Your questions – our answers

Genetic engineering versus organic farming.
The fact and the fiction.

From bees and carrots – 4 stories
Uniting the Organic World . . .

International Federation of
Organic Agriculture Movements

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These are useful questions to ask when assessing a new technology. In the case of GMOs (genetically modified organisms) there are no benefits for either consumers or producers – only for the companies producing and selling them.

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Who benefits? Who needs it? Where does it lead?

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The organic movement rejects GMOs in all agriculture, from an economic and ethical perspective, from a political perspective, from a risk perspective and simply because it is not needed.

We also offer a real alternative. Millions of organic farmers, big or small, rich or poor, demonstrate daily that organic agriculture can produce sufficient safe food for everyone – without using GMOs.
Cecilia Oh, lawyer, Researcher for TWN (Third World Network):

"Many Third World countries object to patenting of seed and of living beings. They are developing ways and model-laws to protect their crop diversity and farmers’ knowledge from corporate control. This gives me hope."

Farmers have to pay royalties for every patented seed, for every patented hen. And also for the chickens produced by this hen, and for all further chicken generations, for as long as 20 years. A farmer planting patented GM-crops is not allowed to save seed from this harvest for the next season. Some farmers in the USA and Canada were sued by the Monsanto company for doing this. With patented seed the control is taken away from farmers, from local areas, and passes into the hands of private companies. Many critics regard this as a major threat to world-wide food security and biodiversity.

the ‘intellectual property’ of some large company. But in the developing age of genetic engineering, industry is under pressure to expand the patent system from lifeless materials to living beings, in order to protect their financial investment in genetic engineering. But is it right to patent a tomato plant in the same way as a chemical or a vacuum cleaner? If life is put on the same base as a patentable commodity, if there is no longer a difference between a living being and a non-living thing, this will dramatically change our relationship to animals, to plants, to other people and to ourselves. The control is taken away from farmers, from local areas, and passes into the hands of private companies. Many critics regard this as a major threat to world-wide food security and biodiversity.

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Mae Van Ho, Professor of biology at the Open University, GB: "I'm a scientist who loves science and believes science and technology can help build a better world and combat world hunger. But it must be the right kind of science and technology, and it must be decided by people themselves. Nature is interconnected and dynamic. But proponents of genetic engineering got stuck in the age of mechanics - the technology is just not innovative enough!"

Genetic engineering is not a precise technology: there is no means of inserting a gene into a specific position within the host cell. The genes end up in random locations. But genes do not operate in isolation, they interact with each other. The inserted genes may disrupt vital other genes, they might disturb vital interactions. Possibly no acute toxic food will enter the market, but nobody can predict possible harmful long-term effects.

According to scientists, GM-food might have the following harmful effects:

- Allergic and immune system reactions to the new substances contained in GMOs.
- Soil organisms may be adversely affected by GM-plants. Toxins Bt has been found to persist in the soil for months, thus causing potential damage to soil-fod fod and fish. Fish are being engineered to grow fast and increase in size. Giant GM-fish, having escaped from fish farms, may out-compete even more native species.
- New genes could alter the expression of native genes and so may have unexpected secondary effects.
- Bacteria and viruses are genetically manipulated for a wide range of traits. If they escape or if they are released to the environment, they could have worse 'side-effects' than plants and animals, because they reproduce and mutate much faster.
- GMOs are living beings, they can spread and propagate. They can pass their foreign genes to wild species. Once released, it will be virtually impossible to recall genetically engineered organisms back into the laboratory. We are opening Pandora's box.

Some possible negative consequences for the environment include:

- Pollen from genetically engineered plants can contaminate wild species.
- Resistance amongst pests and diseases can develop.
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11. What are the ecological consequences of GMOs released into the environment?

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12. Where do patents come in?

In former times, nobody thought of patenting plants, animals or human genes and cells. Now it is thought that it could be possible that an animal or a human gene might ever be considered as an 'invention' or a 'product of nature'.

