

5 Simply not natural

We are part of nature ourselves and ought to have a respectful, mutual relationship with the world around us. After all, we could not survive without food, water and sunlight, or build shelter and clothe ourselves without a continuing dialogue between human beings and nature. In reality, however, our existence within nature is grossly distorted and one-sided. The way in which production is carried out erects barriers to a mutually beneficial relationship.

Alienation from our own nature has taken place over a lengthy period. Britain is a classic example of this experience. From the 17th century onwards, common land was enclosed by big land owners. Small farmers, who lost their grazing rights, had to join the swelling numbers of landless labourers in the towns. They were to become the first free workers – freed from the land, that is, to sell their labour power to the owners of the new factories. They were then further alienated by losing all control over what they produced, and over the process of production – the creative activity that defines what it means to be human. This social estrangement remains the condition of our social being and social consciousness today.

During the same period, the Earth's natural resources, raw materials and minerals, were declared privately owned and ripe for exploitation. In the 19th century this took the form of colonial expropriation of entire countries and continents. At home, coal deposits were declared private. Money had deprived the world of

humanity and nature of real value. From then on, nature, including humanity, was viewed primarily as a collection of potential commodities from which profit could be made.

After the Russian Revolution of 1917, a holistic view of nature and society was encouraged by the government. But as the country's economic and political isolation grew, this approach was gradually abandoned. The Stalinist bureaucracy which seized power and ended democratic discussion, imposed arbitrary planning targets. These were delivered – but at a great cost to people's lives, to scientific inquiry and to the ecosystems of vast areas of the Soviet Union. The current, rapid industrialisation of China is having a similarly devastating impact.

The last quarter of a century has marked a dramatic extension and deepening of capitalism's penetration of nature for the purpose of profit making and taking. The technique of genetic modification, first achieved in 1973, is the basis for an entirely new area of exploitation of nature. This knowledge is being privatised through patents on genes and the processes used in their discovery, re-engineering and production. The mapping of the human genome paves the way, potentially, for the wholesale alteration of the human species by corporations. As Jeremy Rifkin says in *Biotech Century*:

Imagine the wholesale transfer of genes between totally unrelated species and across all biological boundaries – plant, animal and human – creating thousands of novel life forms in a brief moment of evolutionary time. Then, with clonal propagation, mass-producing countless replicas of these new creations, releasing them into the biosphere to propagate, mutate, proliferate, and migrate, colonising the land, water, and air. This is, in fact, the great scientific and commercial experiment underway...

The unbridled abuse of nature, viewed crudely as an economic resource, has had dire consequences in the period of capitalist globalisation. Millions of poor people have been driven off their land, whole areas of agricultural land are damaged, rain forests are destroyed by global logging companies, and ecological

ruination is visited on areas like the oil region of Nigeria. Climate change, reinforced by the most intensive period of production in the history of the planet, poses many dangers. Nature's once common resources are exploited to destruction, for one short-term purpose: profit.

Climate change is here

The “greenhouse effect” refers to the natural phenomenon that keeps the Earth in a temperature range that allows life to flourish. The sun's enormous energy warms the Earth's surface and its atmosphere. As this energy radiates back toward space as heat, a portion is absorbed by a delicate balance of heat-trapping gases in the atmosphere – among them carbon dioxide and methane – which creates an insulating layer. With the temperature control of the greenhouse effect, the Earth has an average surface temperature of 59°F (15°C). Without it, the average surface temperature would be 0°F (-18°C), a temperature so low that the Earth would be frozen and could not sustain life. Global warming is the result of the rise in the Earth's temperature resulting from an increase in heat-trapping gases in the atmosphere. The more carbon dioxide, methane and other greenhouse gases produced by agriculture, industry and transport, the greater the risk of the Earth heating up.

The evidence that human-induced global warming is real is increasingly clear and compelling:

- ▶ since the beginning of the 20th century, the mean surface temperature of the earth has increased by about 0.6°C
- ▶ warming in the 20th century is greater than at any time during the past 400-600 years
- ▶ seven of the ten warmest years in the 20th century occurred in the 1990s, with 1998 the hottest year on record.

