for farmers

> *We have always been under the gun of the multinational corporation. We are forced to get seeds from the two biggest seed companies .... Any arrangement where the farmer is not given a choice is bound to fail.*
>
> Philippine Agriculture Secretary, Salvador Escudero, 1996 [41]

Consolidation of the seed industry ultimately means lack of choice for the farmer. As seed companies phase out certain varieties, farmers who rely on purchasing seed could eventually find themselves with no choice but to buy hybrids or patented GM varieties.

Corn in South-east Asia

After rice, corn is South-east Asia's most important crop. For 12 million Filipinos, corn is a staple food, and in Indonesia more than 80 per cent of the crop goes to feed the country's people. Yet corn is increasingly being reduced to an animal feed crop which is either exported to the North or used to respond to the increase in meat and dairy product consumption and the globalisation of Asian diets. Only a handful of companies control almost 70 per cent of the hybrid corn seed market in South-east Asia. With the acquisition of Cargill Seeds International (excluding its US division) and DeKalb by Monsanto, only two companies – Monsanto and Pioneer – are, in effect, in control.[42]

GM corn will boost this process of corporate takeover. Corn is the subject of more biotech R&D and patent applications than any other crop.

> The majority of patents on transgenic corn are held by a handful of major US companies. Half of the 333 biotechnology patents granted or applied for on corn worldwide can be traced to only six of the world's agrochemical giants. Not surprisingly,

the top three (DuPont–Pioneer, Monsanto and Novartis) are also the top three companies controlling the seed trade worldwide. Some of the patent claims are very broad and sweeping and have been the subject of legal disputes.[43]

By 2002, genetically engineered Bt corn as well as herbicide-tolerant corn were already at various stages of testing in Indonesia, the Philippines and Thailand. Companies are determined to reach full market deployment of GM corn in South-east Asia as soon as possible, thereby securing an important market for their genetically modified products at a time when there is opposition to these in Europe. In December 2002 Monsanto's GM YieldGard 'Corn Borer' corn was approved for planting in the Philippines.[44]

8.7 Argentina: the cost of complying with US pressure

Soya is not bringing wealth to Argentina. 'We are being occupied by the seed multinationals that have patented life and are forcing us to pay tribute to them,' says Jorge Eduardo Rulli, one of Argentina's leading agronomists. 'The more we produce the poorer we become.'[45]

Argentina was long held up as a model of compliance with IMF and World Bank regimes – until its economy went into meltdown, resulting in a popular revolt at the end of 2001. Argentina also showed itself a model of compliance with US policy on genetically engineered crops and has been for some time the second largest GM crop producer in the world, after the US (see Table 8.1, p. 187). Argentina was encouraged to focus on large-scale export agriculture to boost its economy and service its debt.

GM comes to Argentina

In the 1980s, demand for grains and oil seeds rose while the profit from raising cattle declined, which led Argentine farmers to abandon their mixed farming in favour of permanent crop cultivation systems.

This was more lucrative since the production of soybean in rotation with wheat, maize or sunflower allowed three harvests every two years. Fences were removed and facilities for cattle dismantled to allow larger areas to be cultivated.[46]

A familiar pattern asserted itself, with farms growing larger and the smaller farmers abandoning or leasing out their land to contractors. 'In the heart of the soybean production area, north-west of Buenos Aires, half of the cultivated area is already managed by contractor holdings.'[47] It is estimated that some 7,000 farming families left the land each year. Millions of acres of land were put up for auction by the banks.[48]

Soil fertility soon began to decline and no-till farming was introduced (see ConTill, pp. 217–20). This involved the use of glyphosate to clear weeds instead of ploughing. It was but a short step from this to glyphosate- tolerant crops such as Monsanto's RoundUp Ready soya, introduced in 1996. The contractors found these methods suited their large-scale operations. In 1995, Monsanto's application for a patent on the RoundUp gene had been rejected by the Argentine national patent office. Plants cannot be patented under Argentine law. This means that Monsanto cannot protect its property with contracts, fines and court cases as in the USA. Furthermore, it had to cut the price of its seed in Argentina, which aroused some resentment among farmers in the USA, fearful of competition from Argentinian soybeans.[49] However, the factors protested by US farmers helped to get the crop massively established in Argentina, and Monsanto also benefited from the increased sales of glyphosate (up 250 per cent in two years – from 28 million litres in 1997/8 to 58 million litres in 1998/9 and 70 million in 1999/2000, much of it sprayed from the air).

By 2000, roughly 90 per cent of the soybeans (some 20 million acres) grown in Argentina were genetically engineered. Most of this soy was destined for export. GM maize (corn) and Bt cotton were also increasing, while RoundUp Ready cotton was expected soon. Official statistics reveal that some 12,000 acres of GM trials were held in 1999, including vegetables, cereals and fibres.[50] Nearly all (90 per cent) of the GM trials and all of the GM crops were introduced from outside Argentina. The country was used from early on as an off-season site for testing GM crops. Recently, the number of authorisations fell, perhaps in response to news of resistance to GM crops elsewhere.[51]

As GM crops took hold, smaller farmers found themselves caught in further traps. The price of soy began to fall on international markets, yet the price of loans increased. Once in financial difficulties, farmers could not recover, because the financial margins were too tight. On the way to the bottom, some farmers resorted to taking credit from agricultural input companies, to which packages of GM seed and inputs were often tied.