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The stemborer is Africa’s worst maize pest. In combination with the Striga weed it can destroy whole crops. The International Research Institute (IClPE) in Kenya, together with local farmers, developed a successful Push-and-Pull strategy. The farmers plant 3 rows of the fodder grass Napier around the maize field. Napier grass has a chemical aroma that attracts the stemborer larvae out of the maize crop. Most of them are killed in the sticky sap of the Napier grass. Between the rows of maize farmers also plant the legume Desmodium, which exudes a chemical aroma that repels stemborers. Desmodium also suppresses Striga. It is a perfect Push-and-Pull strategy, which provides healthy maize, additional feed and protection for the soil.

Another approach to control the stemborer is genetically engineered Bt-maize: This maize, with genes from the soil bacterium Bt, produces a toxin to combat the stemborer. The Swiss multinational company Syngenta started a project with Bt-maize in Kenya, together with a Kenyan Institute. But is it sensible to invest everything in an unproven and risky technology, which also increases again the dependency of small farmers?

The vision is monocultures. Left: Mrs Ouzou’s fields were completely destroyed by the stemborer. Now with Push-and-Pull she has good yields. Middle: Stemborer in maize. Right: Close-up of an advertisement of a biotech company: The vision is monocultures.
Miguel Altieri, Professor of Agricultural Ecology, University of Berkeley, USA: “We have shown on hundreds of examples that small scale sustainable agriculture in the South can lead to enormous production increases. In some examples the yields increased by more than 100%. The key to this was diversity instead of monocultures. But genetic engineering is pushing monocultures. It’s no recipe for the South.”

“For us organic farming is not a luxury but the only possible solution to fight hunger and poverty”, says Tewolde Egziabher, leader of Third World countries in international negotiations concerning patents, genetic engineering and biodiversity.

Many experts fear that genetic engineering will dramatically accelerate the loss of biodiversity. An example on English study predicts that a massive release of herbicide-resistant GM-crops could lead to the extinction of the already threatened skylark. This bird feeds on weed seeds. In herbicide-resistant GM-monocultures some of these weeds may be eradicated. This could not only threaten the skylark, but also other seed-eating birds and insects.

In general, genetic engineering represents a new dimension in an industrial agriculture with a strong tendency towards more monocultures, and thus a continuing loss of biodiversity. Furthermore, genetic engineering removes the barriers that have protected the integrity of species for millions of years. “There are probably good reasons why it is impossible for a conventional plant breeder to combine plant genes with animal genes. These reasons have to do with the very survival of life on earth, and we ignore them at our peril”, writes the US institute Sierra Club.

Organic farming is by its very nature based on biodiversity. Many of its practices conserve and enhance a rich diversity, for example:

- Mixed farming with crops and animals. For example rice farmers in Bangladesh stopped using pesticides and started to rear fish in their rice fields and planted vegetables on paddy field dikes, thus introducing a substantial increase in biodiversity.
- Crop rotation is required practice in all organic farming.
- Trees, hedges and field margins maintain a rich diversity of natural predators such as spiders, birds and beetles that help to control pests.
- By solely using organic fertilisers the fertility of the soil and the diversity of soil organisms is enhanced.

Organic farming is a new product, with new proteins we have never eaten before. We have never eaten bacterial proteins in maize, nor fish proteins in tomatoes, nor viral proteins in potatoes. Our bodies have no experience of these; and there is no way to predict if the novel food will cause allergies or other chronic bodily ailments in 5 or 10 years.

Recommended further reading:
IFOAM dossier ‘Biodiversity and Organic Agriculture’ available at the website or from the Headoffice.
In the field: Pollen from genetically engineered plants is blown by wind or carried by insects into other fields, thus contaminating these crops. Bees are known to distribute pollen over a distance of 3 kilometers.

In seed production: Breeding and multiplication of organic seed and seedlings is also affected by contamination from pollen from GM-plants.

During harvesting, transport and processing: All traces from the field to the final processing facility (during transport on trucks, ships or trains, in mills, in food-processing factories etc.) there are many opportunities for contamination. Only strict segregation can minimise the risk.