In addition, changes in the natural environment support the evidence from temperature records:

- ▶ mountain glaciers the world over are receding
- ▶ the Arctic ice pack has lost about 40% of its thickness over

the past four decades

- ▶ the global sea level is rising about three times faster over the past 100 years compared to the previous 3,000 years
- ▶ there are a growing number of studies that show plants and animals changing their range and behaviour in response to shifts in climate.

In 1988, the United Nations Environment Programme and the World Meteorological Organisation set up the Intergovernmental Panel on Climate Change (IPCC) to examine the most current scientific information on global warming and climate change. More than 2,500 of the world's leading climate scientists, economists, and risk experts contributed to the panel's most recent report, *Climate Change 2001: The Third Assessment Report*. The IPCC concluded that "an increasing body of observations gives a collective picture of a warming world and other changes in the climate system".

In this century, it says, we can expect temperatures to increase by as much as 6°C. Warming oceans will expand, raising sea levels round the world. Some 50 million people a year already have to deal with flooding caused by storm surges. If the sea rises by half a metre, this number could double. A metre rise would inundate 1% of Egypt's land, 6% of the Netherlands and 17.5% of Bangladesh. Only 20% of the Marshall Islands would be left above water.

Scientists agree that cuts of at least 60% in carbon dioxide emissions, and in some areas up to 90%, are needed to halt climate change. Yet the Kyoto Protocol, which the US – the world's largest polluter – has refused to ratify, aimed only to reduce industrialised countries' emissions by just over 5% below 1990s' levels by between 2008 and 2012. Realistic new assessments suggest it will achieve cuts of only between 1% and 2%.

More than 150 nations signed Kyoto back in December 1997. But they left much of the detail about how it would be implemented to future talks, which have floundered. The Kyoto talks agreed that countries could meet some targets by encouraging the natural environment to soak up more CO₂

rather than by cutting emissions. Eventually, a carbon trading market emerged where emissions can be bought and sold. The madness of capitalism! Meanwhile, official figures show that CO₂ emissions in Britain actually rose between 1-2% in 2003, leading Sir David King, the government's chief scientific adviser, to warn in the journal *Science* (January 2004) that climate change was more serious than terrorism. "The Bush administration's strategy relies largely on market-based incentives and voluntary action... But the market cannot decide that mitigation is necessary, nor can it establish the basic international framework in which all actors can take their place."

Climate changes take their heaviest toll on poor nations, which have contributed relatively little to the problem in the past century. "African countries are expected to be the hardest hit by climate change because they have the least resources to adapt,"

Carbon trading takes off

In June 2004, a peculiar type of trade fair was held in Cologne. Urging attendance, the organisers said: "This emerging carbon market is potentially very substantial and provides business development opportunities for market intermediaries and service providers such as brokers, traders, auditing and certification entities, consultants, and law firms." Following the failure to implement Kyoto, a market developed whereby companies could buy and sell carbon credits, which are rights to emit greenhouse gases. This bizarre market mechanism has, of course, failed to tackle global warming but has made a lot of people a great deal of money. The Cologne conference was sponsored by the World Bank and the International Emissions Trading Association, which has 80 members around the world. Admission for the three-day conference was €980 + VAT. Carbon trading rose to 70 million tonnes in 2003, up from 30 million in 2002 and 13 million in 2001, according to the World Bank's *State of the Carbon Market 2003* report. Jorund Buen of Point Carbon projects an even bigger market. "The market is still in an early phase, and Point Carbon's best estimate would be that the value of contracts will increase towards 10 billion dollars in 2007."

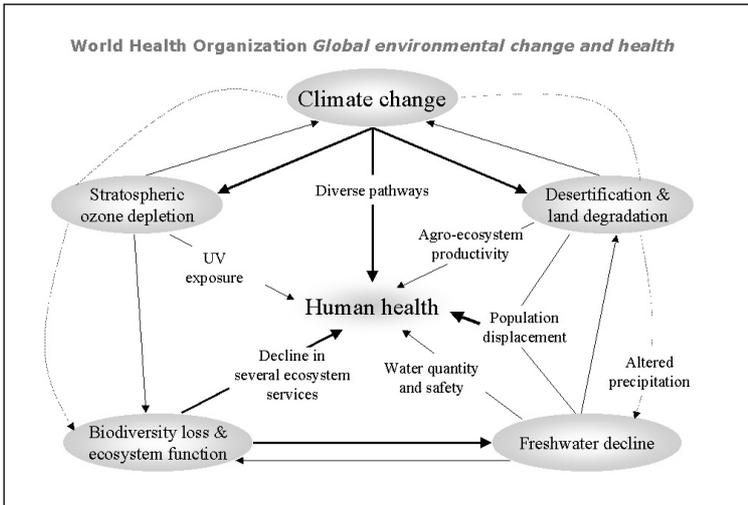
says Brett Orlando, a climate expert at the World Conservation Union (IUCN). “The difference between impacts on developing and industrialised countries is categorical. In industrialised countries one speaks of loss of property and income, whereas in developing countries one speaks of loss of life and livelihood.”

