Both ENDS
Information Package
Nr. 14

Gene-Technology

Both ENDS offers a wide range of services to NGOs in Africa, Latin America, Asia and Central and Eastern Europe, who are working in the field of environment, development and social justice.

Our standard information service includes Information packs on a wide range of topical environment issues. These packs have been written mainly for Southern NGOs. They are to enable (beginner) environmental organisations to get familiarized with an important environmental subject in a short period of time.

Contents:

- a general overview of the theme
- details of relevant international treaties, guidelines and conventions
- some aspects of the current (international) debates on the topic
- a listing of useful contacts in North and South
- a list of publications
- a choice of Websites
- case studies (mainly from Southern countries)

We are making an effort to regularly update the information included in these packs. But since people and developments are moving fast, we will inevitably lag behind somewhat. The information presented is meant as an introduction. If you require more specific information, please feel free to contact us.

You can download the information packs from our Website or you can request an E-mail printed version. They are free of charge for NGOs in the South and Central/Eastern Europe.

We welcome any suggestions or comments, which help improve this information pack.

Both ENDS
Environmental and Development Service for NGOs

Nieuwe Keizersgracht 45
1018 VC Amsterdam
the Netherlands
Phone: +31 20 6230823
Fax: +31 20 6208049
E-mail: info@bothends.org
Website: http://www.bothends.org

This activity has been made possible thanks to the financial support of the Dutch Ministry of Housing, Spatial Planning and Environment (VROM).

Content

The following Information Packages are available at Both ENDS:

1. Desertification
2. Sustainable Energy
3. Tourism
4. Dams and the Environment
5. Oil
6. Coastal Zone Management
7. Mining
8. Gender, Environment and Development
9. Trade and Environment
10. Local Forest Management
11. Multilateral Financial Institutions
12. Analog Forestry
13. River Management
14. Gene-technology

Gene-Technology

1. Introduction

The history of gene technology began with primitive man, growing plants and domesticating animals for subsistence. With the breeding of plants and animals to improve the production of food, gene-technology came to being.
Gene-technologies used 10,000 years ago are still used, e.g. for the production of yoghurt or bread. In comparison, modern gene technology is extremely young, starting in 1869 with the isolation of DNA by Friedrich Miescher. The first experiments with recombinant DNA (genetic engineering) were carried out as recently as 1973.

Scientists and private companies immediately adopted modern gene technology to meet challenges expected from future food and environmental problems. The first industrial production of genetically manipulated products started at the end of the 1980s.

Almost immediately after the first experiments in 1973, civil society has been on the alert. Almost all aspects related to modern gene-technology and Genetically Modified Organisms(GMOs) are questioned constantly. Great environmental and health concerns are held over the implications modern gene-technology has in drastically altering the evolutionary process, a point currently ignored by its proponents. Concerns centre around that erosion of biodiversity will be aggravated by the introduction of GMOs, that traditional preservation and production mechanisms will be disrupted, and that GMOs will significantly influence the composition of ecosystems.

A further concern regards the question of ownership. Will the producers have access to GMOs and the genes that form the basis of these products, or will ownership be restricted to those that hold a patent on each of these products? In the case of the former, if GMOs are allowed to become the basis of world food production, a narrow ownership structure will put unprecedented powers in the hand of a very small group of people and multinationals.

Public participation in the discussion has never before been so high. Reactions and decisions around the world are extremely diverse. This shows that people are sensitive to the issue, and have not accepted GMOs on face value.

2. What is gene technology?

Gene technology refers to any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify processes of specific uses. (Convention on Biological Diversity, art. 2, 1992). Thus defined, gene technology dates back thousands of years, for example in the making of bread and yoghurt. However, over the past decades gene technology acquired a new dimension, with the discovery of various techniques for recombining genetic material from different organisms. Therefore a more narrow definition of gene technology is necessary to describing modern gene-technology. Modern gene-technology refers to those techniques which alter directly and precisely the genetic constitution of living organisms through genetic engineering or genetic manipulation. These techniques can employ, a.o.: new recombinant DNA (rDNA) structures, cell fusion and cell cultures from plant and animal material. The results of these techniques are Genetically Modified Organisms (GMOs).

Genetic manipulation is a revolutionary new technique and still in its experimental stages of development. This technology has the capacity to break down fundamental genetic barriers, not only between species, but between humans, animals, and plants. Genetic Engineering, also known as recombinant or r-DNA technology, is fundamentally different from traditional forms of gene technology. The manipulation of organisms at a cellular level to produce altered organisms with traits that fulfil certain human desires contradicts the laws of nature. Scientists can cut out bits of DNA from living organisms, called genes, and

splice them into totally unrelated species. Animal genes are going into plants, bacteria genes into food crops, and even human genes are being used to change animals and plants. The main aim of agricultural gene technology, is to modify three characteristics of the plant, namely crop quality (better characteristics such as size or weight), crop resistance against fungi or insects and crop resistance against pesticide (the pesticide can be used without harming the crop itself).

Until genetic engineering was possible, the spectrum of genetic resources available to plant breeders ranged from other varieties of the crop to wild relatives of the species. In particular wild relatives of species have contributed greatly to the disease resistance of for example wheat and rice. With the rise of genetic engineering, breeders have access to an expanding spectrum of genes of more distantly or even non-related species.

3. Modern gene-technology, a key issue

Modern gene technology relates to all aspects of a sustainable society: equity, environmental quality and the distribution of the power of decision making and productive resources:

- Almost 90% of all available biotic resources are located in developing countries. The major body of traditional knowledge on the management of biotic resources is concentrated in the South. However technological know-how of modern gene technology is heavily concentrated in the North. Therefore a wide application of these techniques will inevitably increase inequity at all levels.
- The current decision making process is a bio technocracy: all major decisions are taken by a small group of, mostly Northern, politicians and private sector representatives. This structure denies the fact that decisions on modern gene-technology will affect the life of the entire world population.
- Modern gene technology is surrounded by uncertainties, especially regarding impacts on human health and the environment. Indeed, if the evolutionary process is substituted by man-made techniques, it is hard to believe that nature will remain intact. Earth ecosystems will almost certainly be disturbed and consequences cannot be foreseen.

4. Environmental aspects

Risks and uncertainties surrounding the introduction of GMOs into the natural and human environment are tremendous. In order to preserve nature from negative impacts, bio security has to be guaranteed. In other words, no introduction of GMOs is acceptable without proof that it will not damage biodiversity and ecosystems. Regarding nature and human health, all unanswered questions need to be resolved and the precautionary principle (in case of doubt no GMOs are accepted) should apply.

