

Is Biotechnology the Answer? The Evidence From NAFTA

By Gerardo Otero and Gabriela Pechlaner

SINCE GENETICALLY MODIFIED FOOD CROPS were first commercialized in the mid-1990s, they have been touted as a miracle technology that, if only given the chance, will make deserts bloom and put an end to world poverty. The intensity of these claims is not tempered by the fact that most transgenic crops are unintended for direct human consumption.

Grown in large industrial monocultures, transgenic soybeans (which account for two thirds of global biotech food production), corn (one quarter of production), cotton, and canola are sold in volatile global markets as the raw material for cattle feed, agro-fuel, cooking oil, and sweeteners, among other products. Five agrochemical companies—Bayer, Syngenta, BASF, Dow AgroSciences, and the Monsanto Company—dominate the development and production of these products, while their customers are mostly well-capitalized, medium- to large-size farmers looking to mass-produce cash crops.

Even though such a crop system is ill-suited to feeding people, last year's spike in global food prices nonetheless spurred a return to the hopeful industry rhetoric among policy makers and commentators who strongly endorsed transgenic food as a necessary solution to the crisis.¹ World hunger, in this view, can only be eradicated with larger, cheaper, and more efficient crop yields in poor countries, and transgenic crops are said to hold this promise. As one particularly adamant commentator put it recently: "it would be criminal to disregard the hope that biotechnology offers to the world's most malnourished people."²

But to fully answer the question of whether agricultural biotechnology can help solve the food crisis, we must consider its political econ-

omy and the differing power relations that rich and poor countries have with it, especially within the context of trade liberalization, privatization, and what we call "neoregulation" (more on this below). The biotechnology revolution of the 1990s was superimposed on the reforms brought about under neoliberal globalism, and in the years since, transgenic crops have inundated both the countryside and supermarkets. They are the flagship technology of agricultural neoliberalism, going hand in glove with free trade agreements.

For this reason, the three countries of North America, economically integrated since 1994 under NAFTA, provide a good opportunity to analyze the differential impact that transgenic products have had in nations with varying levels of capitalist development. The contrasts are predictably stark, given that one of these countries, the United States, is the top global biotech farmer, home to more than half the world's farmland devoted to growing transgenic crops. Three-quarters of publicly traded biotechnology companies are U.S.-based, and U.S. spending on biotechnology research and development, both private and public, is vastly greater than that of any other country.³ The most prominent U.S.-based producer, the Monsanto Company, sold 88% of transgenic seeds in 2004.⁴ Clearly, the U.S. biotechnology sector has a significant stake in disseminating transgenic agriculture while maintaining its dominant position in both research and development and in patenting new organisms.

Canada, in contrast, invests 1.5% of what the United States does in development and has a much smaller land area dedicated to producing transgenic crops. But as the fourth-highest

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producer by production area (after the United States, Argentina, and Brazil), Canada is a significant player, globally speaking.⁵

The U.S. and Canadian transgenic industries have met with such success partly because of their shared regulatory regime, known as “substantial equivalence,” in which transgenic products are assumed to be practically identical to conventionally bred ones. No special consideration is given to the process in which they are developed, or for any potential deviations that might arise specific to that process. Transgenic products, whether for domestic consumption or export, are not labeled; because of this, there is no way of knowing, for example, how much of U.S. corn exported to Mexico is transgenic.

Substantial equivalence is an example of what we have called “neoregulation,” an alternative to “deregulation”: Under neoregulation, the neoliberal state, far from withdrawing from the economy, regularly intervenes, most importantly by promoting trade liberalization and strengthening intellectual property rights.⁶ This intervention on the part of the U.S. and Canadian governments, together with the easy approval given to many new “substantially equivalent” biotechnology products, appears to have succeeded: Transgenics are reportedly one of the fastest-adopted agricultural technologies. The Monsanto Company alone has posted only one year of losses since 1996.⁷

Because Mexico must honor its free trade agreement not only with its NAFTA partners but also with the European Union, its regulatory approach combines substantial equivalence with the European “precautionary principle,” which prohibits any action when doubts remain about its safety. In practice, this means Mexican law requires labeling for all transgenic seeds, and for directly consumed transgenic food, but only if the latter is “significantly different” from conventional products.