A report from scientists at the University of East Anglia concluded that current trends of droughts in Southern Africa are most likely linked to climate change. While occasional droughts are common in the region, the scientists found that the last 20 years “have seen a trend towards reduced rainfall”, as well as an increase in the number of serious droughts – two or three during the early 1990s alone. “The decade 1986-95, as well as being the warmest this century, has also been the driest,” according to *Climate Change and Southern Africa*.

The World Health Organisation (WHO) says that climate change is responsible for 2.4% of all cases of diarrhoea

Ice cover retreats

A NASA satellite survey of the Arctic has revealed just how rapidly the region is warming. The overall trend of rising temperature over the past 20 years is eight times higher than that recorded by ground measurements over the past century. The data also shows that summer sea ice cover is continuing its retreat. “Climate is changing, the Arctic is changing rapidly, and it has significant effects on lower latitudes,” says Mark Serreze, of the University of Colorado in Boulder. The analysis of Arctic surface temperatures was conducted by Josefino Comiso, of the NASA Goddard Space Flight Centre in Maryland and reported in the *Journal of Climate*. His data show that sea-ice temperatures during the summer – the most critical season for ice cover – increased 1.22°C per decade. Although winters have cooled, that effect was more than offset by rising spring, summer and autumn temperatures, which combined to stretch the melt season by between 10 and 17 days. The retreating summer sea ice has knock-on effects. The exposure of more open water, which absorbs more solar energy than ice, means further warming is likely. More open ocean also means winds can build up stronger waves that are eroding Arctic coasts. Communities in Alaska are already having to move their villages to escape erosion of low-lying coasts.



worldwide and for 2% of all cases of malaria. An estimated 150,000 deaths and 5.5 million disability-adjusted life years in 2000 were due to climate change. “There is growing evidence that changes in the global climate will have profound effects on the health and well-being of citizens in countries throughout the world. We must better understand the potential health effects particularly for those who are most vulnerable, so that we can better manage the risks,” said Dr Kerstin Leitner, WHO assistant director-general, in launching a new study in December 2003.

A report published in the journal *Nature* (January 2004) concluded that climate shifts could soon surpass habitat loss and other threats to wildlife and plants. The study, which examined six biodiversity-rich regions around the world representing 20% of the Earth’s land area, projects that the consequences could be significant for Africa. Important African conservation areas, such as Kruger National Park, could risk losing up to 60% of their species. More than one-third of the 300 plant species studied in South Africa are expected to die out, including the country’s national flower, the King Protea. Researchers found that 15% to 37% of species sampled could be threatened with extinction by 2050 as a result of their inability to adapt to changes in climate. “If the projections can be extrapolated

globally, and to other groups of land animals and plants, our analyses suggest that well over a million species could be threatened with extinction as a result of climate change,” said lead author Chris Thomas of the University of Leeds.

Destroying resources

The intimate and deadly connection between profit margins and the impact on ecosystems is illustrated in a report published by the Worldwatch Institute, an environmental think tank. “As investors search the world for the highest return, they are often drawn to countries with bountiful resources and weak environmental laws, a potentially disastrous combination for the environment and economy,” says the report. Hilary French, author of the report and vice president of Worldwatch Institute, says: “Though the booming economies of the developing world raised national incomes, they left ecological devastation in their wake. Urban air pollution levels in many Asian and Latin American cities are among the worst in the world, and natural resources such as forests and fisheries are badly depleted on both continents.”