Furthermore, yields were not as good as had been promised. At the International Forum on Globalisation and Family Farmers and the Third Assembly of the RIAD (Red Interamericana de Democracia/

Interamerican Network on Democracy) in Rio Grande do Sul, Brazil (4–10 July 2000), a representative from Argentina said there were growing rumours that GE soya yields were 10–15 per cent lower than the conventional yields and that the use of glyphosate was already having to be intensified, with stronger formulations also being required. This has since been confirmed by reports, one of which cites the rise of herbicide-resistant weeds as the cause.[52] It has also been confirmed by comparative experiments in the US that there is a yield drag of 5–10 per cent between RoundUp Ready soybeans and conventional cultivars.[53]

No public participation in decision making

The situation for obtaining consents for field testing or marketing of GM crops in Argentina resembles that in some East European countries. There are no civil society organisations represented on the GM commission. The commission consists largely of scientists, most of whom also work for the companies. Approvals have been granted on the basis of substantial equivalence (see p. 164). There has been no attempt to inform consumers or to have a national debate on the issue of GM and its impacts on human health, the environment and society.

Desperate times in Argentina

In December 2001 (around the same time as the popular revolt in Argentina) it was reported that the country was joining the US in bullying other countries to drop plans for moratoria, strict labelling and other measures to delay or prevent the introduction of GE crops. Bolivia had been planning a moratorium but dropped the idea in October, allegedly under pressure from Argentina.[54] Perhaps desperate Argentina had been bullied in its turn.

One result of the collapse of the economy was that Argentina's farmers planted more and more soy, because the tremendous squeeze on credit meant that they needed to find a crop with lower production costs. Conservation tillage methods mean that one farmer could farm a larger area alone, hence saving labour costs, but also depriving people of jobs. Production of sunflower and corn have fallen while soy, of which 90 per cent is said to be GM, covered 43 per cent of Argentina's farmland in 2002.[55] Lower yields and falling market returns have caused the area of cultivation to be extended, at the expense of indigenous forest – the mountain rainforest region of the Yungas in the north of Argentina – echoing developments in Brazil, where the fragile Cerrado forest is also being destroyed, often for soya, although not of the GM variety.[56]

Argentina's over-reliance on a single crop leaves it with little flexibility in its time of crisis and undermines food security in the country. Food prices have risen steeply, and deaths from hunger were reported in November 2002 among children in the north of the country. Lack of other food supplies, fear of food riots and difficulties with exporting GM soya led the government to devise programmes (such as 'Soya Solidarity') to feed its people soya, most of which is GM, originally destined for export as animal feed. Since it is not a food Argentinians normally eat, they had to be given directions as to how to use it and had no choice over whether to eat GM food. This is the first time soybeans have been consumed directly by human beings in such large quantities. Normally soya is fed to animals, or else, as in China, fermented or precipitated before consumption. Argentinians, it seems, are being subjected to a massive food experiment.

Rebuilding self-reliance

The wide adoption of GM soya has therefore accelerated the loss of food sovereignty, and of food and livelihood security, so increasing dependency. However, there is some cause for optimism in Argentina. People have started to create their own food gardens, most recently in the centre of Buenos Aires itself. By mid-2002, there were said to be some 450,000 of these huertas or gardens in the country, providing some food for about 2.5 million people, and the number is growing. These projects are mostly urban, however, and it is essential to get small farmers back on to the land, producing a diversity of food crops, and setting up seed banks, for the sake of future food security. As the gardens have spread, so the movement has become more political and is now strongly allied with Kick Them Out, which played a major part in the events of December 2001. With high unemployment, rocketing food prices and economic turbulence, some are looking to their own skills, energy and capacity to negotiate a way forward.

> Both the neighbourhood assemblies and the unemployed groups put a strong emphasis on the autonomy that the huertas allow them to achieve from the government. They also emphasise the huertas' cooperative, self-managed nature. The most radicalised participants go one step further. They see the vegetable gardens as an embryonic form of organisation for a new society based on the principles of self-sufficiency and community-based direct democracy.[57]

8.8 Preparing the ground for GM

Flood, famine, collapsing economies and wars all offer corporations opportunities to introduce their seeds, agrochemicals and other products to countries in the South, both directly and through NGOs or UN bodies such as the World Food Programme. Such assistance may sometimes be given free, but often has to be paid for, either directly or indirectly.