Farmers, processors and traders wanting to produce and sell organic and GMO-free products; and consumers wanting to buy it, are confronted with massive problems of genetic pollution.

Another problem is that the pests may develop resistance to the BT-toxin of transgenic plants. Bt-sprays are also used in organic farming, however, resistance to the Bt-toxin of transgenic plants is blown by wind or carried by insects into other fields, thus contaminating these crops.

But there are many more problems to consider: the risk for worldwide food security from their seed. Here I see a great risk for worldwide food security, because there are no silver bullet solutions to such complex problems, says the Indian scientist Vandana Shiva.

The MAIN point is, however, that there are many patents on Vitamin A rice. “The problem is that the transgenic rice will not remove VAD. It is a technology that is sold as a panacea, it is a panacea. It is patented, genetic engineering and biodiversity, winner of the Alternative Nobel prize 2000. ‘With patents big companies make our farmers dependent on us and this is a great risk for worldwide food security and biodiversity.’

Vitamin A rice - a genetically engineered rice producing pro-Vitamin A – is being offered to the Third World as a remedy for widespread Vitamin A Deficiency (VAD). But there are fundamental problems: An adult would need to eat 9 kg of cooked rice a day for the required intake of vitamin A (whereas eating just two carrots would be enough). It is an open question whether transgenic rice will work in practice, and nothing is known about long-term threats to ecosystems and human health. Furthermore, there are many patents on Vitamin A rice. “The problem is that the transgenic rice will not remove VAD. It is a technology that is sold as a panacea, it is a panacea. It is patented, genetic engineering and biodiversity, winner of the Alternative Nobel prize 2000. ‘With patents big companies make our farmers dependent on us and this is a great risk for worldwide food security and biodiversity.’

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Left: The beauty of diversity—the best prevention for VAD.
Right: The genetically engineered rice is also patented.
Organic farming relies on the vast knowledge and skills of farmers and on modern research to provide innovative new technologies.

Organic farming is a term defined by IFOAM standards and all organic food production and processing is governed by a strict set of standards and guidelines.

3. Why are genetic engineering and organic farming incompatible?

Genetic engineering and organic farming are two contradictory world views, two different philosophies, the two main options for the future. The basic principles of organic farming are holistic. Rather than looking at isolated parts, the whole farm as a living entity is the focus. It is seen as a whole, embedded in the intricate web of life and part of the interactions and relationships between all living beings. Organic farming seeks to maintain an overall balance, by enhancing biodiversity (for example, flowering plants are sown on the borders of fields to attract beneficial insects into the crops). Organic pesticides are only used in emergencies, as supplementary measures.

Genetic engineering, on the contrary, isolates and reduces complex problems to simple issues and then tries to find a technical solution. The very basis of genetic engineering depends on the search for single-factor-solutions, whereas all major problems of the environment and agriculture are multi-factorial. An example: Bt-maize expresses a toxin that kills the maize pest stemborer. But what if other, often beneficial, insects (such as lacewings, the monarch- or the black swallowtail-butterfly) are harmed as well? What consequences follow if the toxin also influences the soil-food-web or if the stemborer acquires a resistance to the Bt-toxin?

4. What are the differences between conventional breeding and genetic engineering?

Proponents of genetic engineering often claim that they are doing the same work as conventional breeding, just faster and with more precision. It is true that gene transfers also occur in conventional plant breeding, but these only take place between individuals of the same species, or, in some cases, between closely related species. A rice plant can cross with a different rice species, but not with a walnut. Genetic engineering is bound by these limits. So, for example, the genetically engineered Vitamin A rice contains newly inserted genes from daffodils, viruses and bacteria. As a result a new form of life has been created.

5. Is genetic engineering affecting organic farming?

The standards established by IFOAM categorically exclude genetically engineered organisms and products containing GMOs from the organic production system. With the application of transgenic organisms problems of contamination arise at different levels.
1. What is genetic engineering?

