

## World Hunger and Agricultural Biotechnology

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## Philosophy and World Hunger

1. Peter Singer, "Famine, Affluence, and Morality" 1972.
2. "[T]he way people in relatively affluent countries react to a situation like that in Bengal cannot be justified; indeed, the whole way we look at moral issues—our moral conceptual scheme—needs to be altered, and with it, the way of life that has come to be taken for granted in our society."

### Singer's Argument (as applied to ag biotech)

1. Suffering and death from lack of food is bad.
2. If it is in our power to (a) prevent something bad from happening, and if (b) we will not thereby compromise anything else of comparable moral importance, then morality requires us to do it.
3. It is within our power to promote agricultural biotechnology.
4. By promoting agricultural biotechnology, (a) we will prevent suffering and death from lack of food, and (b) we will not thereby compromise anything else of comparable moral importance.
5. Therefore, morality requires us to promote agricultural biotechnology.

### World Hunger

1. Suffering and death from lack of food is bad.
  - A. The most important stakeholders in this whole debate are those who are suffering from food shortages.
  - B. Some 80,000 infants die every two days from the effects of malnutrition.
  - C. It is estimated that by 2020, farmers will have to produce 40% more grain than they do now, despite little room for expanding agriculture onto new land.

### The Moral Principle

2. If it is in our power to (a) prevent something bad from happening, and if (b) we will not thereby compromise anything else of comparable moral importance, then morality requires us to do it.

"Without sacrificing anything of comparable moral importance" = "without causing anything else comparably bad to happen, or doing something that is wrong in itself, or failing to promote some moral good, comparable in significance to the bad thing that we can prevent."

### The Moral Principle

2. If it is in our power to (a) prevent something bad from happening, and if (b) we will not thereby compromise anything else of comparable moral importance, then morality requires us to do it.

The principle implies:

- a) Proximity or distance is, in and of itself, irrelevant
- b) Whether or not other people can help is, in and of itself, irrelevant.
- c) Famine aid is not an act of charity, but an act of duty.
- d) We should reduce "ourselves to the level of marginal utility."

## The Empirical Claim

4. By promoting agricultural biotechnology, (a) we will prevent suffering and death from lack of food
- Increases in yield
  - Expanded crop range
  - Virus resistance
  - Pest resistance
  - Increased nutritional properties

## Example – Golden Rice

- VAD causes about 1 million deaths per year.
- 230 million children are at risk for VAD.
- VAD causes about 500,000 cases of childhood blindness per year.
- Ingo Potrykus led a team of researchers to engineer rice so that it produces beta carotene, which the body can convert into vitamin A, on the inside of the rice.

## The Empirical/Moral Claim

4. By promoting agricultural biotechnology, (b) we will not thereby compromise anything else of comparable moral importance.
- Cause comparable harms
    - Food safety concerns
    - Environmental concerns
  - Do something intrinsically wrong
    - The unnaturalness argument
  - Fail to promote some moral good comparable in significance to the bad thing that we can prevent.
    - Prevent other, more effective or sustainable solutions

## Cause Comparable Harms?

- Food Safety Concerns
  - Introduction of new allergens
  - Negative effects on nutrient levels
  - Introduction or increase of toxins
- Environmental Concerns
  - Modified crop could become a weed, negatively affecting natural ecosystems
  - Transgenes could spread to nearby relatives, negatively affecting natural ecosystems
  - Direct or indirect negative effects on non-target organisms

## Intrinsically Wrong?

### The Unnaturalness Argument

"That any mode of thinking, feeling, or acting is 'according to nature' is usually accepted as a strong argument for its goodness. If it can be said with any plausibility that 'nature enjoins' anything, the propriety of obeying the injunction is by most people considered to be made out; and, conversely, the imputation of being contrary to nature is thought to bar the door against any pretension, on the part of the thing so designated, to be tolerated or excused; and the word 'unnatural' has not ceased to be one of the most vituperative epithets in the language."

~ John Stuart Mill

## Intrinsically Wrong?

### The "Playing God" Argument

"The consciousness that whatever man does to improve his condition is in so much a censure and a thwarting of the spontaneous order of Nature, has in all ages caused new and unprecedented attempts at improvement to be generally at first under a shade of religious suspicion; as being in any case uncomplimentary, and very probably offensive to the powerful beings (or, when polytheism gave place to monotheism, to the all-powerful Being) supposed to govern the various phenomena of the universe, and of whose will the course of nature was conceived to be the expression."

~ John Stuart Mill

## Forego Comparable Benefits?

- Prevent other, more effective or sustainable solutions
  - Use research funds that would otherwise be available for better solutions
  - Shiva: Golden Rice will "eclipse" the use of native greens and fruits, which would provide more nutritional benefits than provided by Golden Rice.
  - Greenpeace: Genetic engineering is "swamping attempts to enforce existing effective solutions, and carry out further work on other sustainable, reliable methods to address the problem."

## Another Case Study: GM Food Aid

In the fall of 2002, several south African countries were under threat of massive famine but nonetheless rejected millions of tons of food aid because it could not be guaranteed to be free from GE food. Zambia's insistence on rejecting GE food aid from the US despite threats of immense famine has been widely criticized, and it provoked the US ambassador to the UN food agencies to say that Zambian president Levy Mwanawasa should be held responsible "for the highest crimes against humanity." In light of the availability of non-GE food aid, however, GE food critics accused the US of being willing to sacrifice human lives in order to open third-world and EU markets to GE foods.