Economic crisis in Indonesia

In Indonesia, Monsanto's subsidiary PT Monagro Kimia used the economic crisis and crop failures to introduce its products to farmers. At a September1998 ceremony to inaugurate its upgraded factory, Monagro donated 20 tons of Polaris herbicide (glyphosate) and $20,000 cash to the Minister of Agriculture to distribute to farmers.[58] In July 1999 it donated five tons of its C-5 hybrid maize seeds (not GM) and one ton of Polaris to Indonesian rice farmers who had lost crops to pest outbreaks. The July donation was followed by an announcement in August that the company was installing a factory for hybrid maize seed that would be capable of producing 3,000 tons of seed per year.[59]

This is an example of how companies use a disaster or crisis to gain entry and also how they give their products away at first to encourage farmers to begin using them. The hybrid seed and glyphosate formed part of a typical intensive agriculture package. From there it is a short step to the introduction of GM seed resistant to glyphosate, as has been noted previously.

Flooding in Bangladesh

This is another example of companies being swift to exploit opportunities to introduce their products. In 1998, Bangladesh was hit by floods lasting two months, which affected over 20 million people. Farmers lost whole paddy crops and were unable to save seeds for the following year. The government was slow to react and no comprehensive assessment was made of the immediate needs of the affected farmers. TNCs and foreign aid agencies, on the other hand, quickly seized the opportunity to determine the 'needs' of the farmers. Novartis issued special bulletins outlining the need for imported (HRV) seeds and pesticides; it even distributed hybrid tomato seeds and other vegetable seeds to farmers.

Novartis's efforts paid off. The flood opened the Bangladesh seed market to imported hybrid seeds, which previously had been prohibited. The media and the government's Agriculture Extension Department were persuaded to promote the expanded use of pesticides. The Extension Department set up a post-flood agriculture programme, which included seeds and cash credit to buy pesticides. The media played its part by releasing several articles about how farmers were in need of nothing but pesticides. The headline of one article in a national daily said, 'We do not want relief. We want pesticides.'[60]

GM as emergency and development aid

> *The Food for Progress program is authorized under Section 1110 of the Food Security Act of 1985. The authority provides for a responsive food aid mechanism to encourage and support the expansion of private enterprise in recipient countries and is meant to help countries seeking to implement democratic and market reforms. Section 416(b) of the Agricultural Act of 1949 provides for overseas donations of surplus commodities to developing countries and friendly countries.*
>
> US government.[61]

Aid is the last unregulated export market open to US farmers and grain and commodity traders as consumers around the world shun GM foodstuffs and their respective governments begin to introduce strict import and labelling rules.[62] In effect, the US government is subsidising the biotech industry through allowing unlabelled, unsegregated GM crops to be used as emergency and development aid.

The issue of GM aid has become increasingly prominent over the last few years. According to Declan Walsh of the Independent, in 1999

> the US donated 500,000 tons of maize and maize products worth $111 million (£70 million) to international relief programmes. It is 'safe to assume' that 30 per cent of this aid was genetically modified, according to USAID, the US government's aid wing. Lucrative maize contracts were awarded to giant GM grain merchants such as Archer Daniels Midland (ADM) and Cargill .... The UN's World Food Programme (WFP) received just under half of the US maize donations.[63]

The WFP does not know how much food aid is GM nor does it have a policy on it. 'We have many issues to face and GM is way down the list,' said a WFP spokeswoman in Nairobi. It is likely that UN policy was influenced by its dependence on the US: during 1999 the US contributed $711 million to the WFP, almost half its global budget. The WFP food aid is distributed mainly by charities working in the region, such as Save the Children, CARE, and Action against Hunger. In 1999, the WFP's executive director was Catherine Bertini, a former US Department of Agriculture official from the Illinois cornbelt region.[64]

Rafael Mariano, chairperson of the Filipino peasant farmers' movement KMP, condemned these deals: 'The agricultural monopolies are very cruel, knowing that starving people have little choice but to accept the

food and be grateful even if our biological future is being slowly corrupted with dangerous technologies.'[65] But the WFP information officer, Brenda Barton, took a pragmatic position, 'It would be pretentious to say that GM food matters to these people,' she said. 'When people are dying they don't question where the food is coming from.'[66]

Recipients do not necessarily hold the same opinion. In January 2001, the US withdrew a $4 million donation of GM corn grown originally for animal feed after Bosnian officials hesitated to approve it over fears of health risks to humans. In a statement the US embassy said it was 'disappointed' that governments of both entities – the Serbs' Republika Srpska and the Muslim–Croat federation – 'could not decide in a timely fashion to accept its donation of 40,000 metric tons of corn for animal feed'. The US embassy statement stressed that 'The inclusion of the genetically modified corn is not unusual,' adding that 'such corn was routinely exported all over the world for human and animal consumption'.[67]

Similarly, in September 2000 the director of the Africa regional office of the International Organisation for Consumers wrote to President Clinton informing him about the dispatch of unlabelled GM maize by two American companies, Archer Daniels Midland and Cargill. The Association of Burundi Consumers (ABUCO) addressed a similar letter to the US ambassador to Burundi, asking him to convey its concerns to President Clinton. ABUCO asked Clinton to launch an investigation into 'the countries to where the aid is sent, and to ensure that all food aid to Africa is clearly labelled to allow the consumer to enjoy his right for information and choice'.[68]

More recently, Africa has been at the centre of further disputes over GM food aid (see below, pp. 210–13).