Genetic engineering is a new technology involving the manipulation of genes. Scientists can transfer genes from one species to another, unrelated species. This is possible because of the universal "gene language" – the genetic code is the same for all living beings, be it animals, plants or microorganisms. For example, genes from a fish can be transferred to a tomato plant to render the tomato plant more resistant to frost. The engineered tomato plant is genetically forced to produce the fish chemical, because of this "gene language." So it produces an "antifreeze" chemical which the fish normally produces to survive in freezing cold water.

With genetic engineering it is possible to break down the species boundaries set up by millions of years of evolution. Never before was it possible to transfer genes from animals to plants or from bacteria to humans. By combining the genes of unrelated species, permanently altering their genetic codes, novel organisms are created that will pass on the genetic changes onto their offspring through heredity.

Genetic engineering is a corporate technology mainly applied by industrial agriculture. In the year 2000:

- just five multinationals dominated the whole biotech business in agriculture.
- 98% of all transgenic crops were grown in three countries: the USA, Canada and Argentina.
- Two features were dominant: well over 70% of all GM-crops grown worldwide are herbicide-resistant plants, and over 20% are insect-resistant Bt-plants.

2. What is organic farming?

Organic agriculture is a sustainable form of production. It promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on methods that restore, maintain and enhance ecological harmony. Organic farming does not use synthetic chemical pesticides, herbicides and fertilisers relying instead on a wide variety of beneficial insects and other organisms to act as natural predators for crop pests and a soil full of microorganisms and earthworms to maintain its vitality. If direct control measures have to be taken to prevent serious crop damages, organic farming uses different agents of natural sources (for example Neem and Pyrethrum extracts) and biocontrol agents (for example ladybirds against aphids) can be used.

Organic livestock production focuses on animal welfare and husbandry methods that prevent the need for veterinary treatments. It is a method of agricultural production that is environmentally friendly requiring high standards of animal welfare with health benefits for people. Organic farming recognises that human health is directly connected to the health of the food we eat and ultimately the health of the soil. Organic agriculture both.

Grey mould is the worst disease affecting strawberries. A clever new organic control uses honey bees or bumble bees. When the bee leaves the hive, she passes through a footbath containing an antiseptic to grey mould. This is a harmless fungus. When bees pollinate the strawberry blossoms, they deliver the harmless fungus precisely into the blossoms. The beneficial fungus thus inoculates the blossoms preventing infection by grey mould.

Recent studies in the US and Switzerland show that strawberry yields can be more than doubled with the help of these "Flying Doctors."
Genetic contamination - a serious problem

Maize comes originally from Mexico and Peru. Here the greatest diversity of maize cultivars and wild species can be found. This 'centre of origin' with its amazing genetic diversity is essential for the future of maize breeding and thus for world-wide food security.

But this 'centre of origin' is already contaminated. A US-study shows that even in remote Mexican valleys local maize varieties contain genes from transgenic Bt-maize. “We were surprised by these results. We did not expect any such thing, and it’s most disturbing. What this means is that an entire species in its native state may soon become, in effect, genetically contaminated” says scientist Ignacio Chapela from the University of California (USA), who’s team did this research.

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Hans Herren, Director of the ICIPE, Kenya, winner of the World Food prize 1995: When I’m visiting agricultural research institutes in Africa and India, I find the labs for biological control half empty and with broken windows. But the biotech-labs will be all new, with new equipment and stuffed with staff. Biocontrol projects, as we do it, are not so spectacular, not so sexy. Here I see a big problem.

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PropONENTS OF GENETIC ENGINEERING OFTEN CLAIM THAT THEY ARE DOING THE SAME WORK AS CONVENTIONAL BREEDING, JUST FASTER AND WITH MORE PRECISION. IT IS TRUE THAT GENE TRANSFERS ALSO OCCUR IN CONVENTIONAL PLANT BREEDING, BUT THESE ONLY TAKE PLACE BETWEEN INDIVIDUALS OF THE SAME SPECIES, OR, IN SOME CASES, BETWEEN CLOSELY RELATED SPECIES. A RICE PLANT CAN CROSS WITH A DIFFERENT RICE SPECIES, BUT NOT WITH A WALNUT. GENETIC ENGINEERING IS NOT BOUND BY THESE LIMITS. FOR EXAMPLE, THE GENETICALLY ENGINEERED VITAMIN A RICE CONTAINS NEWLY INSERTED GENES FROM DAFFODILS, VIRUSES AND BACTERIA. AS A RESULT A NEW FORM OF LIFE HAS BEEN CREATED.