## Various Degrees of Rejection

1. Initially rejected the food aid, but accepted it after consultation with the WHO in 9/2002:
  - A. Malawi: 3.2M threatened with famine, needed 560K tons of food aid
  - B. Lesotho: 650K people (33% of the population)
  - C. Swaziland: 250K people (25% of the population)
2. Initially rejected the food aid, but accepted it after it was milled (\$25/ton):
  - A. Zimbabwe: estimated 8M could not afford basic food stuffs, needed 1.5M tons of food aid
  - B. Mozambique: 515K faced severe food shortages, 355K needed "immediate food aid"
3. Rejected even milled food aid:
  - A. Zambia: 2.3M people would need food aid by the end of December 2002; maize shortage estimated at of 630K tons to 1.2M tons; in August 2002, World Food Program estimated that "as many as 6 million Zambians will soon face starvation"

## Zambia's Concerns

1. A 1999 report by the British Medical Association that stated "We cannot at present know whether there are serious risks to the environment or to human health involved in producing GM crops or consuming GM food products ... and adverse effects are likely to be irreversible".
  - i. Food safety concerns:
    - a. Poor testing for allergenicity of novel proteins
    - b. Antibiotic resistance marker genes could transfer to bacteria in the gut
  - ii. Concerns about contamination of local crops or foodstuffs
    - a. Could jeopardize ability to export to the EU
    - b. Herbicide resistant crops could increase herbicide usage, invade neighboring ecosystems, or transfer gene to nearby relative and increase their weediness
    - c. CaMV promoter could reactivate dormant viral DNA in crops' genomes

## Discussion Questions

1. How do considerations of national sovereignty affect this debate?
2. Under what circumstances, if any, would it be permissible for a country to choose a course of action that allows its citizens to starve? Was Zambia in those circumstances?
3. Are any of the substantive worries (food safety, environmental harm, loss of EU as an importer) about genetically engineered food plausible?
4. How should we allocate moral blame in this situation among the various actors (the EU, the US, the ag biotech industry, the African leaders)?
5. How should we attribute moral blame when people clearly have strategic reasons for making threats that they would not, in the end, act upon?
6. Should countries have a right to reject imports on grounds not directly related to human or environmental health?
7. How do Zambia's decisions differ from decisions we might make about the other situations mentioned below?

## Some Other Situations

- A. StarLink 1999 – 2000
- B. ProdiGene: November 2002
- C. Last Chance Therapies
- D. RCTs in which there are arms that receive something worse than the best available treatment, but the study group is likely to still get something better than what they would get in the absence of a trial.
- E. Risky but effective vaccines for important diseases in developing countries that are not suitable for use in developed countries
- F. Rejection of aid for religious reasons or moral reasons
- G. Workplace safety standards
- H. Minimum wage standards
- I. Child labor/sweatshop laws

## StarLink 1999 - 2000

StarLink corn contains a Cry9c protein, which is a pesticide. The corn was approved for use in animal feed, but failed the approval tests for use in food. The USDA bought the remaining supplies of StarLink corn, total cost \$68 million. Scientific Advisory Panel concluded that risk of harm is extremely low, but the EPA refuses to allow it to be distributed as food in the U.S. Some of it was exported as food aid to other countries. The language for the safety testing for pesticide is that the limits should be set so that "there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposures and all other exposures for which there is reliable information."

## ProdiGene: November 2002

"Thousands of bushels" of soybeans are found to be adulterated because they are mixed in with corn kernels containing genes that produce either pharmaceutical or industrial protein, not approved for human consumption. The USDA said the soybeans were unlikely to be harmful, even if eaten. The soybeans are nonetheless destroyed.

## Last Chance Therapies

May 2003 report in the New York Times: Jonathan Simms suffers from variant Creutzfeldt-Jakob disease (vCJD), which is invariably (?) fatal. His condition worsened until he became incompetent. Doctors predicted that he would be dead within a year. His father found researchers with some success using pentosan polysulphate, (PPS) against scrapie (another prion disease) and which had shown promise against vCJD *in vitro*. Because of the size of PPS molecules, it would have to be injected directly into the brain. However, when injected into the brains of animals, it could cause "hemorrhage, convulsions and extensive brain damage." After being refused by several hospitals because the treatment was thought to be too dangerous, and after going to court, Jonathan finally received treatment. He is still alive 7 months after doctors predicted he would die.

## Rotavirus Vaccine

Rotavirus causes diarrhea that is easily treated in developed countries with sufficient water and electrolytes, but which causes approximately 600,000 deaths each year worldwide. Wyeth pharmaceutical company developed a vaccine that was approved and distributed in the U.S. After widespread use, it was found to cause a potentially fatal bowel obstruction in 1 in 10,000 cases. This risk is unacceptable in developed countries, where rotavirus is only a minor illness, and Wyeth promptly pulled it from those markets. But Wyeth also refuses to market it in other countries.

## Outcomes of Zambia Case

- Zambians rioted and raided warehouses of GE corn, which they heard was to be shipped elsewhere.
- U.S. found food aid in the form of wheat, which at the present time, is not GE.
- Zambia finally changed its policy to allow GM food aid.