Not all aid is a gift

As well as emergency programmes, aid is directed at particular sectors such as women and children, through, for example, school feeding programmes. This kind of aid is generally not a donation, but linked to credit with long payback periods.

The Report from the Latin American Meeting on Food Aid (2001) in Ecuador points out that food aid, using excess production supported by subsidies, is at least in part designed to open up markets for US products and provide employment for US firms. Heavily subsidised food and crops are purchased in the US by organisations such as the Commodity Credit Corporation. The US government's PL480 emergency and development food aid programme provides food and also sets up credit lines so that countries can buy food. Food may be sold on the markets of recipient countries, with the proviso that the proceeds shall be used for specific development programmes. Because the price and transport of the food aid are subsidised, basically by the US consumers' taxes, its sale frequently undercuts local producers, who may then go out of business.

In this way, food aid can undermine the internal markets of recipient countries for local farmers and food processors; create dependency on food imports; provide a means of dumping products past their sell-by date and GMOs rejected by the EU and Japan, and generate good business for US transportation companies.[69] The impacts of such dumping are stark. The food sovereignty of countries like Bolivia, Ecuador and Colombia has been compromised by these programmes. The undercutting of local producers destroys livelihoods and disrupts agricultural traditions which may date back thousands of years, and which are adapted to local conditions and needs. The countries may then become dependent on imported food.

The dumping of GM food and feed compounds the problem further. Since GM is rejected by many Northern countries, the incentive to dump it on the South becomes even greater. It is almost as if aid were being used as an alternative form of subsidy for US farmers who are finding it difficult to sell their GM products legitimately. There are also consequences linked to the technology itself. For instance, some food aid which arrives in the form of seed is bound to be used for planting by hungry people to secure food for the next year, leading inevitably to GM contamination of local crop varieties. This could be seen as a strategy to contaminate the world so widely with GM crops and food that resistance will seem pointless.

The struggle for Africa's agriculture

> *'Food is power. We use it to change behaviour. Some may call that bribery. We do not apologise,'* exclaimed Catherine Bertini, Executive Director of the World Food Programme, at the Beijing Woman's Conference (September 1995).[70]

The issue of GM food aid to Africa generated headlines in 2002, when it appeared that famine threatened, first in southern Africa (Zimbabwe, Zambia, Malawi, Mozambique, Swaziland and Lesotho) and then in Ethiopia. Western press reports tended to reproduce the old picture of Africa, the helpless and hopeless, needing to be fed once more because its governments were corrupt and modern farming had never been able to establish itself, except where white farmers had taken control – as in Zimbabwe, where now they were being pushed out and their land given to people who did not know how to cultivate it. In May 2002 Zimbabwe refused US food aid, on the grounds that it did not want GM food, and the US (apparently with no sense of irony) warned the Zimbabwean government not to play politics with food aid.[71] US food aid is known to contain many varieties of GM corn because

the US does not segregate GM from non-GM. In July 2002 Zambia followed suit, also refusing food aid because it consisted of US corn. The US then accused Europe of causing starvation in Africa by refusing to accept GM out of hysteria or protection- ism. The argument is that African countries may not accept GM crops or food aid out of fear they could lose exports to Europe because of concern over possible GM contamination. In September 2002 a delegation of Zambian scientists visited the US, the UK and South Africa on a fact-finding mission, after which Zambia announced that it would not change its position.

In August 2002 the head of the WFP announced: 'There is no way that the World Food Programme can provide the resources to feed these starving people without using food that has some biotech content.'[72] Later the WFP stated that countries had the right to choose; then it announced that it would try to find supplies of wheat instead of maize for Zambia, which had begun to call for funds to buy food instead of food donations. The EU responded to African appeals with some funding and NGOs pointed out that there was plenty of non-GM food to be purchased, for example from India.

Analysis of the realities underlying the emergency reveal another struggle for control. In many of the countries threatened with famine there were similar issues to be addressed, that if tackled properly could contribute to helping African countries build up their food security or sovereignty in the long term, instead of being forced into dependence. For example, in both Ethiopia and Zambia, while there were food shortages in some regions, there were food surpluses in others. What was lacking was money to purchase that food, the infrastructure to move it and storage facilities to keep it until it was distributed. Bringing in food from outside might be a short-term solution, but what was really needed was money to buy and transport the food produced in these other parts of the country, which would help to boost local and regional markets. Investigation showed that distortions caused by subsidy meant that it was actually cheaper to bring in US-produced food from outside, including subsidised international transport for it, than to move food within Africa. Once again, a controversy over GM has helped to reveal underlying issues. What African countries need is long-term sovereign solutions arrived at through a bottom-up process, with donors responding rather than imposing their own priorities.

Africa – a new frontier for US business

The GM food aid issue served as a timely reminder of other US activities in Africa. USAID's Agricultural Initiative to Cut Hunger in Africa (AICHA)[73] aims to accelerate smallholder-based agricultural growth in Africa. The initiative is supported by IFPRI, which points out that smallholder agriculture is the 'predominant source of livelihoods in Africa', and that smallholders are as efficient as larger farmers when they 'have received similar support services and inputs (seeds, fertiliser and credit)'.[74] IFPRI notes that women form 70 per cent of the labour in African agriculture and says that a smallholder-led agricultural transformation of Africa is feasible.