Box 1: Health and safety

Although much more research is necessary, research already undertaken, indicates genetically engineered food has the potential to be more hazardous to human health than regular food. In 1998, front-page headline stories in the British press, and later on all over the world, revealed Rowett Institute scientist Dr. Arpad Pustai's research findings that genetically engineered potatoes are poisonous to mammals. Genetically engineered potatoes, found to be significantly different in chemical composition from regular potatoes, damaged the vital organs, and immune systems of the lab rats fed with the genetically engineered potatoes. Most alarming of all was the finding that damage to the rat's stomach linings, apparently a severe viral infection, most likely was caused by the Cauliflower Mosaic Virus (CaMv) promoter, a promoter spliced into nearly all genetically engineered food (Cummins, R., Organic Consumers Association, Sept. 1999). Dr. Pustai's research was never completed, because funding was cut off and he was fired after he had spoken to the media. But more and more scientists all over the world recognise the potential dangers involved in bringing genetically engineered food in the human/animal food chain. Other research also indicated higher cancer risks and the emergence of new food allergies to be possible outcomes of a diet consisting of genetically engineered ingredients.

Besides the risks involved for human or animal health, the risks of genetically

engineered food goes beyond mammals that eat these products. Just as alarming are the potential dangers involved for the ecosystem as a whole. Genetic pollution occurs when wind, rain, birds, bees and other insect pollinators begin carrying genetically altered pollen into adjoining fields, bringing the possibility of polluting the DNA of other, regular crops.

Genetically modified pollen is sometimes found miles from the official trial sites, indicating that genetic pollution is indeed taking place. The release of genetically modified organisms (GMOs) cannot be reversed in most cases. They reproduce, can cross with related plants or animals, adapt to new environmental conditions and take their own evolution. If something goes wrong, immediately or in one or more generations, there are no means to recall them.

Pollen from genetically engineered plants can also pose a direct threat to beneficial insects. In early 1999, researchers made the discovery that the pollen from a genetically engineered corn species was poisonous for the Monarch butterfly, indicating that other GM crops could also be damaging other beneficial insects.

Box 2: Pesticide-Resistant Super-Bugs

New research published in Nature shows that the GM insect-resistant crops may produce pesticide resistant pests quicker than expected. The insect-resistant crops contain toxins (Bacillus thuringiensis or Bt) genetically engineered into the plants. Scientists and farmers have long known that sooner or later, insects would become resistant to Bt. However, biotech experts claimed the pesticide-resistant bugs would mate with the non-resistant bugs in designated non-GE areas called refuges, delaying the development of pesticide resistance. However, new research shows that the pesticide resistant varieties have a different life cycle, indicating that they may be more likely to mate with each other, and produce pesticide-resistant super-bugs in large numbers.

(source: Biotech News, Nov. 1999)

4.1 Biodiversity and gene technology

Species have always, and will always be subject to extinction. Of all species that ever existed on earth, only one to six percent still survives. Natural selection and evolution make existing species disappear and new species come to life. However, never before has one species has such a dramatic influence over the extinction of other species as does the human species. For the last fifty years, almost two third of the world's biological diversity has been lost forever, in most part due to mankind.

The total spectrum of human activities, such as agriculture, deforestation, live stock breeding and land being used for industrial purposes, have a tremendous effect on our natural environment. Especially frightening are the threats to those ecosystems that are essential for the continuance of evolution such as coral reefs, old lakes and the tropical rainforest, or to ecosystems like drylands, which are essential in providing genetic resources for agriculture.

Effects from overexploitation of biological diversity is not only limited to the user of this biodiversity. Negative actions can also have serious effects on third parties. Erosion due to (illegal) logging can make an area practically unliveable, can deprive people from their main source of income and result in large amounts of eco-refugees, a common phenomenon in the Americas (Van de Wateringen,1997;15). The decline in genetic diversity may result in the definite loss of the natural resources needed to produce the medicine to fight against AIDS or cancer.

Besides the loss of tropical rainforests, deforestation, desertification and the loss of biodiversity in oceans and lakes, the loss of genetic biodiversity in agriculture, agro biodiversity, has become very alarming. More and more acknowledge that the loss of global agro biodiversity could have disastrous effects for the food security for the expected 7 billion people inhabiting this planet in a couple of years.

As genetic diversity is essential for agriculture and forestry, sustainability and diversity are closely connected. Diversity enables the ecosystem to recover

itself when disturbed. In a non-sustainable situation, a disturbance in one aspect of the ecosystem could mean the disturbance of all aspects of the ecosystem. Monocultures are vulnerable, because one disruptance could lead to a chain reaction in which all of the system breaks down. The diversity of genes in crops for example minimise crop failure due to pests or insects, and new varieties can be bred to maximise production or adapt to changing conditions in its environment. As important as genetic diversity is to increasing yields, it is at least as important in maintaining existing productivity. For example, introducing genetic resistance to certain insect pests can increase crop yields, but since natural selection often helps insects quickly overcome this resistance, genetic resistance has to be periodically introduced into the crop just to sustain the higher productivity (WRI). High Yielding Varieties (HYVs), products of the Green Revolution, has led to a trend toward more uniform agriculture. Whereas traditional farming produces modest, but reliable yields, the monocultures producing HYVs may be extremely vulnerable to pests, disease and severe weather, as all the crops are genetically identical, one pest, or fungus could destroy the entire yield.

Box 3: Swiss Detect Contaminated Non-GE Corn from USA

The Swiss Department of Agriculture discovered that guaranteed non-GE corn from the USA was contaminated with genetically modified varieties. The corn was purchased from Pioneer Hi-Bred (USA). Before the contamination was discovered, about 200 hectares of contaminated seeds were planted, and another 200 hectares worth of the seeds were sold. Swiss farmers burned the fields planted with contaminated seeds. The Swiss seed importer compensated farmers 700 Swiss Francs per hectare.

(source: Biotech News, Nov. 1999)

Introducing genetically modified organisms into the natural environment produces unique risks, which the natural environment has never before been exposed to. Pronounced as safe on the basis of laboratory results only, modern gene technology advocates show a poor and simplified view of ecology, denying the complex interaction between all aspects of an ecosystem. Laboratory results do not show how these organisms will behave in the natural environment and in interaction with other, non-genetically modified organisms. Neither does laboratory research show any of the potential socio-economic effects that might result from the introduction of GMOs in agriculture on world scale.

4.2 The Convention on Biological Diversity and the Bio safety protocol

The Convention on Biological Diversity (CBD) was one of the five resulting documents of the United Nations Conference on Environment and Development (UNCED, held in 1992 in Rio de Janeiro). The Convention on Biological Diversity is legally binding and thereby part of international law. The objectives of the Convention on Biological Diversity are "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

The Convention is thus the first global, comprehensive agreement to address all aspects of biodiversity: genetic resources, species, and ecosystems. It recognises - for the first time - that the conservation of biological diversity is "a common concern of humankind" and an integral part of the development process. Under Agenda 21 and the CBD, governments agreed to co-operate on gene technology and related safety issues through information exchange, capacity building and progress toward and international agreement on principles for safety in gene-technology (bio safety). The negotiations on a Bio safety Protocol formally began in 1996, although discussions in the form of intergovernmental meeting started as early as 1992. On 22 - 23rd February 1999 the first Extraordinary Conference of the Parties to the CBD took place in Cartagena (Colombia). This Conference had been convened to adopt the draft Protocol on Bio safety, however, no consensus could be reached on some of the key issues of the Protocol and therefore the Conference was suspended.