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I’m an organic farmer. For me it’s nature. I care for it carefully and respectfully with much better solutions, dealing too big. But above all we have to keep out of agriculture. The risk of contamination is far more obvious that genetic engineering has to be kept out of agriculture.

Regina Fuhrer, president of the Swiss Organic Farmers association: ‘Of course! An organic farmer for me it’s obvious that genetic engineering has to be kept out of agriculture.

‘The risk of contamination is far too big. But above all we have to keep out of agriculture. The risk of contamination is far more obvious than genetic engineering has to be kept out of agriculture."

Another problem is that the pests may develop resistance to the Bi-tonein of transgenic plants. Bi-toneins are also used in organic farming, however, as an effective, natural insecticide. If this resistance would occur to them they would become ineffective.

6. Will genetic engineering feed the hungry?

The main question confronting organic and sustainable farming is: how can farmers increase their yields with cheap, locally available and simple technologies, without damaging the environment? Organic farmers take their fate again in their own hands, and as many examples show, they can often increase their production – especially in the developing countries – significantly. One example is Cuba. In Cuba the traditional ‘three-sister-agriculture’ of maize, beans and cassava produces yields twice as high as the sum of each one in monoculture. With maize, beans and cassava producing yields twice as high as the sum of each one in monoculture, an adult would need to eat 9 kg of cooked rice a day for the required intake of vitamin A (VAD). It is an open question whether transgenic rice will work in practice, and nothing is known about long-term threats to ecosystems and human health. Furthermore, there are many patents on Vitamin A rice. “The problem is that the transgenic rice will not remove VAD. It is a technology in its promise, because there are no silver bullet solutions to complex problems such as simple,” says the Indian scientist Vandana Shiva. The MAIN point is, however, that there are many better, cheaper and already proven solutions. The root cause of VAD and many other diseases is a totally unbalanced diet. Rice, rice and nothing but rice. So changing dietary habits is essential. Small gardens with green leafy vegetables and with fruits, leaves from wild plants, dried mango slices, dried Baobab leaves, sweet potatoes… Even the World Bank has admitted that rediscovering and using local plants and conserving vitamin A rich fruit and vegetables has dramatically reduced the number of VAD threatened children in inexpensive and efficient ways.

7. Will organic farming feed the hungry?

Food for all is a long-term project, and only the protection of biodiversity and the cultural diversity of agriculture adapted to local conditions can secure significantly. One example: Vitamin A rice – a genetically engineered rice producing pro-vitamin A – is being offered to the Third World as a remedy for widespread Vitamin A Deficiency (VAD). But there are fundamental problems: An adult would need to eat 9 kg of cooked rice a day for the required intake of vitamin A (VAD), and the transgenic rice will not remove VAD. It is an open question whether transgenic rice will work in practice, and nothing is known about long-term threats to ecosystems and human health. Furthermore, there are many patents on Vitamin A rice. “The problem is that the transgenic rice will not remove VAD. It is a technology in its promise, because there are no silver bullet solutions to complex problems such as simple,” says the Indian scientist Vandana Shiva. The MAIN point is, however, that there are many better, cheaper and already proven solutions. The root cause of VAD and many other diseases is a totally unbalanced diet. Rice, rice and nothing but rice. So changing dietary habits is essential. Small gardens with green leafy vegetables and with fruits, leaves from wild plants, dried mango slices, dried Baobab leaves, sweet potatoes... Even the World Bank has admitted that rediscovering and using local plants and conserving vitamin A rich fruit and vegetables has dramatically reduced the number of VAD threatened children in inexpensive and efficient ways.
Miguel Altieri, Professor of Agricultural Ecology, University of Berkeley, USA: “We have shown on hundreds of examples that small scale sustainable agriculture in the South can lead to enormous production increases. In some examples the yields increased by more than 100%. The key to success was: diversity instead of monocultures. But genetic engineering is pushing monocultures. It’s no recipe for the South.”