In its publicity on AICHA, USAID is at pains to point out that

> US exports to Africa are already substantial, totaling $6.1 billion in 1996 alone and creating an estimated 100,000 American jobs, but an expanding African agricultural sector and greater African economic growth means expanding markets for US exports and even more American jobs.[75]

At the World Food Summit – Five Years Later (June 2002), USAID announced the Collaborative Agricultural Biotechnology Initiative (CABIO), designed to help countries access biotechnology and develop 'local private sectors to help integrate biotech into local food systems'. The press release goes on to say: '"Biofortified Crops to Combat Micronutrient Deficiency" is an international collaboration focused on raising Vitamin A, iron and zinc content in crops.'[76] The CGIAR is involved in the initiative through a 'challenge programme' of the same name, revealing the linkages between the organisations.

The USAID report 'Assessment of Biotechnology in Uganda',[77] reveals cooperation between governments, government agencies, publicly financed institutions and private corporations even more clearly. It shows how USAID is working with Monsanto plus a number of other players (including Makerere University, the National Agricultural Research Organisation, the Rockefeller Foundation, CIMMYT, and CABI-Biosciences, based in the UK and funded by the Monsanto Fund) to facilitate the development of biotechnology in that country. It notes that 'While Monsanto has an interest in the development of the company's own transgenic crops, the other crops of importance to Uganda do not provide sufficient commercial benefit for a multinational company to develop on its own.' The transgenic crop of interest to Monsanto which is nearest to commercial production in Uganda is Bt cotton. While USAID sees Africa as an important target for US exports, the organisation Investment in Developing Export Agriculture (IDEA), when discussing the African Growth and Opportunity Act (AGOA) suggests that Uganda should focus its food exports on markets in Europe.[78]

When one sees these developments in the context of the World Bank's Initiative on Seed Supply in Sub-Saharan Africa (ISSSSA – see pp. 104–6) and of efforts to promote the development of IPR and biosafety law as quickly as possible through interplay between research projects and building institutional

capacity (see pp. 124–9), the breadth of the US initiative becomes apparent.

The AGOA[79] adds to the richness of the mixture. Signed into law by President Clinton on 18 May 2000 as Title 1 of the Trade and Development Act of 2000, the Act purports to offer trade advantages to eligible African countries provided they can demonstrate that they are making progress towards establishing

> market-based economies; the rule of law and political pluralism; elimination of barriers to US trade and investment; protection of intellectual property; efforts to combat corruption; policies to reduce poverty, increasing availability of health care and educational opportunities; protection of human rights and worker rights; and elimination of certain child labor practices.

This is a familiar mixture of measures required to create a good working context for corporations and standard Western democracy. Under AGOA by the end of 2002, 80 per cent of African exports to the US were crude oil, and only 1 per cent agriculture products:

> To date 38 countries have been declared eligible for Agoa benefits, but only 22 had exported something under the programme by mid-2002. Five countries account for 95 per cent of Agoa exports and most of that is oil.... In the first half of last year, more than 80 per cent of Agoa exports to the US were made up of oil-related products. Textiles and apparel made up 10 per cent and transportation equipment 6 per cent. Agricultural exports were a mere 1 per cent of the total imports under Agoa. The primary benefit to the US economy as a result of Agoa is that oil from eligible countries is landed at lower cost to refiners.[80]

Moreover, according to a letter from US Trade Representative Robert Zoellick to Senator Byrd in November 2002, commented on by Larry Goodwin of the Africa Faith and Justice Network, 'the [US] President intends to initiate negotiations for a free trade agreement (FTA) with the five member countries of the Southern African Customs Union (Botswana, Lesotho, Namibia, South Africa and Swaziland, hereinafter SACU)'. As Larry Goodwin comments, this has implications for the whole of Africa. On IPRs, the letter proposes that the US should 'seek to establish standards that reflect a standard of [patent] protection similar to that found in US law'.

It is therefore evident that the US intends to ensure harmonised regimes in Africa that suit the biotech industry and facilitate the profitable 'modernisation' of African agriculture by and for US interests. There is a lot to play for. Most African farmers use saved seed for planting, and small farmers are the main seed breeders too, with a great wealth of knowledge and locally adapted varieties, which companies could use for developing GM or for other breeding programmes. The green revolution largely failed in Africa, and the use there of inputs has remained low. Many farmers are de facto organic. There are massive opportunities for expansion. Africa represents a new frontier for the US and its industries.

Meanwhile, Europe and the US continue to snipe at each other over Africa.

> International environment and development groups accuse the US of manipulating the crisis to benefit the biotech corporations, and of using the UN to distribute domestic food surpluses which cannot find a market. America responds that hysteria stoked by Europeans is endangering starving people.[81]

8.9 Resistance in the South

Monsanto has expended great efforts in recent years to try and gain approval for GM (Bt) cotton in India and GM soya in Brazil. Just before each planting season the pressure reaches its height in each country. In Brazil, resistance has been spearheaded by NGOs and farmer organisations working with the judiciary, together with a handful of states in resistance to the federal government. In India, NGOs have exposed corruption and incompetence among the government committees responsible for the issue. In Thailand, Monsanto has been accused of releasing Bt cotton illegally. More recently the ISAAA has set up there, following clear actions to resist GM by government and people.