Most of the money now flowing into developing countries is underwriting projects that are potentially damaging to the earth’s ecology, according to the report. International investment in

Global warming is a WMD

As a climate scientist who has worked on this issue for several decades, first as head of the Met Office, and then as co-chair of scientific assessment for the UN intergovernmental panel on climate change, the impacts of global warming are such that I have no hesitation in describing it as a ‘weapon of mass destruction’. Like terrorism, this weapon knows no boundaries. It can strike anywhere, in any form – a heat wave in one place, a drought or a flood or a storm surge in another. Nor is this just a problem for the future. The 1990s were probably the warmest decade in the last 1,000 years, and 1998 the warmest year. Global warming is already upon us.

John Houghton *The Guardian*, 28 July 2003

resource extraction, such as mining, for example, is flowing rapidly into many countries with valuable natural assets such as primary forests, mineral and petroleum reserves, and biological diversity. From 1991 to 1997, international spending on exploration for non-iron metals grew six times in Latin America, almost quadrupled in the Pacific region, and doubled in Africa, notes the report. The major oil and gas companies are also increasingly striking deals – and oil – in new regions such as the Central Asian republics and the South American rainforests.

Mining to destruction

- ▶ more than one quarter of active mines and exploration sites overlap with or are within a 10-kilometre radius of a strictly protected area
- ▶ more than one-third of all active mines and exploration sites are located within intact areas of high conservation areas
- ▶ nearly one-third of all active mines are located in stressed watersheds
- ▶ nearly three-quarters of active mines and exploration sites are in areas deemed to be of high ecological value.

World Resources Institute

With their own forests badly depleted, Asian companies are now vying for the vast timber concessions in Africa, Asia, and Latin America, threatening some of the world's last remaining untouched forests, says the Worldwatch Institute report.

Brazil, Cambodia, Congo, the Democratic Republic of Congo, Guyana, Nicaragua, Papua New Guinea, the Solomon Islands, and Surinam are among the countries that have granted, or are on the brink of granting, rights to log large tracts of primary forests.

“International investment can facilitate access to new technologies that minimise energy use and waste generation, helping developing countries leapfrog over the most damaging phases of industrialisation,” she says. “But these funds can also bring highly polluting industries that jeopardise human and ecological health.” Hazardous industries, such as battery

manufacturers, chemical companies, and computer manufacturing and assembly facilities, are becoming increasingly concentrated in developing countries as a result, where safety practices and environmental enforcement and monitoring are basic at best, says the report. It cites a review of 22 computer-related companies based in industrial countries, which found that more than half of their collective manufacturing and assembly operations – processes intensive in the use of acids, solvents, and toxic gases – are now located in developing countries.

Major global car companies are also expanding into the emerging markets of Asia, Eastern Europe, and Latin America. If current projections hold, some three-quarters of the auto factories to be built over the next three years will go up in these regions, says the report. “If developing countries acquire auto based transportation systems along the lines of the US model, there will be grave consequences for local air pollution and food security as well as global climate change,” French warned.

At the turn of the century, the United Nations Environment Program (UNEP), the World Bank, and the World Resources Institute assessed five ecosystem types – agricultural, coastal, forest, freshwater, and grassland – in relation to five ecosystem services – food and fibre production, water quantity, air quality, biodiversity, and carbon storage. It found that of these 25 ecosystem-service combinations, 16 had declining trends. The only positive trend was in food and fibre production by forest ecosystems, which has been achieved by an expansion of industrial forest monocropping at the expense of species diversity.

In 2001, some 60 million transistors – the tiny components used to build semiconductor chips – were manufactured for each person in the world. But because of the rapid pace at which electronic products become obsolete and are being replaced, production is expected to skyrocket in coming years, to perhaps as many as 1 billion transistors per person in 2010, according to the Worldwatch Institute. Yet the industry requires huge amounts of chemicals and leaves behind large quantities of dangerous wastes. Production of a single six-inch silicon wafer

Endangered rainforests

Indonesia's rainforests are some of the richest in the world and are home to countless species of endangered wildlife, including the Asian elephant, Sumatran tiger, Sumatran rhino and orang-utan. Over 72% of Indonesia's forests have now been destroyed and according to a recent study by the World Bank, the Indonesian deforestation rate has reached 2 million hectares a year. This is equivalent to an area of forest the size of Belgium being lost each year. Asia Pulp & Paper (APP), one of the world's biggest paper companies, through its main subsidiary, Indah Kiat, has destroyed at least 287,000 hectares of rainforest and in 2000 sourced 75% of its logs by clear cutting forests. APP is also at the centre of a number of conflicts with indigenous communities. APP is reported to have cleared over 3000 hectares of forest belonging to the Sakai indigenous people in Sumatra. It is reported that on 3 February 2001, employees of APP's main logging company were involved in serious clashes with Sakai villagers. According to those reports, at least five villagers were injured, two seriously and 52 people were detained by the company before being temporarily handed over to the local police.