For us organic farming is not a luxury, but the only possible solution to fight hunger and poverty”, says Tewolde Egziabher, leader of Third World countries in international negotiations concerning patents, genetic engineering and biodiversity.

8. Is genetic engineering affecting biodiversity?

Many experts fear that genetic engineering will dramatically accelerate the loss of biodiversity. An example: an English study predicts that a massive release of herbicide-resistant GM-crops could lead to the extinction of the already threatened Skylark. This bird feeds on weed seeds. In herbicide-resistant GM-monocultures some of these weeds may be eradicated. This could not only threaten the Skylark, but also other seed-eating birds and insects.

In general, genetic engineering represents a new dimension in industrial agriculture with a strong tendency towards monocultures, and thus a continuing loss of biodiversity.

Furthermore, genetic engineering removes the barriers that have protected the integrity of species for millions of years. “There are probably good reasons why it is impossible for a conventional plant-breeder to combine plant genes with animal genes. These reasons have to do with the very survival of life on earth, and we ignore them at our peril”, writes the US institute Sierra Club.

Organic farming is by its very nature based on biodiversity. Many of its practices conserve and enhance a rich diversity, for example:

• Mixed farming with crops and animals. For example rice farmers in Bangladesh stopped using pesticides and started to rear fish in rice fields and planted vegetables on paddy field dikes, thus introducing a substantial increase in biodiversity.

• Crop rotation is required practice in all organic farming.

• Trees, hedges and field margins maintain a rich diversity of natural predators such as spiders, birds and beetles that help to control pests.

• By solely using organic fertilisers the fertility of the soil and the diversity of soil organisms is enhanced.

Maybe. Maybe not. GM-food is a new product, with new proteins we have never eaten before. We have never eaten bacterial proteins in maize, nor fish proteins in tomatoes, nor viral proteins in potatoes. Our bodies have no experience of these; and there is no way to predict if the novel food will cause allergies or other chronic bodily ailments in 5 or 10 years.

Recommended further reading:
IFOAM dossier ‘Biodiversity and Organic Agriculture’ available at the website or from the Headoffice.
Mae Van Ho, Professor of biology at the Open University, GB: “I’m a scientist who loves science and believes science and technology can help build a better world and combat world hunger. But it must be the right kind of science and technology, and it must be decided by people themselves. Nature is interconnected and dynamic. But proponents of genetic engineering got stuck in the age of mechanics – the technology is just not innovative enough!”

Genetic engineering is not a precise technology: there is no means of inserting a gene into a specific position within the host cell. The genes end up in random locations. But genes do not operate in isolation, they interact with each other. The inserted genes may disrupt vital relationships, they might disturb vital interactions. Possibly no acute toxic food will enter the market, but nobody can predict possible harmful long-term effects.

According to scientists, GM-food might have the following harmful effects:

- **Allergenic and immune system reactions** to the new substances contained in GMOs
- **Antibiotic-resistant genes**, often used in genetic engineering, could be transferred to pathogens in the gut. Disease triggered by these pathogens could no longer be treated with antibiotics.
- **New genes could alter the expression of native genes** and so may have unexpected secondary effects.
- **GM-plants can spread and propagate**. They can pass their foreign genes to wild species. Once released, it will be virtually impossible to recall genetically engineered organisms back into the laboratory. We are opening Pandora’s box.

Some possible negative consequences for the environment include:

- Soil organisms may be adversely affected by GM-organisms. Bt has been found not to persist in the soil for months, thus causing potential damage to soil-food-webs.
- Fish are being engineered to grow fast and increase in size. Giant GM-fish, having escaped from fish farms, may out-compete or even make native species extinct.
- **Bacteria and viruses are genetically manipulated** for a wide range of traits. If they escape or if they are released to the environment, they could have worse ‘side-effects’ than plants and animals, because they reproduce and mutate much faster.
- **GM-plants can spread**. They can pass their foreign genes to wild species. Once released, it will be virtually impossible to recall genetically engineered organisms back into the laboratory. We are opening Pandora’s box.

