Genetically Engineered Maize: The Reality Behind the Myths

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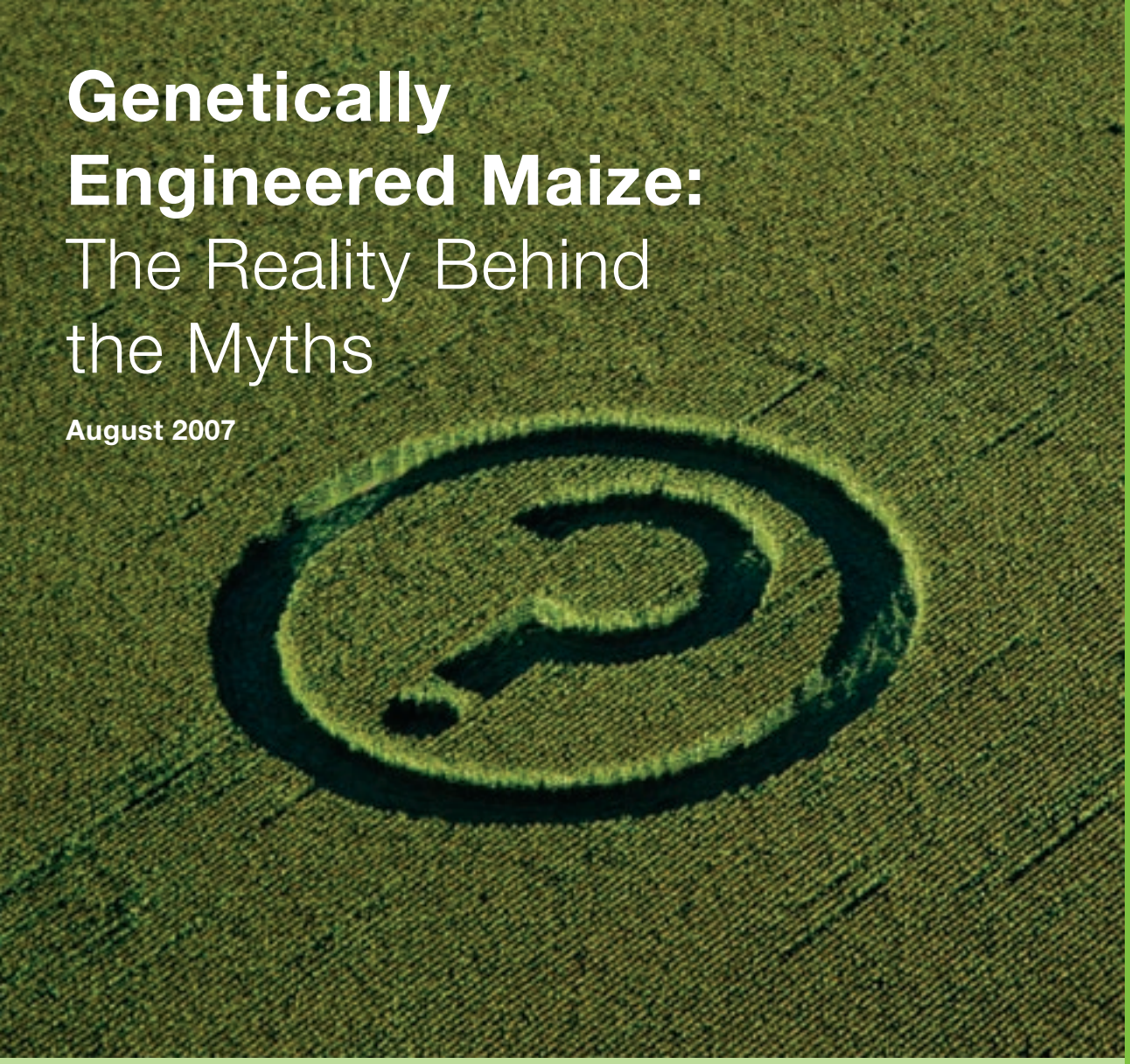

Greenpeace activists in Canada create a 60-meter wide question mark in a cornfield containing Monsanto's NK603 genetically engineered (GE) corn, which scientists recently linked with liver and kidney toxicity in rats. Greenpeace is calling for a global ban on GE foods, as long as the many question marks hanging over their safety are not resolved. © Greenpeace/Desjardins. August 2007

Maize under threat.

Maize, it's one of the world's largest commercial food crops and is grown in many countries around the world. We use it on a large scale and it's in many of them common foods we eat, from soft drinks and bread through to processed foods, in the form of syrup and starch. Large quantities are used as animal feed for poultry, cows and pigs. Many people in countries such as those in Latin America and eastern Africa are reliant on maize as their main staple food crop.