In terms of adopting transgenic crops, particularly corn, the Mexican government was initially very cautious, given the demonstrated threat of gene pollution that transgenics pose to Mexico’s native varieties.⁸ But in 2002, the secretary of agriculture began awarding permits for the commercial planting of transgenic corn, presumably in the north of the country, away from the central and southern regions, where corn biodiversity is greatest. Between 1995 and 2005, 31 transgenic crop varieties, including alfalfa, soybeans, tomatoes, potatoes, canola, cotton, and corn, were approved in Mexico, 16 of which were developed by Monsanto.

In view of the haphazard approach to awarding permits, the Mexican Congress in 2005 issued the Law of Biosecurity of Genetically Modified Organisms (LBOGM), which

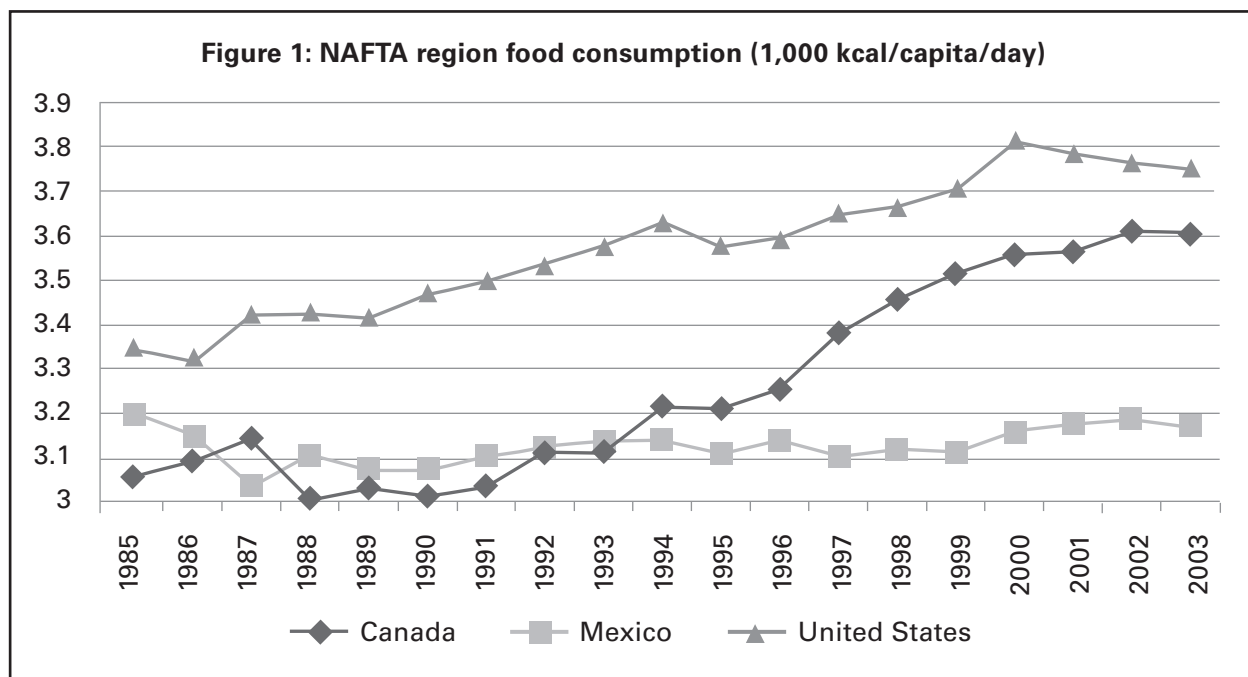
singled out corn as a crop to be treated as a special case. A section of the LBOGM is devoted to restricted zones, meant to protect centers of origin and biological diversity, as well as to transgenic-free zones, which may be designated at the request of local communities that, for example, seek to protect their organic farming and markets. Such community requests, however, must be backed both by state and municipal governments, raising the question of to what extent such governments are sufficiently autonomous from local ruling classes and large transnational corporations.