Resistance to Bt cotton in India is finally overwhelmed

In June 2001 Monsanto just failed to gain approval for large-scale planting of Bt cotton in India.[82] Shortly before the planting season, even though all the tests called for had not been completed, the Maharashtra Hybrid Seed Company (Mahyco) in India, in which Monsanto had a controlling interest, tried to rush through approval for planting in the July 2001 season. There were complaints of unprecedented pressure being applied to scientists and bureaucrats – it was said that not even the battle over whether patents should cover living organisms had been so intense.[83]

Trials of Monsanto's Bt cotton had been carried out in India, but had persistently been planted too late in the season to properly test the crop for its resistance to its

main problem, the American bollworm. The committees involved in monitoring the trials were denounced for corruption and incompetence. The Genetic Engineering Approval Committee (GEAC) called for another year of trials,[84] but a source in the Indian Department of Plant Biotechnology said this would not be enough to examine the implications of gene flow, the impact on bees, and whether the antibiotic resistance gene used in the crop could cause resistance to streptomycin, commonly used in the treatment of TB.[85]

The Forum For Biotechnology and Food Security, New Delhi, called for a major investigation into the conduct of all the government departments and committees involved, and for Mahyco to be blacklisted for misrepresentation of the facts. It also called for two further years of trials in view of the defective nature of data gathered so far.[86]

In March 2002 the GEAC gave approval for the commercial production in some parts of India of Bt cotton varieties BT MECH 12, BT MECH 162 and BT MECH 184, all containing the Bt toxin CRY1Ac. Mahyco, which Monsanto calls its 'seed partner', was the company authorised. The approval was given provided that certain conditions were met, such as the establishment of refugia (places where non-Bt cotton would be planted) so as to discourage the appearance of resistance among the target pests. However, reports suggest that farmers have not been informed of these conditions, while many of them do not have enough land to implement them. Rumours about the capacity of the new product have led to seed being smuggled to areas for which it was not authorised and to which it was not adapted and fake GM seed has been sold to farmers. Problems have been compounded by monsoon failures and have led to assertions of disaster for small farmers. Meanwhile the Indian government is still working towards the production of its own Bt varieties, which it claims will be better than Mahyco's and will provide choice on the market. With farmers so ill-informed, and so vulnerable to rumours, it is hard to see how they can either benefit or make a balanced choice.

Resistance to RoundUp Ready soybeans in Brazil is successful

The release of GM crops in Brazil was halted by the courts of the country. After Monsanto received approval for its RoundUp Ready soybeans from Brazil's National Technical Biosafety Commission (CTNBio), a class action suit was filed in 1998 by the Brazilian Consumer Defence Institute (IDEC) and Greenpeace. They got an injunction in 1999 on GM releases, pending proper labelling and an environmental impact assessment, which is required under the Brazilian constitution. Following a challenge, the injunction was upheld and extended in a judgement issued by federal judge Antonio Prudente(aptly named for a judge endorsing the precautionary principle) in June 2000: it ordered the government to carry out more complete environ- mental and health impact studies before approving any commercial GMO releases.[87]

Weak rules on labelling for packaged GM products were rushed through in July 2001. However, the country's agriculture minister failed (August 2001) in a bid to gain consent for Monsanto to plant RoundUp Ready soybeans commercially just before the new growing season, and was accused of trying to sidestep the court rulings on the matter. Prior to this setback Monsanto's shares were rising, but they fell sharply on this news.[88] In February 2002 all field trials of 'biopesticide ' plants were suspended pending the enforcement of Brazil's agro-toxin legislation. All this adds up to a kind of judicial moratorium on commercial releases of GM crops and most field trials, including those of herbicide-tolerant crops.[89]

The state of Rio Grande do Sul in the south of the country was the first to act decisively against the introduction of GMOs, with crops on some illegal trial sites being impounded or burned. It was prevented by the federal government from passing a state law to ban GM crops, but has prevented most of the field trials authorised by the federal government from taking place. However, it has also been the worst victim of RR soya seed smuggled across the border from Argentina, and is reported to have levels of up to 70 per cent GM soya.[90] Three other Brazilian states (Santa Catarina in southern Brazil, Mato Grosso do Sul in the west – said now to have a contamination level of 30 per cent GM soya[91]– and Pará in the Amazon region) all resisted strong pressure from the federal government to accept GM crops in 2001–2. These states have now set up their own biosafety commissions, with strong participation from farmers and consumers, that give their governments decision-making powers over all aspects of GM crops in order to be able to resist any federal decision to allow them in the future. A project to decontaminate the south of the country and further promote small-scale ecological and organic agriculture is just beginning.[92]

Government aid for RoundUp factory in Brazil

In December 1999 Monsanto was granted about US$150 million (R285.9 million, at the time) in low-interest, long-term credit from the federal development agency FINOR to help build a factory in the state of Bahia's Camaçari petrochemical complex, just outside Salvador. This was about half of FINOR's total annual budget for promoting industrial development in north-eastern Brazil. The purpose was the manufacture of several chemical precursors to glyphosate, currently imported by Brazil. It was expected to create 319 new jobs when completed.