And right now multinational agrochemical companies are trying to get control of this staple food crop through promoting genetically engineered (GE) varieties of maize.

Currently the world's big agrochemical firms that produce GE seeds – notably Monsanto, Bayer and Syngenta(1) - are investing millions of dollars every year to promote so-called benefits of the use of their GE technology. But the truth is that many farmers that have grown GE maize have yet to see any benefits promised by the agrochemical companies. Furthermore GE maize poses a serious threat to the environment, animal and human health.

Below we take six of the GE industry's biggest greenwash statements and show the reality behind the growing and consumption of GE maize. Further, the analysis we show proves beyond a doubt that the best option for farmers, beekeepers, governments, food companies and consumers is to reject GE maize and ensure the protection of one of the world's most important food crops.

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What is genetic engineering?

Genetically engineered organisms (GE organisms) also known as genetically modified organisms (GMOs) are new life forms which have never before occurred in nature, and which cross species barriers, unlike traditional plant breeding or traditional biotechnology. Genetic engineering breaks the natural boundaries that exist between species. A fish and a strawberry will not breed in nature, but in the laboratory, scientists can take a gene from a fish, insert it into a strawberry, and essentially create an entirely new organism. Genetic engineering can manipulate genes from animals, plants, and even humans.
Once these man-made organisms are released into the environment and the food chain, they reproduce and contaminate conventional and organic (food) crops. No one knows what the long-term effects of GE organisms on the environment will be, as before the mid-90s they had never been released into the environment on a large scale.

Native Mexican maize would be threatened by the introduction of GE maize. © Greenpeace/Lopez.

Myth 1: GE maize is safe for the environment

Reality: Most of the GE maize grown around the world is a variety called Bt maize. This maize has been genetically engineered to produce its own toxin. This toxin is harmful to certain beneficial insects which kill pests. It has also been demonstrated that Bt maize is harmful for butterflies, and there are concerns for the long term health of the soil as the Bt toxin can accumulate in the soil.

The genetic engineering industry has also created so-called herbicide tolerant (HT) maize, such as maize T25 from the German agrochemical conglomerate Bayer. Cultivation of the GE herbicide tolerant maize will undoubtedly lead to increased weed resistance resulting in more and more herbicide being applied - a pattern that has been seen with other GE herbicide tolerant crops. The herbicides sprayed on GE maize are often extremely harmful for the environment. For example the herbicide sprayed on Bayer's T25 maize – gufosinate ammomium – has been described as "a high risk to mammals" by the European Food Safety Authority.(2)

Myth 2: GE maize is safe to eat

Reality: The GE industry has for years promoted GE foods as safe to eat but they have been reluctant to disclose vital information to the public that clearly shows potential problems with the consumption of GE foods. In 2005, in a case that was initiated by Greenpeace, a German court ordered agrochemical company Monsanto to publish studies of effects on rats that had been fed GE Bt maize (MON 863). Monsanto's studies were then re-assessed by independent scientists, with shocking results.(3) Among other things the scientists revealed that Monsanto had failed to disclose negative effects ("signs of toxicity") on the internal organs of the rats. Nevertheless, the GE maize was already approved in more than 10 countries around the world including the EU, Japan, Canada and the Philippines. The authorities in all these countries had completely relied on the genetic engineering industry's own research and allowed a high risk product to slip through the authorisation system. The case again emphasizes the urgent need for more independent research into the health effects of GE maize and other GE food crops.

Myth 3: GE maize is needed to fight climate change

Reality: When biomass is used to generate energy in an efficient and sustainable way, it has a role to play in the fight against climate change. However, independent studies confirm that ethanol fuel based on maize is an unsustainable form of bio energy.

Firstly, the use of maize for ethanol drives up food prices and threatens the food security of the poor in certain regions; this is currently happening in Central-America. Secondly, there is wide agreement that the CO2 savings from corn ethanol are small or even negative depending on the production techniques used and source of energy inputs.(4) Thirdly, the use of GE maize for biofuels is a even riskier prospect, GE maize designed for industrial fuel contains proteins that are not normally present in the human diet. These proteins have the potential to be toxic and to cause allergies, as was recognized by the South African department of agriculture, who – in March 2007- rejected Syngenta's application for the approval of its GE maize ethanol. GE ethanol maize could easily contaminate the food chain, as more than a decade of experience with GE maize has shown.(5) In other words, if the agrochemical industry gets its way your breakfast cornflakes could soon contain GE ethanol maize, an energy boost you don't need!