Some of the main goals of the protocol are:

- the precautionary principle must be applied when dealing with GMOs;
- every country must have the right to refuse the import of GMOs;
- no exports of GMOs can take place without the approval of the countries involved;
- there must be strict liability and insurance for the possible damage caused by these GMOs;
- All GMOs must be labelled for the consumers;
- GMOs must be kept segregated from natural crops.

While the Convention on Biological Diversity itself does not directly oppose to the biotech industry, the enormous interests involved and discussions on the issue made the gene technology industry nervous enough to pressure the US government not to sign the treaty, which they didn't. There are several reasons for their anxiousness. Both the biotech industry and the US government feared their interests were at stake. And indeed, the CBD contains different elements that address the current state of power relations in the global economy. First, natural resources are not longer regarded as common heritage of mankind.
According to the CBD, each country has sovereignty over the natural resources within its territory. In article 15 this sovereignty is restricted, because each country also has the obligation to make genetic resources accessible to third parties (art.15.2). Access is only permissible on the basis of prior informed consent and to those applications of genetic information or other natural resources that are no threat to the environment (art.15.3 and 15.4). Benefits arising from the use of genetic information should be shared equitable. No specific language is used as to how this is to be done, but the gene technology industry fears it will have to share its technology related to genetic information. The third reason the industry is opposed to the biodiversity convention is that they fear it will undermine the regime on intellectual property rights, which is handled under the WTO agreement (within the TRIPS treaty, concerning Trade Related Intellectual Property Rights).

5. Socio-economic aspects

The 1990s saw a strong concentration of power in the so called 'life industry': the industry sector that is dependent on genetic information and other natural resources. The number of companies involved in agribusiness is shrinking, resulting in a monopolising tendency in agribusiness, food and pharmacy. Market dominance combined with patents give these companies unprecedented control over the products and processes that are essential to human existence: food, farming and health. The risk involved in this situation is that there will be a growing gap between the North and the South and between the rich and the poor. Access to food, nutrition and health is becoming more and more subject to the free market system. The Rural Advancement Foundation International (RAFI) ranking (July/august 1998) of the seed industry giants reveals that the top 10 companies now control $7 billion- or 30%- of the $23 billion commercial seed trade. These top 10 companies have experienced a 25% sale increase in just two years time. Consolidation of companies is nothing new, but different sectors of industry seem to merge together. The traditional lines between seed, agrochemical, gene-technology, drug and food corporation is disappearing. These huge corporations have enormous economic might; they have more power than many nation states.

The power that gene-technology corporations have is illustrated by their influence during the negotiations on the Biodiversity Convention. As described above, the industry showed itself a strong opponent of this Convention. By using strong lobby force on the US government, and being a financial supporter of republican US president Bush, the gene technology lobby was able to stop the US government from signing the treaty. Recently, the gene-technology industry gave up their opposition, probably realising they could increase their influence in the coming negotiations by becoming a member of the Convention.

5.1 Intellectual Property Rights

Over the past years the gene technology industry has filed thousands of patents on genes, but also on entire plants and animals and even parts of human bodies. Patents give their owner the exclusive right to use them over a certain period of time and demand royalties from everybody to whom they give a license to use their patent.
The general principle behind the protection of intellectual property is that the owners of the patent should have a temporary monopoly over the exploitation of their innovation. The original idea was that intellectual property rights would stimulate innovations, since corporations would invest more in research and development when their efforts would be rewarded. The other side of the coin was that these corporations had the obligation to share their knowledge related to their innovation. Recent developments in the system of intellectual property rights seem to ignore the last part and place more importance on the first (Van de Wateringen,1997;40).

Companies cannot file for a patent on any given organism. There has to be an innovative aspect, e.g. it has to be new, innovative and industrially applicable. Original, raw natural material can therefore never be subject to a patent, and farmers can always continue using these raw natural resources. The main risks involving the current intellectual property rights regime are therefore not that farmers can no longer use plants and other natural resources available in their direct natural environment. The main reason for concern is the eventual consequence that only a hand full of companies will dominate the global seed market. Offering package deals to local farmers, not only offering them 'wondercrops', but also including the whole package of fertilisers and pesticides needed to receive the greatest possible yield, make farmers totally dependent on these companies. If local farmers are convinced into using genetically modified, patented seeds, a further consequence will be seen in the disappearance of local varieties of crops. The negative impact of this loss in genetic biodiversity was described above.

The TRIPS (Trade Related Aspects of Intellectual Property Rights) agreement, signed under the WTO, could have serious implications for third world agriculture and farmer's rights. It requires governments to afford patent protection for micro-organisms and biological processes involving them, which include genetic engineering processes and genetically engineered animals and plants. It also requires that intellectual property rights on plant varieties be protected either through patenting or through an 'effective sui generis system of protection'. In practice this means that the knowledge of farmers and indigenous peoples will not be legally recognised, while the corporations which genetically modify biological resources found in the Southern countries, will be rewarded for applications they themselves did not discover. Countries of the South will then have to buy expensive biotechnological products, even though the biological basis (and knowledge on their utilisation) of these products may originate in their own country.

5.2 Socio-economic effects for developing countries

In many countries, government policies have stimulate the transformation from a local orientated, farmer based agriculture towards a farming system that is largely based on global markets. Often this resulted in the shift from a diverse agricultural system, to a system that uses a few high external-input varieties (using huge quantities of fertilisers, insecticides and so forth). Besides the effects on genetic diversity described above, one can imagine the social effects when societies are transformed as quickly as they have been. Traditionally small and closed societies are being forced to rapidly adapt to the global economy, entirely altering their social structures. Similar experiences resulting from the Green Revolution back in the sixties and seventies don not bring much console: the sudden disruption of social structure caused a social catastrophe not yet recovered. Because the High Yielding Varieties of the Green Revolution only worked under ideal conditions (water supply, constant climate), farmer's working with them in other than ideal circumstances were confronted with high yield losses.

The consequences of introducing modern gene technology in developing countries are closely connected to the safety issue. The transfer to developing countries of projects or experiments involving genetic engineering could be hazardous; at least until safety regulations are put in place in these countries. There is also a well-justified concern in these countries that the development of new biotechnologies will develop food products which would displace the traditional export commodities of the South (Khor, 1999).
The United Nations Conference on Trade and Development conducted several technology assessment studies. The main conclusions were that although the (export) opportunities created by gene technology are of great importance, this potential might not be realised due to secrecy and confidentiality characterising private and also public institutions. Furthermore, the ability of developing countries to realise the potential of gene technology depends on the size and quality of their investment in adaptive research and development. At the same time, there is less demand for raw materials on the world market due to, among other factors, substitution. The current low market prices for raw materials make the substitution through the products of modern gene technology less profitable. Nevertheless, the availability of biotechnological alternatives might create a pressure on world market prices (Biotechnology and development monitor, June 1995).