Paper Tiger, Hidden Dragons, Friends of the Earth

results in 14 kilograms of solid waste and 11,000 litres of waste water. Workers in the industry are on the frontline of exposure and at risk of developing cancer or seeing birth defects in their children. More than 80% of the world's hazardous waste is produced in the United States. One half to three quarters of annual resource inputs to industrial economies are returned to the environment as wastes within a year.

Unhealthy food

The intensive farming of the last 60 years and the turn to industrialised agriculture under globalisation, have produced an ecological catastrophe in many parts of the world. An estimated 10-20% of the world's 1.5 billion hectares of cropland are degraded to some degree. This is the result of excessive tillage and fertiliser use, the removal of vegetation and over-grazing. In

the developing world, according to the Worldwatch Institute, the pace of decline has accelerated to the point where a quarter of farmland suffers from degradation. Worldwide, farmland degradation has reduced cumulative food production by about 13% over the last 50 years. Urban expansion is also responsible for the loss of farmland. In the United States, more than one million hectares of arable land are paved over each year, while in China the figure is 200,000 hectares. About 20% of the world's irrigated land is damaged by salinisation – a build-up of salt that occurs when excess irrigation water evaporates. By 2015, it is estimated that 40% of humanity will live in water-stressed countries. Finally, two-thirds of all fisheries are exploited at or beyond their sustainable limits.

Pesticide poison

Pesticide use (two thirds of it in agriculture) has grown 15-fold since 1950 but imposes a terrible toll, poisoning 3 million people severely and killing 220,000 each year. Meanwhile, farmers confront increasing pesticide resistance. For consumers, food quality ranks among the most widespread health concerns. Food borne diseases strike 30% of the population in industrial countries each year, but people living in developing countries bear a more frightful burden due to a wide range of hazards and inadequate prevention and treatment.

Vital Signs 2002, Worldwatch Institute

While food is plentiful in the rich capitalist countries, what we eat is more harmful than ever before. Our own internal ecosystems are under attack from antibiotics in factory farming and processed food containing high levels of salt, sugar, fats and preservatives. Pesticides in food contain carcinogenics or hormone disrupting properties. The results include Creuzfeldt-Jacob “Mad Cow” Disease in humans, obesity and deep concerns about genetically-modified food. The Health Development Agency says that obesity – often the product of a poor diet and lack of physical exercise – kills about 34,000 people a year. It also says obesity costs the NHS an estimated

£2.6 billion a year in treating conditions such as diabetes and heart disease. This figure is expected to rise to £3.6 billion by 2010.

Meanwhile, the supermarkets (see Chapter 10) and government bodies engage in a dance of confusion about labelling and what can or cannot be added to food. It is estimated that 70% of the £20 billion global annual food advertising budget is used to promote soft drinks, sweets and snacks. Good food is priced higher so that poorer people end up buying the cheapest, but least healthy products.

In her book *Not on The Label*, Felicity Lawrence describes what really goes into the food on your plate. She worked anonymously in a chicken processing factory and found that the doctoring of processed foods was commonplace as well as being legal. She explained: “Water is routinely added to catering chicken, together with additives to hold it in. If you’ve ever eaten a takeaway, a ready meal, or a sandwich containing chicken, the chances are that you will have consumed chicken adulterated like this.” Lawrence says:

Chickens, like other animals, have become industrialised and globalised. We no longer know where they are produced or how they are processed. By the time we buy them in aseptic little packages, or processed into convenience meals, we have lost any sense of their origin.”