Push-and-Pull: an innovative and low-tech solution to control stemborers in Africa

The stemborer is Africa’s worst maize pest. In combination with the Striga weed it can destroy whole crops. The International Research Institute ICIPE in Kenya, together with local farmers, developed a successful Push-and-Pull strategy. The farmers plant 3 rows of the fodder grass Napier around the maize field. Napier grass has a chemical aroma that attracts the stemborer larvae out of the maize crop. Most of them are killed in the sticky sap of the Napier grass. Between the rows of maize farmers also plant the legume Desmodium, which exudes a chemical aroma that repels stemborers. Desmodium also suppresses Striga. It is a perfect Push-and-Pull strategy, which provides healthy maize, additional feed and protection for the soil.

Another approach to control the stemborer is genetically engineered Bt-maize: This maize, with genes from the soil bacterium Bt, produces a toxin to combat the stemborer. The Swiss multinational company Syngenta started a project with Bt-maize in Kenya, together with a Kenyan Institute. But is it sensible to invest everything in an unproven and risky technology, which also increases once again the dependency of small farmers?

11. What are the ecological consequences of GMOs released into the environment?

12. Where do patents come in?

Hardy Vogtmann, Honorary President IFOAM, Head of the German Federal Agency of Nature Protection (BfN): “The ‘green biotechnology’ pretends to be eco-friendly and to reduce the chemical input. I’m sceptical. Our future lies in decentralised and organic solutions.”

Phan Van I Ho, Professor of Biology at the Vay University, GiB: ““A scientist who loves science and believes science and technology can help build a better world and combat world hunger. But it must be the right kind of science and technology and it must be decided by people themselves. Nature is interconnected and dynamic. But proponents of genetic engineering got stuck in the age of mechanics – the technology is just not innovative enough!”

In former times, nobody thought of patenting plants, animals or human genes and cells. I’m not sure if it was possible to think that an animal or a human gene might ever be considered as an ‘invention’ or ‘invention’ or ‘invention’ or
Cecilia Oh, lawyer, Researcher for TWN (Third World Network):

"Many Third World countries object to patenting of seed and of living beings. They are developing ways and model-laws to protect their crop diversity and farmers’ knowledge from corporate control. This gives me hope."

But in the developing age of genetic engineering, industry is under pressure to expand the patent system from lifeless materials to living beings, in order to protect their financial investment in genetic engineering. But is it right to patent a tomato plant in the same way as a chemical or a vacuum cleaner? Is life put on the same base as a patentable commodity, if there is no longer a difference between a living being and a non-living thing, this will dramatically change our relationship to animals, to plants, to other people and to ourselves. Farmers have to pay royalties for every patented seed, for every patented hen. And also for the chickens produced by this hen, and for all further chicken generations, for as long as 20 years. A farmer planting patented GM-crops is not allowed to save seed from this harvest for the next season. Some farmers in the USA and Canada were sued by the Monsanto company for doing this. With patented seed the control is taken away from farmers, from local areas, and passes into the hands of private companies. Many critics regard this as a major threat to world-wide food security and biodiversity.
These are useful questions to ask when assessing a new technology. In the case of GMOs (genetically modified organisms) there are no benefits for either consumers or producers – only for the companies producing and selling them.

If farmers feel they need herbicide-resistant varieties that is because they are locked into a production system that depends on chemical inputs. Genetic engineering is just one more step into a cul-de-sac (blind alley) that leads to further degradation of the environment, increased dependency of farmers and more risks for everybody.

The organic movement rejects GMOs in all agriculture, from an economic and ethical perspective, from a political perspective, and simply because it is not needed.

We also offer a real alternative. Millions of organic farmers, big or small, rich or poor, demonstrate daily that organic agriculture can produce sufficient safe food for everybody – without using GMOs.
Genetic engineering versus organic farming.
The fact and the fiction.