Greenpeace mark a conventional maize field with signs showing 'question marked maize' due to the unpredictable nature of GE maize. © Greenpeace/Langer

Myth 4:
GE maize brings economic benefits

Reality: The worldwide rejection of GE food by consumers, retailers and food companies has turned the production of GE crops into a risky business. After the introduction of GE maize in the US – by far the largest producer of GE crops in the world – many US maize farmers and traders lost their exports to key destinations. For example, the export of maize from the US to Europe has declined from 3.3 million tonnes in 1995 to just 25,000 tonnes in 2002.(6)

The negative economic impact of GE maize and other GE crops falls heavily on the most vulnerable, the rural poor in developing countries. GE seeds are often aggressively marketed and presented as miracle seeds by agrochemical companies such as Monsanto. These companies offer loans to resource-poor farmers in order to allow them to buy the GE seeds, which are often much more expensive than conventional seeds. Then it turns out that the seeds are not a miracle and that they do not have yields that are substantially higher than non-GE seeds. Consequently the farmers end up with a large debt and have to take out even more loans to buy new seeds (agrochemical companies do not allow farmers to save GE seeds for the next growing season as this is considered to be an infringement of the agrochemical companies patents).

Myth 5:
GE maize will help to reduce hunger

Reality: Hunger is a problem of food distribution, lack of access to land, water and income, not the availability of food. In India - for example - millions of tonnes of grain are rotting away, while 300 million people go to bed hungry every night.

The real problem is that too many people do not have enough income to get access to the available food and too few people have the land to grow food for themselves. These problems are not solved by introducing GE seed. On the contrary – GE crops are likely to aggravate the hunger problem and indebtedness of small farmers, because they require high investments in expensive seeds and huge amounts of pesticides.

GE seeds are not designed to solve the hunger of the poor, but the hunger of greedy corporations and their shareholders for more profits.

"When I first planted GE maize, the yield was good, but there were so many expenses that I did not earn anything. I was very disappointed with Monsanto's seeds and I will never plant them again. I now only plant local varieties of maize for which a much lower capital investment is required."

Thomas Datinguinoo, small scale farmer in the municipality Naujan, on the island Mindoro in The Philippines. June 2007. © Greenpeace/Ritsema

Myth 6:
Coexistence between GE and non GE crops is perfectly possible

Reality: Scientific research has demonstrated that GE crops contaminate conventional and organic crops, foods and honey. And when GE crops are planted in the open environment - even with stringent laws in place – it is impossible to control insects, pollen drift and wind flow.

GE contamination not only poses a risk to foodsafety, but also to biodiversity and to foodsecurity, especially in the centres of origin and centres of diversity for maize. The primary centre of diversity of maize is found in Mexico and Central America, but farmers throughout the western hemisphere are the keepers of traditional varieties of maize grown for millennia by their ancestors. If GE maize contaminates the original maize plants that are grown in these regions, humanity may lose the "mother plants" from which all maize varieties originate. This would be a major disaster, since diversity is essential to ongoing breeding programmes and the development of new varieties that can resist pests, diseases, drought and other agronomic challenges.

A population of bees work an area of at least 30 square kilometers, so contamination of honey could originate from many different fields, if GMO cultivation becomes the rule. The costs of analysing honey in order to verify if it is GMO free, would make beekeeping uneconomic for most beekeepers. This would not only endanger honey production, but also pollination in agriculture and nature.

Walter Haefeker, beekeeper in Germany and vice-president of the European Professional Beekeepers Association. May 2005

Wind and insects spread pollen and genetic information to other plants.
© Nimtsch/Greenpeace

Conclusion:
GE maize, unnecessary and unwanted.

GE maize is an unnecessary, outdated and risky technology that poses serious threats to our health and the environment. GE maize is also a risky business from an economic point of view. The best option for farmers, beekeepers, governments, global markets and consumers is to reject GE maize and ensure the protection of one of the worlds most important food crops. There are many viable alternatives for GE maize, such as organic agriculture and other forms of sustainable agriculture that can ensure foodsafety and food security for all, while at the same protecting the environment.

Footnotes:
(1) 91 per cent of GE seed is owned by one company – Monsanto, other genetic engineering companies include; Bayer, Syngenta and DuPont. For more information on Monsanto http://www.greenpeace.org/international/press/reports/7-deadly-sins
(2) Summary of the EFSA scientific report (2005) 27,1-81
(3) See: http://www.greenpeace.org/international/press/releases/seralini_study_MON863
(4) J Hill, E Nelson, D Tilman, S Polasky, D Tiffany (2006) Environmental, economic and energetic costs and benefits of biodiesel and ethanol biofuels. Proceedings of the National Academy of Sciences 103:11206-11210.
(5) See: www.gmcontaminationregister.org
(6) Source: European Commission press release. 13 May 2003.

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Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

Greenpeace works for a global agricultural system based on biodiversity and sustainability, that protects the world's forests and other natural ecosystems, reduces greenhouse gas emissions, encourages soil and water health, uses less fertilisers and pesticides, protects biodiversity with no genetic engineering releases and provides fair trade and food security for all