The effects of substitution may in fact be aggravated by the increasing competition as a result of gene technology, which takes place not only between North and South, but also within the South. The diffusion of gene technology does not take place at the same speed in all countries and results in an unequal distribution of a new production process. According to the Organisation for Economic Co-operation and Development (OECD), only about ten developing countries have major gene technology research programs.

Box: 4 US Patenting India's Genetic Resources

American owned Cromak Research was recently granted a patent on a combination of three Indian herbs, which has been used for centuries in India for the treatment of diabetes. India's scientists are furious. "It's outrageous", said Suman Sahai of GeneCampaign, set up to protect genetic resources and farmers' rights. "This amounts to theft, a violation of our indigenous knowledge. The Americans are stealing fromus with impunity and dispossessing Indians of what is rightfully theirs. It's like someone stealing Coca-Cola's formula and getting away with it."

(source: Biotech News, Nov. 1999).

6. Gene Technology and Food Security

The gene technology industry has always tried to conceal their economic motives through ideological arguments. One of their favourite arguments is that gene-technology will make it possible to end world hunger. But there is no simple technological solution to end world hunger. The Green Revolution gives us a great example in this aspect. Gene technology is not the answer, just as chemical pesticides were not the answer. Nor is ending world hunger a simple matter of increasing food production. According to the FAO, current world food production is sufficient to provide every person with more than 2,700 calories per day - yet over 800 million people in the developing world suffer from a chronic lack of nutrition. Hunger and poverty are closely linked. That is, while there is more than enough food in the world, hunger persists. Hunger is a social phenomenon of how food production and distribution is organised, not a natural phenomenon of crop failures, food shortages or other "acts of nature" leading to absolute shortages of food.

Box 5: Terminator technology

In May of 1999, 500 Indian farmers travelled throughout Europe. This Inter Continental Caravan, as they call themselves, protested against the rise of an international free trade-regime, globalisation and the ever-growing control multinational companies have over, for example, the international seed market. The protest was in particular focused on the new technology developed by Monsanto: the terminator technology, first developed by Delta & Pine Land Co. This technique, while allowing the seed to grow to a mature plant, prevents the plant from producing fertile seeds. In effect, farmers can only use the seed once, having to buy new seeds every year. This will have severe consequences for farmers worldwide, particularly in developing

countries. Farmers in developing countries are used to buying new hybrid seeds every year. These seeds do not produce the same yielding every year, but they do have the opportunity to replant the seed and hope for the best. Apart from planting regained seeds, they are also used for small-scale trading purposes. Terminator technology will end this practice. Farmers will have to buy new seeds every year, making them completely dependent on large, multinational seed companies.

(The Economist, Oct. 1999).

Delta & Pine Co. was given a patent licence on this technique in March 1998. Two months later, Monsanto bought Delta & Pine Land Co. for the total sum of 1,8 billion US dollars. After 18 months of controversy and public opposition, Monsanto recently made the surprising announcement that it will not be commercialising sterile seed technologies.

7. Arguments for and against 'genetic engineering'

	Pro	Con
1	Genetransfer is not an unnatural process. In nature, transfer between genes also takes place, e.g. through cross-fertilisation	Transfer of DNA, as the result of a natural process is not the same as DNA transfers through the deliberate action of men. Ecosystems can only take so many mutations in a given period, natural gene transfer is a slow process and not comparable to the sudden introduction of strange DNA in the ecosystem by genetically modified organisms. Ecosystems have their own stability due to the dynamic relationship between different organisms and their genetic information. Biodiversity is crucial for the stability of the ecosystem and it's biodiversity that is under threat by modern biotechnology. Monoculture threatens genetic diversity in agriculture making it more vulnerable to pests and plagues.
2	Modern gene technology does not differ fundamentally with gene technology, as we have known for centuries. Modifying natural species is a practice known by man for centuries and has proven to be useful for human society in the form of medicine, crops and livestock breeding.	Breeding and cross-fertilisation of organisms is possible to a certain extent. Only related organism can be combined and the physiology of the organisms still remains an important aspect of biotechnological applications, whereas in modern gene technology the organism is nothing more than a collection of genes without physical shape.
3	The physical characteristics of an organism can be determined by knowledge of the genetic information of this organism.	Physiological characteristics of an organism, being a plant or human or any other living organism, are determined by more than just its DNA. Environmental aspects and the interaction between different genes also have their part in determining the physical characteristics of the organism. The definite effect of DNA on the physiology of the organism and the interrelation between genes remains uncertain and therefore a risky business.
4	Developments in science always involve taking risks.	Most scientific experiments take place in the safe haven of the laboratory. Modern gene technology goes beyond the experimental setting and introduces genetically modified organisms into the natural environment, without knowing the possible consequences for other organisms and ecosystems. Not enough knowledge is available to guarantee safety.
5	Advantages of modern gene technology, such as medicine, higher yields in agriculture en less pesticide use, compensate for potential dangers	Advantages of modern gene technology are only temporary in nature. Pest or insect resistance is usually only temporary, because insects and pests can mutate quickly enough to withstand the poison in the plant. Lesser chemical use is often used as a pro argument, but practice shows that no lesser amount of pesticides and chemicals are being used. Economic relations between North and South cause world famine, not an absolute food shortage. Modern gene technology only strengthens this unequal distribution of power. The system of intellectual property rights results in a monopolising tendency meaning that only a few large seed companies control the world market, leaving farmers totally dependant.

6	Research shows that genetic engineering is safe.	Research is more than often incomplete and based on the simplistic assumption underlining much of the research, namely that knowledge of the genetic information about the organism is enough to determine the physiological characteristics of the organism. Research is not focused on the eventual effects of the GMOs interaction in the natural environment, effects that may appear after years.

8. The Role of NGOs

The discussion about modern gene-technology reveals a complex network of different stakeholders. NGOs play an important role in the creation and maintenance of information flows, awareness building and are often initiators of public debate. Also, they enhance the development of alternative production methods, based on principles of organic agriculture, and optimal use of the local knowledge and biotic resource base.

Farmers are a key agent in the maintenance of biotic resources. Over the past millennia, they have developed and applied numerous techniques to make agricultural production more efficient. If they accept the large scale application of GMOs, traditional knowledge becomes useless, and farmers will loose their independence and their role as guardian of biodiversity.

Scientific and research institutions are the main developers of new techniques for genetic engineering. These institutions created and maintain 'ex-situ' gene-banks of species, of which most originated in the South. Most of these banks are located in, and owned by the North. These banks are vital to the further development of modern gene technology applications.

The stance of Governments are very diverse, from clearly in favour to the development and application of gene technology to active agents in the discussion against GMOs. What is clear, is that on a governmental level, except for the USA, the discussions will be fierce and controversial.

The private sector is a very diverse stakeholder. Approximately ten multinational food producers and pharmaceutical enterprises are fierce

proponents of modern gene-technology. On the other hand, supermarkets and retail stores, as well as large-scale producers, responding to demands of consumers, are still refusing GMOs.

Consumers in industrialised countries have shown strong opposition against genetically engineered food. In other countries such a clear outcry has not yet been heard, but the discussion is increasing.