She decided to reconstruct the contents of a 99p bag of washed and ready-to-eat salad, and was shocked by what she discovered. Modified-atmosphere packaging (MAP) was used to increase shelf-life, and to keep the salad looking fresh for up to 10 days. This allowed the supermarkets to get food from around the world, where it was often produced by migrant labour living in appalling conditions and earning a pittance. She writes:

The salad is cut or separated out into individual leaves by gangs of workers, then washed in chlorine, dried and sorted before being packaged in pillows of plastic in which the normal levels of oxygen and carbon dioxide have been altered. Typically in MAP, the oxygen

is reduced from 21% to 3% and the CO₂ levels correspondingly raised. This slows any visible deterioration or discolouring.

This process, however, is thought to destroy many of the nutrients in the original salad. In addition, chlorine washes leave surface residues of chlorinated compounds on lettuce and some compounds used are known to cause cancer.

The genetic gap

In March 2004, the New Labour government announced that genetically engineered/modified (GE/GM) maize can be grown in the UK – provided it gets national seed list and pesticide approval. This is despite the fact that the field tests that preceded the announcement were carried out using a pesticide that was about to be banned! This crop will be fed to cows to make milk that will not be labelled as GM. Not at all bad for a day's work for a government committed to promoting biotech corporations, whatever the doubts and public hostility.

Sue Mayer, GeneWatch UK's director, commented: "They've betrayed the public's trust, no wonder people are cynical about our political system." She added: "The [government's] Science Review concluded that the public were not anti-science and that there are gaps in our knowledge about the issues worrying people. Clearly, the government is more interested in the profits of the biotech industry than good science. Giving the go-ahead before any rules are in place to deal with contamination or if other things go wrong, shows how little regard the government has for the public, non-GM farmers or the environment."

In the hands of a small group of biotech corporations, this new science has potentially deadly outcomes. Genetic engineering is not, as the biotech companies claim, a precise science that simply extends traditional breeding techniques practised over thousands of years. It involves taking a gene from one species and inserting it into another distinct species, a process known as recombination. When crops are engineered, the gene is inserted randomly into another sequence that may have taken hundreds of millions of years to evolve. Bringing them into mutual action is therefore certain to have unpredictable results.

These uncertainties have been acknowledged by some of the leading UK institutions. The Royal Society said in a 2002 report that the potential health effects of GM foods should be rigorously investigated before allowing them into baby food, or to be marketed to pregnant or breast-feeding women, elderly people, and those with chronic disease. This was because GM “could lead to unpredicted harmful changes in the nutritional state of foods”.

In March 2004, in an update of its 1999 statement on the health implications of GM food crops, the British Medical Association warned against complacency, saying: “Public health surveillance should be so complete that we can be certain that adverse effects from any dietary change would be recognised. We also need a commitment to research in key areas to minimise the potential risks to human health and the environment posed by genetically modified food.” The BMA said work was still needed on the potential for GM foods to cause food allergies. A statement added: “The transfer of genetic material (DNA) between species has been observed but its significance is uncertain. While we daily consume large amounts of non-GM DNA with no identifiable problems, we need to know whether the risk of DNA transfer is in any way enhanced by genetic modification of food. It is important that individual crops are assessed on a case-by-case basis using extensive field trials of the type undertaken recently in the UK and that crops which are more harmful to the environment than conventional varieties are not licensed for commercial use.”

In its submission to the Scottish Parliament’s health and community care committee in November 2002, the BMA stated that “there has not yet been a robust and thorough search into the potentially harmful effects of GM foodstuffs on human health... In the UK not enough is known to enable us to give an accurate risk of assessment of the health impact of GM crops on the health of local communities”.

None of the independent tests carried out so far have examined the issue of the health effects of GM technology. When the scientist Dr Arpad Pusztai examined the health impact of GM organisms on rats and potatoes, he found negative effects. His

The Sainsbury web

The leading centre in biotechnology research in this country is the Sainsbury Laboratory. It's a joint venture between Lord Sainsbury's Gatsby Foundation, the University of East Anglia, the BBSRC and the John Innes Foundation. Funding is primarily through grants from the Gatsby Foundation but also via the public funding body for the bio-sciences, the BBSRC, whose grant is determined by Lord Sainsbury's department. As Science Minister, he had overseen a massive 300% increase in funding for the Sainsbury Laboratory.

