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**Genetically Modified (GM) crops  
are neither needed nor beneficial**

**Mae-Wan Ho**

Institute of Science in Society

Genetically Modified (GM) crops are neither needed nor beneficial. They are a dangerous diversion from the real task of providing food and health around the world.

The promises to genetic engineer crops to fix nitrogen, resist drought, improve yield and to 'feed the world' have been around for at least 30 years. Such promises have built up a multibillion-dollar industry now controlled by a mere handful of corporate giants.

But the miracle crops have not materialised. So far, two simple characteristics account for all the GM crops in the world. More than 70% are tolerant to broad-spectrum herbicides, with companies engineering plants to be tolerant to their own brand of herbicide, while the rest are engineered with bt-toxins to kill insect pests. A total of 65 million acres were planted in 1998 within the US, Argentina and Canada. The latest surveys on GM crops in the US, the largest grower by far, showed no significant benefit. On the contrary, the most widely grown GM crops -- herbicide-tolerant soya beans -- yielded on average 6.7% less and required two to five times more herbicides than non-GM varieties.

The same GM crops have already given rise to herbicide-tolerant weeds and bt-resistant insect pests. Worse still, the broad-spectrum herbicides not only decimate wild species indiscriminately, but are toxic to animals. One of them, glufosinate, causes birth defects in mammals, while another, glyphosate, is now linked to non-Hodgkin's lymphoma. GM crops with bt-toxins kill beneficial insects such as bees and lacewings, and pollen from bt-maize is lethal to monarch butterflies.

According to the UN food programme, there is enough food to feed the world one and a half times over. World cereal yields have consistently outstripped population growth since 1980, but one billion are hungry. It is on account of corporate monopolies operating under the globalised economy that the poor are getting poorer and hungrier. Corporations already control 75% of the world trade in cereals. The new patents on seeds will intensify corporate monopoly by preventing farmers from saving and replanting seeds, which is what 85% of the farmers still do in the Third World. Christian Aid, a major charity working with the Third World, concludes that GM crops will cause unemployment, exacerbate Third World debt, threaten sustainable farming systems and damage the environment. It predicts famine for the poorest countries.

What about GM crops with enhanced nutritional value, such as putting soya protein into rice, or incorporating genes to increase iron content? The major cause of malnutrition worldwide is the substitution of industrial monocultures for the varied diet provided by traditional farming/foraging systems. Moreover, intensive agricultural practices deplete and leach nutrients from the soil, thereby changing the nutritional values of all food crops for the worse within the past 40 years. No amount of genetic engineering can reverse this trend, which can be achieved only by re-introducing sustainable farming methods and recovering agricultural biodiversity.

It is clear that GM crops offer no benefits and cannot feed the world. There are also enormous risks. The most immediate are random and unpredictable. Dr. Arpad Pusztai, an eminent scientist in the Rowett Institute of Scotland, lost his job when he released findings that showed two GM potato lines were toxic to rats. A more insidious danger is horizontal gene transfer -- the transfer of genetic material directly to unrelated species. It is inherent to the way GM organisms are constructed that the foreign genes introduced (transgenic DNA) may be more likely to transfer again to unrelated species. Such horizontal gene transfer can give rise to new viruses and bacteria that cause diseases and spread antibiotic and drug resistances among the pathogens.

It was because of these concerns that the pioneers of genetic engineering called for a moratorium in the '70s. Unfortunately, commercial pressures cut the moratorium short. Since then, drug and antibiotic resistant infectious diseases have returned with a vengeance. New viruses are appearing at alarming frequencies, while life-threatening bacteria are rapidly becoming resistant to all antibiotics and are hence untreatable. New evidence also indicates that transgenic DNA from dust and pollen in GM crops can spread to organisms in all environments, including the human body.

Another hazard is that the transgenic DNA can jump into the genomes of cells, resulting in harmful effects which include cancer. In its interim report (May 1999), the British Medical Association called for an indefinite moratorium on the release of GM crops pending further

studies on new allergies, on the spread of antibiotic resistances and on the effects of transgenic DNA. These concerns are shared by at least 100 scientists from 20 countries who have signed a World Scientists' Statement calling for a 5 year moratorium and a ban on patents of life-forms.

While the 'benefits' from GM crops remain illusory and hypothetical, the successes of sustainable, organic farming are well-documented, in the Third World, as well as in Europe and North America. There is also an enormous 'health bonus' in phasing out agrochemicals which are linked to many forms of cancer, to reproductive abnormalities and degenerative diseases.

The current obsession with gene manipulation may be entirely misplaced. Indeed, genes and genomes can remain relatively stable and constant only within a stable, balanced ecosystem. Organic agriculture is predicated on such a balanced ecosystem. The requirements for genetic health, similarly, are no different from those for physiological health: unpolluted environment; wholesome organic foods free from agrochemicals; sanitary and socially satisfying living conditions. Those are the real choices for civil society.

Dr. Mae-Wan Ho is Reader in Biology at the Open University and author of best-selling book, *Genetic Engineering Dream or Nightmare? The Brave New World of Bad Science and Big Business*, Gateway Books, Bath, 1998, 1999 (2nd. ed.).

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**The Institute of Science in Society**  
**PO Box 32097, London NW1 OXR**  
**Tel: 44 -020-7380 0908**



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