8.1 Consumers against genetically modified food

Resistance against genetically modified food is growing stronger every day. This consumer campaign is particularly strong in Europe, where - according to many public surveys a majority of consumers does not want genetically modified food and more than 90% demand clear labelling of all GMO in food.

In Germany for instance 250,000 people have joined Greenpeace's "No GE shopping network" actively writing and talking to their supermarkets and food companies asking them to stay free of genetic engineering. More than 300.000 have signed an appeal to the government not to allow genetically engineered food on the market.

In Austria 1,2 million voters have signed a referendum to stop the release of genetically modified organisms into the environment and to keep GMOs out of their food. The Austrian government has subsequently banned the growing and import of the GMOs presently legalised for planting in the European Union (Novartis Maize). Luxembourg followed Austria and so did Norway. In most other European countries the maize cannot be grown, as the seeds are not approved for commercialisation.

Tens of thousands of citizens all over Europe have appealed to the French prime minister Lionel Jospin not to allow

the growing of GMs maize, designed by the multinational Novartis. The maize has been grown in France for the first time on a commercial base in Europe. However in the end Novartis could not sell more than seeds for 500 hectares (out of 1,3 million hectares) of its GM's maize.

In Greece the association of supermarket-retailers issued a statement saying they did not want to sell GMOs in their supermarkets. In Germany, Switzerland, France, Denmark and Sweden Greenpeace's "genetic detectives" are exposing genetically engineered products in supermarkets. Most of these products have been withdrawn after they were detected.

In Great Britain Greenpeace issued a "disloyalty card" against Unilever, who introduced genetically engineered instant food (Beanfeast). Thousands have joined that initiative and one supermarket chain already withdrew the products. Another supermarket chain, "Iceland" actively committed itself to guarantee all their products are GMO free in the future.

In France and Luxembourg big supermarket chains withdrew "tortilla chips" which contained Novartis GMO maize.

In the United States, where GMOs, such as Monsanto's "Roundup ready" soybeans or insecticide containing maize and cotton are now planted in large quantities, the US Department of Agriculture tried to set up rules for organic farming, also providing allowances for genetic engineering. In a national campaign organic agriculture organisations and concerned NGOs organised the resistance against these plans. More than 150.000 complaints against the inclusion of genetic engineering finally forced the USDA to withdraw their plan and acknowledge that organic farming is incompatible with genetic engineering.

(Source: Greenpeace international)

8.2 What can you do?

There are different things individuals and groups can do in trying to stop genetic engineering. Everybody can make a difference, however small your effort may seem. Writing a letter to your local politician or supermarket manager doesn't take up much of your time. When they receive thousands of letters they cannot do anything else but listen to what people have to say. Yourself, as a consumer, can also make a tremendous change. Business is about making money and when people stop buying foods that have GMO ingredients, producers have no choice but to stop using these ingredients. Throughout this paper you have seen different examples of how people have reacted to the GMO challenge. You can use these examples and start projects or other initiatives in your own neighbourhood, county or state.

To summarise, these are some of the actions you can take:

- Write to local and national politicians. In a democracy, you can demand that they take action on behalf of their voters in banning GE crops in your country.
- Contact farmers and farmer's organisations and ask them to stay GE-free.
- National and international environmental organisations can provide them with suitable alternatives for genetically engineered crops.
- Write letters to producers using genetically engineered ingredients in their products.
- Ask your supermarket manager to guarantee foods that are free from genetic engineering.
- Buy organic food.
- When you are not sure you are buying genetic engineered-free food, ask the supermarket manager or the producer.
- Bring back products that are labelled as containing GE-ingredients.
- When part of an environmental group, you can start a project aimed at informing your fellow citizens of the hazards of genetically engineered food.
- As an individual, you can start with your family, friends and people you work with.
- Most newsletters and magazines have public opinion sections. Every time papers publicise a pro-genetic engineering article, you could send a letter, which explains otherwise. If they receive different letters on this subject,

chances are that one of them might be publicised.
- Get in touch with other organisations to discuss and undertake action that is most appropriate to your situation.

9. Organisations

Over the past couple of years literally hundreds of non-governmental organisations all over the world became active in opposing genetic engineering. Below you will find a selection of environmental-, consumers-, scientific and Farmer's organisations undertaking action against genetic engineering in agriculture. All were taken from the official GM-resistance register publicised by A SEED Europe. You can contact these organisations for information and advice.

International level

Greenpeace International
Contact persons: Benny Haerling, Barbara Kueppper
Address: Chausseestr. 131, D-10115 Berlin, Germany
Tel.: +49-30-308.89914
E-mail: bkuepper@greenpeace.de, bhaerlin@greenpeace.de

Look at the website: http://www.greenpeace.org/~geneng for national Greenpeace offices, extensive information about all aspects of genetic engineering and links to other relevant websites.
Greenpeace International oppose the release of genetically modified organisms into the environment. Part of their campaign focuses on the international market for such GMOs from the farmers to the supermarket, including commodity trade, processors, food producers, retailers and consumers.

Action Group on Erosion, Technology and Concentration (ETC-Group)
formerly known as RAFI (Rural Advancement Foundation International)
Address: 110 Osborne St., Suite 202, Winnipeg MB R3L 1Y5, Canada
Tel.: +1-204-453.5259; Fax: +1-204-925.8034
E-mail: rafi@rafi.org
Website: http://www.etcgroup.org

The ETC-Group is dedicated to the conservation and sustainable improvement of agricultural biodiversity, and to the socially responsible development of technologies useful to rural societies. ETCGroup is also concerned about the loss of genetic diversity, especially in agriculture, and about the impact of intellectual property rights on agriculture and world food security. In recent years, RAFI and numerous other NGOs have worked together and successfully brought down some unjust and immoral patent claims.

World Resources Institute (WRI)
Address: 10 G street, NE (suite 800), Washington, DC 20002, USA
Tel.: +1-202-729.7600; Fax: +1-202-729.7610
E-mail: lauralee@wri.org
Website: http://www.wri.org

WRI provides, and helps other institutions to provide, objective information and practical proposals for policy and institutional change that will foster environmentally sound and socially equitable development.

GRAIN (Genetic Resources Action International)
Address: Girona 25, pral, 08010 Barcelona, Spain
Tel.: +34-93-301.1381; Fax: +34-93-301.1627
E-mail: grain@bcn.servicecom.es
Website: http://www.grain.org

GRAIN is an international NGO whose main objective is to help further a global movement of popular action against genetic erosion by means of promoting popular control of agricultural biodiversity, stopping the destruction of biodiversity by industrial agriculture and by giving support to agricultural biodiversity-based programs.

European level

A Seed Europe (Environmental Youth NGO)
Contact persons: Stephanie Howard, Helen Holder, Daniel Swartz

Address: PO Box 92066, 1090 AB Amsterdam, the Netherlands
Tel.: +31-20-668.2236; Fax: +31-20-468.2275
E-mail: steph@aseed.antenna.nl, helen@aseed.antenna.nl, kuka@swartz.zpok.hu, groundup@aseed.antenna.nl
Website: http://www.GRoundUp.org

A Seed Europe specialises in copyrights/patents, EU Crop administration, EU legislation, field trials, monitoring multinational corporations, sustainable development and TRIPS.