He is also a member of the cabinet biotechnology committee, Sci-Bio, responsible for national policy on biotechnology including GM crops and foods. Although a key adviser to Blair on biotech, he apparently absents himself from decisions impacting directly on GM foods because, it is said, of his connection to the Sainsbury supermarket chain. When he was made Science Minister, Lord Sainsbury resigned as chairman of the Sainsbury's supermarket chain and put into a blind trust major investments in two plant genetics-related investment companies (Diatech and Innotech Ltd). Innotech is known to have a substantial stake in a firm called Paradigm Genetics involved in a joint GM-related venture with Monsanto.

Lord Sainsbury's GM investment company Diatech has funded research at the Sainsbury Laboratory. Dr Roger Freedman, the Director of Diatech approved the work. Dr. Freedman is also on the board of the Sainsbury Laboratory Council, which oversees the Sainsbury Laboratory. In short, Sainsbury heads a government department that gives money to the Laboratory (via the BBSRC) that he supports and which bears his name, and on whose board is the man who runs his company, currently held in a blind trust. But the story doesn't end there. In 1987 the scientist Mike Wilson was named as the inventor of a UK patent that could generate millions from GM commercialisation.

Diatech was listed as the patent applicant. The patent is seen as being crucial to the future of genetic engineering. Sainsbury gave Labour its biggest ever single donation in 1997. On October 3 1997 he was made a life peer by Blair and a year later Minister for Science. By 2003 he had given over £11 million to the Labour Party.

What's Wrong with Supermarkets? Corporate Watch

research was rubbished in government circles and the scientist was driven from his post by the extraordinary pressure piled on him by his employer and the biotech industry. So, at this point, no one knows whether GM crops are safe for humans and farm animals to eat, or about the damage that they can inflict on neighbouring, non-GM fields.

What is clear, however, is that GE has enabled capitalism to extend its reach deeper into nature through control of food production. When you think of this technology, there is only one corporation that really counts. Monsanto products accounted for over 90% of the total area planted with GE crops in the world in 2001. This is a company that exerts considerable political influence, particularly in the US, and is experienced in manipulating governments, the media and scientific opinion in order to gain approval for its products. Monsanto made large contributions towards Clinton's election campaigns. Monsanto bought its way into a key position in the seed market by spending billions of dollars buying up plant-cultivating firms, including the market leaders in maize, soybeans and cotton. At the same time the company acquired important GE-related patents and access to valuable germplasm.

The power and influence of the biotech corporations in the World Trade Organisation was undoubtedly behind its six-year battle with the European Union over the sale of a brand of American GE corn, known as Bt-11, for human consumption. The European Commission decided in May 2004 to lift its ban. In a predictable response, David Bowe, a New Labour minister, declared: "This is good news for consumers because it will increase choice and competition. It is also good news because it will increase choice and competition for producers, too."

Most of the GE seeds marketed by Monsanto are resistant to the company's own "broad-spectrum" herbicide, Roundup/Glyphosate. So the more GE seeds Monsanto sells, the more profit it makes on its herbicide. In 2001, herbicide tolerant crops accounted for 77% of the acreage sown to GE crops, and Roundup is now the world's biggest selling herbicide and Monsanto's main source of profit. When US and Canadian farmers buy GE seeds they are – more often than not – tying

themselves to a contract which bars them from saving seed for use the following year and obliges them to buy Monsanto's chemicals. These contracts, and the patents on GE seeds, deny farmers the right to save, exchange and replant seeds, and forces them to buy new patented seed each season. Monsanto is currently suing hundreds of US and Canadian farmers for saving seed or otherwise breaching the patent. At the same time, Monsanto itself is being sued by farming, scientific and civil society organisations for the contamination of conventional and

Monsanto comes calling

Percy Schmeiser is a farmer from Saskatchewan Canada whose Canola fields were contaminated with Monsanto's genetically engineered Round-Up Ready canola by pollen from a nearby farm. Monsanto says it doesn't matter how the contamination took place, and is therefore demanding Schmeiser pay their Technology Fee (the fee farmers must pay to grow Monsanto's genetically engineered products). According to Schmeiser, "I never had anything to do with Monsanto, outside of buying chemicals. I never signed a contract. If I would go to St. Louis (Monsanto Headquarters) and contaminate their plots – destroy what they have worked on for 40 years – I think I would be put in jail and the key thrown away."

