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The Magic Wand: Can Genetically Modifies Crops Offer a Solution for World Hunger?

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“But there are others — and I am one of them — who, supported by statistics and historical examples, believe that there is plenty to go around, and that all that is lacking is sincere willingness to change the status quo.”—Fatemah Hermes

One of the greatest paradigms of the twenty first century is hunger. In an age where fast food restaurants and large supermarkets have become commonplace, and at least 1.2 billion people are at risk of weight-related problems such as diabetes, heart attack and cancer2, 800 million people are hungry2, and 10,000 die each day of starvation or hunger-related illnesses3. A country as large as India, suffers $10 to $28 billion, or 3 to 9 percent of its GDP in hunger-induced productivity losses a year5. The paradigm is also envisioned in that an ancient menace which had historically wiped out entire human populations when man could not control the elements, still exists in a time when man not only directly manipulates life on earth but is also conquering the cosmos.

A tremendous amount of literature has been published tackling the root causes of hunger and suggesting politically and/or economically oriented solutions. There is often an underlying belief that there are more mouths to feed than food that can be produced, what has come to be known as the "world food problem". The world population was estimated to be 6 billion in 1999, and is expected to grow to 10 billion by 20501. That is, in less than 50 years there will be another 4 billion people that must be fed off of the same dry land area, if not more of it is lost to pollution and soil erosion,

In yet another discovery that will change the world no less than the discoveries of the wheel and penicillin, genetic engineering has unraveled the double helical structure of DNA, the information code of life. Scientists are now able to split and splice pieces of DNA into and out of plants and animals to produce more disease- and stress-resistant varieties that can grow bigger, faster and in greater numbers. Many in the scientific community are now waving genetically modified (GM) plants and animals at the hunger problem like a magic wand. Where the limiting factor is space, they claim, GM crops and livestock will grow more efficiently than traditionally bred varieties and with less net losses. But many Third World nations that suffer the most from hunger are reluctant to introduce the technology in their countries.

Away from the controversy over their safety, I do not believe GM crops are the solution to the world food problem because their development is profit-driven, and because they will cause irreversible damage to the age-old invention of agriculture. In the long run the problem will be ramified and the Third World will become even more dependant on the West. Additionally, the hunger problem is not caused by the unavailability of food, but by its inaccessibility, which will not be alleviated by GM crops alone.

Maximizing profit is the ultimate goal of multinational business companies including those involved in the production and sale of GM crops. Their modified crops are marketed only in rich industrial countries

where there are well-paying consumers and where the crops are already abundant. The crops are also modified in ways that are not particularly useful to Third World. For example, Monsanto has engineered extra-starch "quick fry" potatoes that sell mainly in fast food chains in the West5. Other crops, such as fruits, are modified for enhanced taste. Beans are modified to reduce flatulence in consumers. Little work has been done on drought or heat resistance, although herbicide-resistance (as discussed later) has been exhausted. Additionally, crops like cassava, cowpea, yams and millet that are indispensable to the peoples of the Third World, have been given little attention because of their low economic value. Concentration in GM studies has been on model plants and cash crops such as cotton, maize, tomato, tobacco and soybean. As Stephen Nottingham puts it, "multinationals are seeking to grow large areas of transgenic crops in the Third World — for example, tomatoes and potatoes for the major fast-food chains. These crops rarely fit in with the traditional local diets or the plans of local farmers (2003)."

These crops are impossible to adopt by the Third World at any rate because of patents on GM seeds owned by the multinationals to protect their investments in biotechnology. For the duration of the patents, the seeds can be used only when patent rights are issued by the multinationals in exchange for royalties or fees. Fees must also be paid on the use of seed from one harvest for planting the next season. Hybrid plants are not patented, but still provide protection to the multinationals because they do not produce seed, therefore farmers will constantly be dependent on the multinationals for the supply of new plants every planting season.

An additional form of dependency is created when crops are herbicide-resistant. As stated early, much research has been carried out in this front and has turned up many advances. These crops have been engineered to resist damage by chemicals sprayed to check unwanted plant growth, such as weeds. They do not however, sustain without the herbicides. Therefore a complementary demand for the seeds and the herbicides, which are often manufactured by the same company, will always persist.

This dependency is probably why many Third World nations are wary of technology. But the greatest concern about GM crops in my view is that they are required unsustainable agriculture methods. The domestic plants that our very existence today depends on were not nature's gifts, on the contrary, they were artificially selected for over 10,000 years. Our ancestors watered them, protected them from predators and compactors, and saved the best of their harvests for planting the next season. The numerous corn varieties with different size cobs and color kernels started out as roadside grasses. Maintaining genetic diversity is one aspect of sustainable agriculture. GM crops, on the other hand, are planted as monocultures; entire fields harbor nothing but clones of the same laboratory-manipulated mutant. This genetic uniformity leaves the field more susceptible to pest infestation and disease. When such infestation hits, it is transmitted easily within the field because all the plants have the same level of resistance. Plants genetically constructed in petri dishes are also not adapted to local conditions, which runs the risk of dramatic loses in cases of sudden climatic changes. Therefore, a country like India, may not want to make the foolish mistake of replacing its 50,000 rice variants5 with an experimental Frankenstein.

Advocators of GM foods as the solution to world hunger are concerned with increasing production to keep up with population growth. But despite the high rate of population growth, there's plenty to go around. According to Sylvie Brunel (2000) of Action Against Hunger, the production curve is already higher than the population growth curve:

"While world population did indeed double in one generation, grain production increased more than threefold, from 600 million to approximately 1,900 million per year. Each human being has available in theory 20 percent more food than in the early 1970's, or 2,700 calories per person per day."

She goes on to write that unfortunately half of the grain produced is not accessible to humans, "approximately 20 percent is used to feed cattle, 5 percent is kept for seed and the remainder 25 percent is quite simply lost as a result of poor storage or destruction by rodents, insects, and so on, especially in developing countries." So the problem seems to lie not in under production but in post harvest losses. Additionally, government and aid policies strongly affect what crops are grown (there is a shift toward growing cash in stead of stable crops) and how production is allocated. During its 1984 famine, Ethiopia was exporting meat, coffee, and fruits and vegetables to Europe; and in the East African drought of the mid 1980's, Burkina Faso, Mali, Niger, Senegal and Chad exported cotton to industrialized nations5. Another determining factor in food accessibility is affordability. In 1978, India produced more wheat than it could store. In just that one year, while 20 to 40 percent of its population was hungry, it exported over a million tons of wheat4. India's caste system means that some people cannot pay for food.

At first glance, genetically modified crops seem to offer a fix to the suffering of 800 million hungry people. But increased production will come at the cost of increased Third World dependability on the few multinationals that produce GM seeds, plants and their required chemicals; and the loss of crop diversity, thus leaving the Third World vulnerable to any environmental or climatic changes. If this diversity is lost, it can never be regained. So are the prices worth paying? Indeed there are many who question the ability of GM crops to increase production any more than traditional breeding (see Ref. 6). But there are others — and I am one of them — who, supported by statistics and historical examples, believe that there is plenty to go around, and that all that is lacking is sincere willingness to change the status quo. Willingness IS the magic wand.

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