European Farmers Co-ordination (CPE)
Contact persons: Nico Verhagen, Gerard Choplin
Address: Rue de la Sablonnière18, 1000 Brussels, Belgium
Tel.: +32-2- 2173112; Fax: +32-2-2184509
E-mail: cpe@cpefarmers.org
Website: http://www.cpefarmers.org

CPE is specialised in organic agriculture, Farmer's Union, biodiversity, biopiracy, biosafety, food safety, national legislation, reduction of agro-chemical use and sustainable development.

Friends of the Earth Europe - Biotechnology Program
Contact person: Gill Lacroix
Address: 29 rue Blanche, 1060 Brussels, Belgium
Tel.: +32-2-542.0180; Fax: +32-2-537.5596
E-mail: info@foeeurope.org
Website: http://www.foeeurope.org
GMO Contamination around the world: http://www.foeeurope.org/publications/Final_GMO_Contamination.pdf

Friends of the Earth Europe specialises in antibiotic use, biodiversity, biopiracy, biosafety, consumer protection, food safety, IPR's, monitoring multinational corporations, organic agriculture, sustainable development and TRIPs.

Latin America

Brazil
Centro Ecológico
Contact person: Maria José Guazzelli
CP 21,95, 240-000 Ipé, Brazil
E-mail: flaviobo@zaz.com.br

Advise and information for NGOs, farmers and government in relation to ecological products and production. Objectives are to improve socio-economic conditions of farming families and the preservation of local ecosystems.

Costa Rica
Programa Cambios-UNA
Contact person: Silvia Rodriguez
Address: Apartado Postal 86, 3000 Heredia, Costa Rica
Tel.: +506-277-3601/3290; Fax: +506-240-7374
E-mail:silviar@una.ac.cr

Specialisation in research into bio-prospecting, biosafety, consumers protection, ethics, public participation/right to know.

Ecuador
Red Interamericana de Agriculturas y Democracia (RIAD)
Contact person: Fernando Larrea
Address: San Ignacio 134 y 6 de diciembre, Quito, Ecuador
Tel.: +593-2-504-496; Fax: +593-2-504-496
E-mail: ferhpi@uio.satnet.net
Website: http://www.riad.org

Specialisations are bio-prospecting, biosafety, food-security, ethics, monitoring multinational corporations, public participation/right to know, research.

Red por una Latino America libre de transgenicos - Accion Ecologica
(Umbrella organisation of anti-genetic engineering NGO’s)
Contact person: Eliabeth Bravo
Address: Alejandro de Valdez N24-33 y La Gasca, 12-15-246C Quito, Ecuador
Tel.: +593-2-547.516; Fax: +593-2-527.583
E-mail: ebravo@hoy.net

Specialises in Bio-Prospecting, biopiracy, biosafety, consumers protection, Farmer';s Union, Human Genome project, monitoring multinational corporations,

national legislation, organic agriculture, sustainable development and TRIPs.

Asia

Bangladesh
Bangladesh Krishok Federation (Farmers Union)
Contact person: Badrul Alam
Address: 274/2 South Jatrabari, 3rd Floor, Dholaipar Bus stand, 1204 Dhaka, Bangladesh
Tel.: +880-193-40276; Fax: +880-295-65506/65483
E-mail: gbs@dhaka.agni.com

Specialises in farmers issues, food safety, food security, monitoring multinational corporations, organic agriculture, research, seed and sustainable development.

India
Forum for Biotechnology and Food Security
Contact person: Devinder Sharma
Address: PO Box 4, Lajpat Nagar-IV, 110-163 New Delhi, India
Tel.: +91-11-525.0494
E-mail: dsharma@del6.vsnl.net.in, eeg@sdalt.ernet.in

Specialises in food security.

Research Foundation for Science, Technology, and Natural Resources Policy
Contact person: Vandana Shiva
Address: A 60, Hauz Khas, 110-016 New Delhi, India
Phone: +91-11-696.8077/685.3772; Fax: +91-11-685.6795
E-mail: rfste@ndf.vsnl.net.in
Website: http://www.vshiva.net

Specialises in bio-prospecting, biodiversity, biopiracy, biosafety, ethics, field trials, food safety, food security, national legislation, organic agriculture, reduction of agro-chemical use, sustainable development and TRIPs.

Indonesia
World Food Day - Farmers and Fishermen Movement of Indonesia
Contact person: Paulus Hardiyoko
Address: Tegal Gendu KG II RT 50/XI, 55172 Yogyakarta, Indonesia
Tel.: +62-024-380.776; Fax: +32-024-380-776
E-mail: ganjuran@indosatnet.id

Specialises in biodiversity, Farmer's Union, field trials, food security, IPR’s, organic agriculture, sustainable development.

Japan
Consumers Union of Japan - No GE Technology Campaign Office
Contact person: Setsuko Yasuda
Address: Asaga Building 2F, 1-10-16 Meguro, Honmachi, Meguro-ku, 152-0002 Tokyo, Japan
Tel.: +813-3711.7766; Fax: +813-3715.9378
E-mail: nishoten@jca.ax.apc.org

Specialises in antibiotic use, biodiversity, biodynamic farming, biosafety, cloning, endocrine disrupters, labelling, organic agriculture, other medical applications, transgenetic animals, sustainable development.

Korea
Green Korea United
Contact person: Lee So-Young, Youk Kyung Suk
Address: 1004 Garden Tower, 98-78 Wooni-dong, Chongno-/ku, 110-350 Seoul, Korea
Tel.: +82-2-747.8500; Fax: +82-2-766.4180
E-mail: environ@chollian.net
Website: http://www.greenkorea.org

Green Korea United is specialised in Bio-prospecting, biodiversity, biosafety, ethics, cloning/patents, Human Genome Project, labelling, monitoring multinational corporations, organic agriculture and sustainable development.

Malaysia
Third World Network & Consumers Association of Penang
Contact person: Martin Khor
Address: 228 Macalister Rd., 10400 Penang, Malaysia
Tel.: +60-4-226-6728; Fax: +60-4-226-4505
E-mail: twn@igc.org, twnet@po.jaring.my
Website:

http://www.southbound.com.my/souths/cap/cap.htm

Specialises in consumers protection, food safety, South and the development context.

Nepal
A Seed Nepal
Contact person: Ramesh Pant
Address: P.O. Box 7933, Kirtipur Kathmandu, Nepal
Tel.: +977-1-332.004
E-mail: rameshannfsu@hotmail.com

Specialises in animal welfare, biodiversity, biosafety, reduction of agro-chemical use, south and the development context and sustainable development.