GM doesn't help poor farmers

Today, 21% of the food grown in the developing world is destined for animal consumption. In many developing countries, more than a third of the grain is now being grown for livestock. The animals, in turn, will be eaten by the world's wealthiest consumers in the northern industrial countries. The result is that the world's richest consumers eat a diet high in animal protein, while the poorest people on earth are left with little land to grow food grain for their own families. And, even the land that is available is often owned by global agribusiness interests, further aggravating the plight of the rural poor. The introduction of GM food crops does nothing to change this fundamental reality.

Jeremy Rifkin, president of the Foundation on Economic Trends
Guardian 2 June 2003

organic agriculture.

Far from solving world hunger, as the corporations and governments tell us, genetic engineering is used to exploit the farmers of poorer countries. By exercising intellectual property control over the genetic traits of the world's major food crops, companies such as Monsanto stand to make huge profits while the world's poorest farmers become increasingly marginalised. It is estimated that OECD countries hold 97% of all patents, and global corporations 90% of all technology and product patents. The concept of intellectual property rights was developed by a committee made up of the leading biotech corporations.

Monsanto's James Enyart explained how it happened: "Our trilateral group was able to distil from the laws of the more advanced countries the fundamental principles for protecting all forms of intellectual property... Besides selling our concepts at home, we went to Geneva where [we] presented [our] document to the staff of the GATT secretariat. We also took the opportunity to present it to the Geneva-based representatives of a large number of countries... Industry identified a major problem for international trade. It crafted a solution, reduced it to a concrete proposal, and sold it to our own and other governments. The industries and traders of the world have played simultaneously the role of patients, the diagnosticians, and the prescribing physicians."

And there is nanotechnology – the manipulation of material at the scale of the nanometre (one billionth of a metre), which is the scale of atoms and molecules. Precise manipulations of nanoscale materials became possible towards the end of the 20th century. Already hundreds of tons of nanoscale particles are showing up in consumer products as diverse as sunscreens, car parts, tennis balls, eyeglasses, and paint. Particles that had been approved for consumer products at the micro- or macro-scale were not tested again when introduced into the same products at the nanoscale, so their effects on health are unknown. Nanotechnology is not limited to the development of new materials with new characteristics. Scientists are also hoping to someday master new forms of molecular scale manufacture that could transform how everything in the world is made, including the raw materials we

start with. Because quantum mechanics takes over at the nanoscale, there may be unpredictable changes to a substance's conductivity, elasticity, reactivity, strength, colour, and tolerance to temperature and pressure. Some nanoparticles can slip past immune systems and even cross through the blood-brain barrier undetected.

The Action Group on Erosion, Technology and Concentration, a group dedicated to the advancement of cultural and ecological diversity and human rights, has raised awareness of nanotechnology. In a groundbreaking report, it says: "Fearful of a public backlash, industry attacked the theory that nanotechnologies could lead to the development of directed molecular self-assembly (nanoscale 'robots' capable of manipulating molecules and reproducing). Critics raised concerns that, unless perfectly controlled, human-created self-assembly could pose a major threat to global survival, analogous to uncontrolled cancer cells self-replicating until they destroy a living organism.

"The threat has been named 'global ecophagy' or, more simply and cinematically, 'Grey Goo'. Not an enticing image for venture capitalists or manufacturers thinking of going nano on the assembly line. But even if self-assembly could be controlled, the implications for the environment, the economy, labour, and democracy are enormous and need to be addressed openly. Now there is growing scientific evidence that directed molecular self-assembly is not only possible but relatively close at hand. If the industry's dismissals turn out to be short-sighted and/or self-serving, society will question whether or not scientists and industry cheerleaders can be trusted with so powerful a technology."

As Jeremy Rifkin puts it in *Biotech Century*: "Genetic engineering represents the ultimate tool. It extends humanity's reach over the forces of nature as no other technology in history... With genetic technology we assume control over the hereditary blueprints of life itself. Can any reasonable person believe for a moment that such unprecedented power is without substantial risks?" He warns:

A handful of corporations, research institutions and governments could hold patents on virtually all 100,000 genes that make up the blueprint of the human race, as well as the cells, organs, and tissues that comprise the human body. They may also own similar patents on thousands of micro-organisms, plants and animals, allowing them unprecedented power to dictate the terms by which we and future generations will live our lives.