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SEEDS OF CONTENTION

WORLD HUNGER AND THE GLOBAL CONTROVERSY OVER GENETICALLY MODIFIED CROPS

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The population of the world surpassed 6 billion in 1999. It is expected to reach 7.5 billion in 2020. Most of the increase will occur in the poor regions of Africa and South Asia. The growing numbers of people in these developing regions and the pressing need to end hunger—twin concerns of economic development—require increased production of crops, livestock, and other foods. How will agriculture meet this challenge?

Historically, farmers in both developed and developing countries have been able to produce more food by applying better farming techniques, using improved plant varieties and livestock, and appropriating new lands. The latter option, however, will be available only on an extremely limited scale in the future and mostly at a cost to the environment. Despite historic gains, a continued increase in grain yields is not a foregone conclusion. In more productive regions of the developing world, grain yields are not increasing at the same rate as before. Although incomes are rising, poor farmers cannot afford to invest in the necessary pesticides, herbicides, and fertilizers to close the yield gap. Global redistribution of food supplies is logistically, financially, and politically impractical.

Can we overcome these formidable constraints and feed the world's expanding population? In *Seeds of Contention,* published by Johns Hopkins University Press, Per Pinstrup-Andersen and Ebbe Schiøler assess the role various strategies can play in augmenting global food supplies and combating hunger. They attempt to defuse the contentious debate surrounding the development and spread of genetically modified (GM) foods, which, they argue, can help meet the needs of the poor. The authors recommend a cautious approach that would encourage innovation but respect sound scientific procedures that guard against risks to humans and the environment.

WHAT'S NEW ABOUT GENETIC RESEARCH?

Long before humans intervened, nature overstepped its own species boundaries. Crossing grasses in the wild led to the emergence of durum wheat thousands of years ago. Farmers everywhere, down through the ages, noted which plants gave the best yield, and carefully set aside seeds from the sturdiest plants to sow the following year. Both traditional plant breeding practices and genetic research follow these same basic principles. This book demonstrates that with proper biosafety procedures plant modifications derived from genetic research need not be riskier than those derived from traditional plant breeding. There are, however, advantages to genetic engineering over traditional methods. Plant improvements can occur more rapidly and extend beyond the limitations of the plant's own gene pool—thus, the possibilities for combining genes to increase food production become endless.

CAN THE POOR BENEFIT FROM GENETICALLY MODIFIED FOODS?

Although the number of undernourished children worldwide is expected to decline from a current 160 million to 135 million in 2020, the number of undernourished children is expected to increase in some areas such as Sub-Saharan Africa. Inadequate intake of food has a harmful affect on children's growth and intellectual development and on the immune system. Undernourished children can succumb to what would normally be considered a trivial illness in a well-fed child. Undernourishment and malnourishment result in adults who have insufficient energy to fulfill their regular work obligations and who become more debilitated by common illnesses. Many people in developing countries suffer not only from insufficient caloric intake but also from unbalanced diets. Around the

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world, 125 million children show symptoms of vitamin A deficiency, and as a result 14 million have seriously impaired vision or blindness.

Heated public debate threatens to drown out all serious consideration of the important promise genetic engineering has for the poor and hungry in developing countries. Great strides have been made through traditional plant breeding to endow grains and other crops with higher vitamin and mineral content, but adding vitamin A to rice became possible only with the advent of genetic modification. Researchers are also working steadily to make plants resistant to diseases, more efficient at nutrient uptake, and drought tolerant—all critical attributes in the developing-country context.

WHO SETS THE AGENDA?

Industrialized-country positions for or against the use of genetic engineering in food and agriculture are frequently extrapolated directly to developing countries. Consumers, companies, lobbyists, advocacy groups, politicians, the media, and farmers are all part of the debate as to whether genetic engineering in agriculture is allowed to develop and under what conditions. These individuals and groups discuss underlying ethical quandaries, establish the agenda for poor people and poor countries, and influence who controls new technologies. But there are problems in the discussion about genetic modification: lack of understanding about the science, a steady flow of misinformation dispensed by the press, and politicians who are all too eager to jump on the critical bandwagon. If each country made its own decision about the use of genetic engineering technology based on domestic perception about benefits and risks, that would be a fair playing field. But rich countries and groups of well-fed individuals sometimes try to impose their views on developing countries and poor people. In the words of Hassan Adamu, the Nigerian minister of agriculture: ". . . to deny desperate, hungry people the means to control their futures by presuming to know what is best for them is not only paternalistic but morally wrong."

IS THERE A WAY FORWARD?

Taking a balanced view of the potential and the risks of agricultural biotechnology is neither easy nor popular, but adopting a moderate approach to using genetic engineering responsibly is essential if future food needs are to be met. Authorization procedures based on case-by-case evaluations would undoubtedly enhance the objectivity of the whole debate. The choice to plant modified seed or consume modified food ought to be a free and informed one, supported by a transparent system of product labeling. Nongovernmental organizations could approach the topic with an open mind and use their position to help advance the potential of genetic engineering while testing for risks. Private companies could relax their restrictions and still reap profits. Although it is generally acknowledged that some sort of ownership protection is necessary if private enterprise is to invest in research, the question is whether this must necessarily be in the form of blanket protection provided by patents, or whether some more limited arrangement such as the plant variety protection (PVP) regulations might not suffice. The latter would allow public researchers to further develop new material and disseminate innovations to a wider clientele, including poor farmers. Also, by increasing its contribution to international agricultural research, the industrialized world could ensure that genetic modification does indeed fulfill its promise for feeding the poor.