Thailand
Biothai (Biodiversity and Community Right Action Thailand)
Address: 80/8 soi 5, Ngam-worgwan 27, Ngam-wongwanrd., Muang District, Nonthaburi 11000, Thailand
Tel.: +66-2-952.7371/952.7953
E-mail: biothai@pacific.net.th
Website: http://biothai.topcities.com/aboutBiothai.html

Australia & Pacific

Australia
Australian Gene Ethics Network (AGEN)
Contact person: Bob Phelps
Address: c/-ACF 340 Gore Street, 3065 Fitzroy, Australia
Tel.: +61-3-9416.2222; Fax: +61-3-9416.0767
E-mail: info@geneethics.org
Website: http://www.geneethics.org

A federation of groups and individuals who promote critical discussion and debate on the environmental, social and ethical impacts of genetic engineering technologies.

New Zealand
Soil & Health Association of New Zealand
Contact person: Chris Wheeler
Address: PO Box 36-170, Northcote, New Zealand
Tel.: +64-9-480.4440; Fax: +64-9-480.4440
E-mail: soil&health@pl.net
Website: http://www.soil-health.org.nz

Specialises in animal welfare, antibiotic use, bio-prospecting, biodiversity, biodynamic farming, biopiracy, BSE, cloning, ethics, EU Crop Admissions, Farmer's Union, IPRs, national legislation, organic agriculture, pharmaceutical applications, religious ethics, research, transgenetic animals, TRIPs and xeno-transplantation.

Africa

Algeria
Seddouk Ecology Association
Contact person: Berkani Aissa
Address: 1 rue Boudiba Larbi, 06500 Bejaia, Algeria
Tel.: +213-532-2467; Fax: 213-532-2676
E-mail: ALBerkani@yahoo.fr, ABerkani@dromadaire.com

Specialises in animal welfare, biodiversity, biodynamic farming, cloning, consumers protection, ethics, national legislation, South and the development context and sustainable development.

Ethiopia
Institute for Sustainable Development
Contact person: Sue Edwards, Tewolde Berhan Gerbe Egziabher
Addis Abeba, Ethiopia
E-mail: sue@padis.gn.apc.org

Specialises in biosafety and sustainable development.

Western Europe

Austria
Global 2000
Contact person: Daniel Hausknost, Ulli Sima
Address: Flurschutzstraase 13, 1120 Vienna, Austria
Tel.: +43-1-812.57300/812.57310; Fax: +43-1-812.5728
E-mail: ulli.sima@global2000.at, global2000@global2000.at
Website: http://www.global2000.at

Specialises at biopiracy, consumer protection, EU Crops Admissions, EU

legislation, field trials, food safety, national legislation, organic agriculture.

Belgium
Centre d'Etudes et de Formation en Ecology
Contact person: Michel Sornville
28 Rue Basse Marcelle, 5000 Namur, Belgium
Tel.: +32-8-122.5848; Fax: +328-123.1847
E-mail: ecolo.cefe@ecolo.be
Website: http://www.ecolo.be

Specialises in all aspects related to environmental issues, biodiversity and sustainable development.

Denmark
Friends of the Earth Denmark (NOAH)
Contact person: Mads Tiesen (chairman)
Address: Norrebrogade 39 1, 2200 Copenhagen, Denmark
Tel.: +45-3536.1212; Fax: +45-3536.1217
E-mail: foedenmark@nn.apc.org
Website: http://www.noah.dk/english.html

Specialises in animal welfare, biodiversity, copyrights/patents and ethics.

France
Action OGM - Direct Action Group
Contact person: Bethan Stagg
Address: 4, rue Bodin, 69001 Lyon, France
Tel.: +34-782-72982; Fax: +34-782-85578
E-mail: maison.ecologie@wanadoo.fr, bethanstagg@hotmail.com

Specialises in EU Crop Admissions, EU legislation, Farmer's Union, food safety, monitoring multinational corporations and national legislation. Also produced a guide on anti-GMO Direct Action in French and English (Spanish will follow).

Friends of the Earth France / Les Amis de la Terre
Contact person: Phillipe Lequenne
Address: 38, rue Meslay, 75003 Paris, France
Tel.: +33-1-48.87.3344; Fax: +33-1-48.87.285.23
Website: http://www.amisdelaterre.org/pages/anglais/englishpresentation.html
Information about all environmental issues. Special publications about gene-technology.

Germany
Gen-ethisches Netzwerk (GeN)
Contact person: Henning Strodthoff
Address: Brunnenstraße 4, 10119 Berlin, Germany
Tel.: +49-30-685.7073; Fax: +49-30-684.1183
E-Mail: gen@gen-ethisches-netzwerk.de

Ireland
Genetic Concern
Contact person: Clare Watson, Quentin Gargan
Address: Room 13a, Dame House, 24-26 Dame Street, Dublin 2.
Tel.: +353-1-670.5606; Fax: +353-1-670.5561
E-mail: geneticconcern@tinet.ie
Website: http://wwwvibrantplanet.com/geneticconcern

Genetic Concern is specialised in field trials, national crops admissions, national legislation and lawsuits.

Italy
Comitato Scientifico Antivivisezionista
Contact person: Fabrizia Pratesi
Address: Via Piero Antonio Micheli 62, Rome, Italy
Tel./Fax: +39-6-322.0720
E-mail: csafin@iol.it, aversano@humet.it

Specialises in animal welfare, biosafety, copyrights/patents, EU legislation, research, South and the development context and xeno-transplantation.

The Netherlands
Alternatieve Konsumenten Bond (AKB)
Contact persons: Diederick Spangers, Richard Zwiers
Address: PO Box 61236, 1005 HE Amsterdam, the Netherlands
Tel.: +31-20-626.3338; Fax: +31-20-686.7361
E-mail: gentech@akb.a2000.nl
Website: http://www.pz.nl/akb

The AKB is specialised in issues related to sustainable development: social equity, environmental issues and human rights.

Dutch Platform on Genetechnologies
(Umbrella organisation on anti-genetic engineering NGOs)
Contact person: Micha Kuiper

PO Box 56684, 1040 AR Amsterdam, the Netherlands
Tel.: +31-30-231.6566; Fax: +31-20-693.7681
E-mail: npg@dds.nl

Specialises in all areas related to modern gene technology and sustainable development.

Spain
See GRAIN, listed under international organisations

Sweden
Jordens Vanner (Friends of the Earth Sweden) - Agricultural Committee
Contact person: Charly Hulten
Address: Lokevagen 24, 187 76 Taby, Sweden
Tel.: +46-8510-12778; Fax: +46-8510-13139
E-mail: inotherwords@swipnet.se, charly.hulten@mjv.se

Specialises in all areas of sustainable development, including animal welfare and legal questions.

United Kingdom
Corporate Watch
Address: 16b Cherwell St., Oxford OX41BG,
Tel.: +44-1865-791-391
E-mail: mail@corporatewatch.org
Website :
http://www.corporatewatch.org.uk

Corporate Watch is specialised in monitoring multinational organisations and research.

Friends of the Earth UK
Contact persons: Adrian Bebb, Adrian Riley
Address: 26-28 Underwood St., N1 7JQ London, UK
Tel.: +44-171-490.1555; Fax: +44-171-490.0881
E-mail: foodbio@foe.co.uk
Website: http://www.foe.co.uk

FOE is specialised in areas of sustainable development and gene technology.