This investment was made, of course, on the assumption that RoundUp Ready soybeans would soon be released in Brazil and the market for RoundUp would explode. Meanwhile, the government's 2001 budget for fighting the worst drought in the impoverished north-east of the country in 70 years was about a quarter (R77 million) of what Monsanto was granted, even before the falling value of the Real was taken into account.[93] The factory opened in December 2001 and in January 2003 was reported to be making good profits by producing the components for RoundUp for sale in Brazil and for export to Argentina and Belgium.[94] However, as reported in August 2002 by the Guardian, Monsanto appears to have accepted that it will make little headway in Brazil until 2005.[95] Meanwhile, the country is consolidating its position as an exporter of GM-free soya, much of it to Europe, and commercial interests are pointing out to the government that its GM-free status is likely to become increasingly valuable. Late in 2002, the famous Worker's Party stalwart Luiz Inacio Lula da Silva, known as Lula, became President of Brazil. The party called for a moratorium on GM several years ago. However, the Minister of Agriculture represents agribusiness interests and is in favour of GMOs. The struggle continues, but extreme pressure from the federal government and Monsanto to commercialise GMOs has so far met with even stronger resistance.

Illegal cotton planting in Thailand

In September 1999 BIOTHAI – an NGO based in Bangkok, Thailand – sent out an open letter accusing Monsanto of illegally releasing GM cotton for cultivation in Thailand.[96] During August and September 1999 farmers' groups monitoring cotton crops in provinces in the central and north-east regions of Thailand sent samples of cotton from fields recently leased by a local company. Tests confirmed that the cotton was a Bt transgenic variety. Bt cotton was on Thailand's quarantine list and, under the provisions of the Plant Quarantine Law of 1964 (amended 1994), it had to go through biosafety testing before it could be released to farmers' fields.

While Monsanto denied involvement in the illegal plantings, BIOTHAI argued that 'the evidence clearly points to the company's contempt for Thai laws and sovereignty'. BIOTHAI also claimed that Monsanto had been promoting GM crops in the Thai press:

> Meanwhile, Monsanto has poured a huge amount of money into public relations by running a series of full-page advertisements or special sections in Thai newspapers about the 'miracle of GM crops'. These advertisements, disguised as newspaper articles, appear as a 'special issue' of the newspapers claiming that GM crops and technology would help alleviate the economic crisis in Thailand. The advertisements selectively quote leading Thai scientists as stating that GMs are necessary to increase food yields and decrease pesticide use. However, they do not mention the various harmful effects associated with GM crops.[97]

Following a ban on field trials (April 2001) and imports of genetically engineered crops (January 2002) in Thailand, the ISAAA (see pp. 124–6) set up an office in Bangkok in April 2002 and began to try to counter NGO opposition to GM crops, which it says is unfounded.[98] At the same time, the Thai senate set up a special committee to investigate Thai NGOs to find out whether 'they had been hired by foreign organisations opposed to the development of Thailand'.[99]

8.10 ConTill: Monsanto's brand of sustainable development

Soil erosion and degradation, often associated with green revolution farming methods, pose a massive threat to agricultural production worldwide, especially in the South, where soils are often more fragile and much poorer in nutrients, water retention, structure and micro-organisms (see Box, p. 10: 'Living soil'). As there are many factors involved in the loss of fertile soil, so there are many suggestions about how to overcome the problem. Soil scientists differ about the most sustainable ways of farming and, specifically, about how to increase organic matter (carbon, for example) in soil. For various reasons, ploughing – or tilling – has gone out of favour in large-scale and open-field farming, as explained by Bob Evans, a UK soil scientist:

> The *no-till*, or *non-inversion tillage* technique (i.e., the plough is not used to turn over the soil) was introduced in the USA as a way to save time, energy and money for the farmer when drilling his crop. In the UK in the 1970s and early 1980s it was a way of cultivating only the top 5–10cm or so of the soil, incorporating the crop residue, drilling into this layer and then rolling it and compacting it so that the seed had good contact with the soil. All this could be done with one pass, i.e., one big tractor with behind it a tine, chisel or disc cultivator, a drill and a roller. This is direct drilling. If it is done in two stages, i.e., shallow cultivation and then drilling, that is minimal or reduced cultivation, nowadays also called *lo-till*.
>
> It was realised in the USA that if crop residues were incorporated into the soil and especially if 30 per cent or more of the residue was left on the

> surface the soil was protected from water and wind erosion. This technique became known as *conservation tillage*. In the last two decades or so, and especially in the last few years, this technique has been hard pushed in the USA, Canada, Australia, Chile, Brazil and Argentina. The technique is now being promoted enthusiastically worldwide. In other countries, as in the UK, weeds and slugs can be a problem.[100]

The answer is glyphosate and slug pellets, and if bigger slug infestations occur, a tempting answer is 'more slug pellets'.