Gaia Foundation
Contact person: Helena Paul
Address: 18 Well Walk, NW1 1LD London,
Tel.: +44-171-435.5000; Fax: +44-171-431.0551
E-mail.: gaia@gaianet.org
Website:
http://www.ukfg.org.uk/pages/organisations/ogaia.htm

The Gaia Foundation is specialised in bio-prospecting, biodiversity, biopiracy, IPR’s and TRIPs.

Genetic Engineering Network (GEN)
PO Box 9656, N4 4JY London, UK
Tel./Fax: +44-187-364.9516
E-mail: genetics@gn.apc.org
Website: http://www.dmac.co.uk/gen.html

GEN is an information sharing network with its own e-mail list; to subscribe write to genetics@gn.apc.org

Central and Eastern Europe

Croatia
Green Action Zagreb
Contact persons: Danijel Dubicanac, Vladimir Lay, Andrija Vranic
Address: Ozaljska 93/III, 10000 Zagreb, Croatia
Tel.: +385-1-363-12-362/330-361
E-mail: danijeld@usa.net, vlay@public.sre.hr, zelena-akcija@zd.tel.hr

Czech Republic
GAIA
Contact person: Marie Haisova
Address: Lublanska 18, 12000 Prague, Czech Republic
Tel.: +420-22-492-1080; Fax: +420-22-492-0342
Website: http://www.ecn.cz/gaia

GAIA is specialised in biodiversity, biosafety, consumers protection, ethics, national self-sufficiency, organic agriculture and sustainable development.

Hungary
Biokultura Association (Hungarian Association of Organic Farmers)
Contact person: Eva Daroczi
Address: Kitaibel Pal u. 4, 1024 Budapest, Hungary
Tel.: +36-1-316-2138; Fax: +36-1-316-2139
E-mail: figi@biok.datanet.hu

Poland
Green Federation
Contact person: Bartek Kulinski
Address: ul. Urzednicza 9a/53, 25729 Kielce, Poland
Tel.: +48-41-345-4943; Fax: +48-41-343-0342

Romania
Mama Terra/For Mother Earth Romania
Contact person: Aungira Aurel, Dana Caraivan
Address: A. Obregia 5/R14/69, S.4, 75571 Bucharest-8 2, Romania
Tel.: +40-92-349-522; Fax: +40-1-231-1175
E-mail: romania@motherearth.org

Specialisations are biodynamic farming, food safety, organic agriculture, reduction in agro-chemical use and sustainable development.

Russia
Eco-Accord
Contact person: Andrei Ivaschenko
Address: pr. Mira 36 (510, 512), 129010 Moscow, Russia
Tel.: +7-95-280-8067; Fax: +7-95-280-4250
E-mail: ndrei@aivaschenko.home.bio.msu.ru

Ukraine
Information Centre "Green Dossier"
Contact person: Tamara Malkova
POB 201, 252025 Kiev 25, Ukraine
Tel./Fax: +380-44-477-3110
E-mail: tamara@akcece.kiev.ua, dossier@gd.freenet.kiev.ua

Specialises in biosafety, ethics, EU legislation, food safety, national legislation and public participation.

Northern America

United States
Campaign for Food Safety
Contact person: Ronnie Cummins
Address: 860 Highway 61, Little Marais, MN 55614 USA
Tel.: +1-218-226.4164; Fax: +1-218-226.4157
E-mail: alliance@mr.net
Website: http://wwwpurefood.org

Works in all areas of sustainable development, gene technology and animal welfare.

Council for Responsible Genetics
Contact person: Martin Teitel
Address: 5 upland Rd., suite 3, Cambridge, MA 02140, USA
Tel.: +1-617-868.0870; Fax: +1-617-491.5344
E-mail: crg@gene-watch.org
Website: http://wwwgene-watch.org

Specialises in all aspects related to modern gene technology. Published ‘No Patents on Life’ Petition (French, English and Spanish)

10. Bibliography

From the internet:

Colby & Nance, The biosafety protocol negotiations and U.S. gene technology industries, October 4th 1999, at http://conan.nova.org

Convention on Biological Diversity, treaty text at http://www.biodiv.org

Cummins, R., Hazards of genetically engineered foods and crops, Campaign for Food Safety/Organic Consumers Association, 1999, at http://www.purefood.org and http://www.organicconsumers.org

Greenpeace International, International Genetic Engineering Campaign, November 1999, at http://www.greenpeace.org

Khor, M., Economic globalisation and eroding international co-operation: implications for agricultural and rural sustainability, Third World Network, 1999

Lean, G., GM foods victory for Grass-roots action. Now most of the big names in the food industry are to ban GM products - but it is thanks to the consumer, not to the government. Independent Newspaper, London, May 2nd 1999, at http://www.poptel.org.uk

Ling, C.Y., Concerted moves to undermine a strong biosafety agreement, Third

World Network, October 4th, 1999.

ETC-Group (formerly RAFI)
The Geopolitics of biodiversity: A Biodiversity Balance Sheet, January/February 1996,
The Life Industry, September 1996,
Seed Industry Consolidation: Who Owns Whom?, July/August 1998,
The Gene Giants, Masters of the Universe?, March/April 1999
Terminator Terminated?, Monsanto surrenders ‘suicide seeds’ but continues work
on other Traitor Technologies, October 4th 1999
All at: http://www.etcgroup.org

Wallman, S, A Short History of Biotechnology, at http://biotech.tec.nh.us

Waugh, P., British Stores Tesco and Unilever Ban Genetically Manipulated Products. Independent Newspaper, London, April 28th 1999, at http://www.poptel.org.uk

Wolfson, R., Biotech News, Reprinted with permission from the November 1999 issue of Alive: Canadian Journal of Health and Nutrition

World Resource Institute (WRI), Agriculture and Genetic diversity, at http://www.wri.org

Zedan, H., UNEP biosafety programme initiatives, at http://www.unep.org

Other sources:

Gene technology and Development monitor, The unpredictability of biotechnology,
no.23, June 1995

Biotechnology and Development Monitor, Effects of biotechnology on agro-biodiversity, no.35, June 1998
Biotechnology and Development Monitor, Farmer’s Rights and Plant Genetic Resources, no.36, September/December 1998
Website: http://www.biotech-monitor.nl
Economist, the, ‘Fertility rights’, October 9th 1999

Pistorius, R., Wijk, J. van, The Exploitation of Plant Genetic Resources,
Political Strategies in Crop Development, University of Amsterdam, the Netherlands, 1999

Ramprasad, V., Genetic engineering and the myth of feeding the world (1998), Biotechnology and Development Monitor, no.35, June 1998

Wateringen, S. van de, Biopiraten!?, Biodiversiteit en Intellectueel Eigendom, de culminatie van internationale verdragen in Ecuador, University of Amsterdam, the Netherlands, 1997

Please send comments to info@bothends.org