Although it was not developed for use with pesticides, agrochemical producers are very interested in no-till farming because they see a large market in the need to control weeds. For example, in its 1997 *Sustainability Report* Monsanto explains that:

> *No-till* farming eliminates plowing to prepare land for planting seeds and for weed control. Instead crop residue is left on fields and seeds and nutrients are placed in narrow rows or in drilled holes. Weed control is accomplished with herbicides such as Monsanto's RoundUp. No-till has been shown to decrease erosion rates by 90 per cent and nutrient and pesticide run-off by 70 per cent over conventional tillage.

Whilst scientists argue over the various figures produced in corporate reports regarding erosion or carbon sequestration, they seem to accept that no-till and conservation tillage, by incorporating crop residues into the cultivated layer, can contribute to the reduction of soil erosion and soil degradation in intensive farming systems.

In its 1998 annual report, Monsanto explains that conservation tillage – which it calls ConTill – is 'the practice of substituting the judicious use of herbicides for mechanical tillage', and that its widespread adoption has added to the increased global usage of Monsanto's top-selling pesticide, RoundUp (active ingredient, glyphosate).[101] Glyphosate has impacts on soil and water and is found in water courses at levels above those set by law.[102] Its increasing use for lo-till, as propagated for instance in the UK, could cause problems for the water industry in supplying potable water. Evidence is emerging that glyphosate use may be linked with the global increase in attacks from fusarium fungal diseases.

Conservation tillage has thus become strongly associated with high chemical inputs such as inorganic fertilisers, herbicides and slug poisons, and increasingly with herbicide-resistant GM crops. Many soil scientists favour more benign ways to improve soil structure and increase organic carbon content, for example by adding farmyard manure or compost to the land, or incorporating cover crops or grass into the crop rotation so that these can be ploughed in.

ConTill in Costa Rica

In Costa Rica, Monsanto is allied with Conservation International, a 'non-profit group dedicated to protecting the earth's biologically richest ecosystems', to promote ConTill in the 1.1 million hectare nature reserve called La Amistad, on the Panama border. The project aims to protect the biodiversity of La Amistad by preventing neighbouring hillside farmers from encroaching on the reserve. Monsanto does not mention that surface run-off of herbicides, which will increase through ConTill farming, is particularly dangerous in areas such as tropical regions where rainfall is intense.

Monsanto is one of Conservation International's 34 corporate sponsors, which include Chiquita Brands International, Citibank, Walt Disney, Mobil and Exxon.

Having opened doors to the richly biodiverse La Amistad through their ConTill project, Conservation International and Monsanto are also collaborating on a bioprospecting project with the University of Panama. This will allow them to search for plants, fungi, and insects that can be patented and turned into pharmaceutical and food products. Such bioprospecting or biopiracy is a major problem for Southern governments and communities. It means the privatisation of their biodiversity for the profit of the TNCs rather than the good of all.[103]

Non-inversion tillage can have a useful role, for instance on small tropical plots where weeds and crop residues are constantly incorporated into the topsoil. Here herbicide is replaced by manual labour.

Conservation tillage can (within limits) contribute to less carbon being released from soil or more carbon being incorporated. Monsanto is using the fact to hail their herbicide-resistant crops as a saviour in times of climate change. Monsanto lobbied to this effect at the UN Convention on Climate Change talks in the Hague (November 2000). In the Kyoto Protocol climate negotiations, the US government has consistently argued that 'carbon sinks' should be included in the climate convention. They say that trees (forests) and agricultural land which are said to absorb CO 2 emissions should be accepted as carbon sinks and should therefore be used to offset a country's CO 2 emissions. This position is fully supported by the agrochemical and biotech industry.

Conservation tillage has been promoted globally and successfully since the early 1990s. It has expanded massively, for example in southern Brazil and Argentina, but it is difficult to ascertain how much is treated with herbicide and how much is not.[104]

In Africa, ConTill is promoted through two NGOs, Sasakawa Global 2000 (SG 2000) and Winrock International (see above, pp. 189–96). In partnership

with these groups, in 1992, Monsanto began to facilitate the transfer of Monsanto's ConTill technology to small-scale rice and maize farmers.

Monsanto urges FAO to create 'RoundUp Ready Organisation'

> *An international organization that champions the benefits of conservation agriculture is critically necessary to grow conservation agricultural practices around the world.*
>
> Hugh Grant, chief operating officer of Monsanto, at an FAO-sponsored international conference on conservation agriculture, 3 October 2001

It is not surprising that Monsanto is trying to hitch a ride on yet another 'movement'. As lo-till agriculture spreads rapidly across South Asia, to convince farmers to use RoundUp would prove most profitable, especially if the FAO were providing the public relations cover.

'Conservation agriculture brings many benefits to the growers and the environment, yet there is still so much potential for growth of this farming practice,' Grant said. He estimated a current total of approximately 220 million hectares globally under conservation tillage – and the potential to extend this to 600 million hectares.

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