Today Mexico devotes 247,000 acres of land to growing transgenic cotton and soy, ranking 13th in the world for transgenic acreage in 2008, according to the International Service for the Acquisition of Agri-Biotech Applications, a trade group.⁹ Compared with the United States’ and Canada’s adoption of transgenic crops, of course, Mexico’s is minuscule, and its control over research and development practically nonexistent. But Mexico has nonetheless been significantly affected by transgenic crops—less through directly adopting them for cultivation but indirectly through trade, as the country has become progressively more dependent on importing basic grains, including soybeans (almost 100% imported) and corn (23%), from the United States. Most of Mexico’s imported U.S. transgenic corn is destined to become cattle feed, syrup, and oil.

In sum: The United States dominates agricultural biotechnology, Canada is somewhere between a “taker” and “promoter” of it, and Mexico exerts little influence on the technology’s development, grows a small amount, and is primarily affected by transgenics’ dissemination through its obligatory U.S. imports under NAFTA. But to get a clear idea of what importing transgenic crops has meant for Mexico in contrast with the United States and Canada, we have to compare the empirical data on food consumption in the three countries before and during the NAFTA years.

UNFORTUNATELY, THE UN FOOD AND AGRICULTURE Organization’s data on North American food consumption do not cover the period leading up to and including the 2008 food crisis, but we can still extrapolate the structural trends from 1985 to 2003, the latest year for which they are available. Comparing the three NAFTA countries’ per capita food consumption (see figure 1), we note several trends and shifts that set the context for 2008.

First, while the United States clearly consumes more food than both Canada and Mexico, it may be surprising to some that in 1985, years before NAFTA’s inauguration, Mexico’s per capita food consumption was slightly higher than it was in 2003. Starting exactly in 1994, however,



Canada's food consumption surpassed Mexico's and continued growing, approaching U.S. levels by 2003. Mexico was left behind in per capita food consumption by its northern partners, even prior to the sharp food price increases beginning in 2007.

If we break down the analysis by food components—protein, vegetables, and fats—we can also see some interesting contrasts, which give us a clear indication of each country's food strength or vulnerability. In per capita protein consumption (see figure 2, following page), all three countries experienced slight increases, but Mexico's was 15 to 25 grams per day below that of Canada and the United States at any given time between 1985 and 2003. What increase there is in Mexico's protein intake is likely due to the importation after 1994 of cheaper meat from the United States, where most feed grains are subsidized and produced with transgenic seeds, together with increased purchasing power among middle- and upper-income Mexicans.

The contrasts change when we move on to per capita vegetable consumption (figure 3): While the United States consumed more vegetables than Canada and Mexico, and increased its per capita vegetable intake between 1985 and 2003, Canada's consumption, on the rise since before NAFTA, surpassed Mexico's by 1998. Mexico's vegetable intake, which started the period at a higher level than Canada's, declined slightly. This is ironic, given that during the same period Mexico substantially increased

its fruit and vegetable exports to Canada and the United States.¹⁰ Evidently this means that, while capitalized Mexican farmers were able to take good advantage of liberalized trade through NAFTA, average Mexican consumers lost purchasing power and were less able to afford the fruits and vegetables leaving their country for the international market.

Finally, Mexico's per capita fat consumption (figure 4), which has always been less than half of Canada's and the United States', remained fairly stable, with a slight decline in the early phase of the neoliberal turn in 1986–90. Canada and the United States, meanwhile, increased their fat consumption.

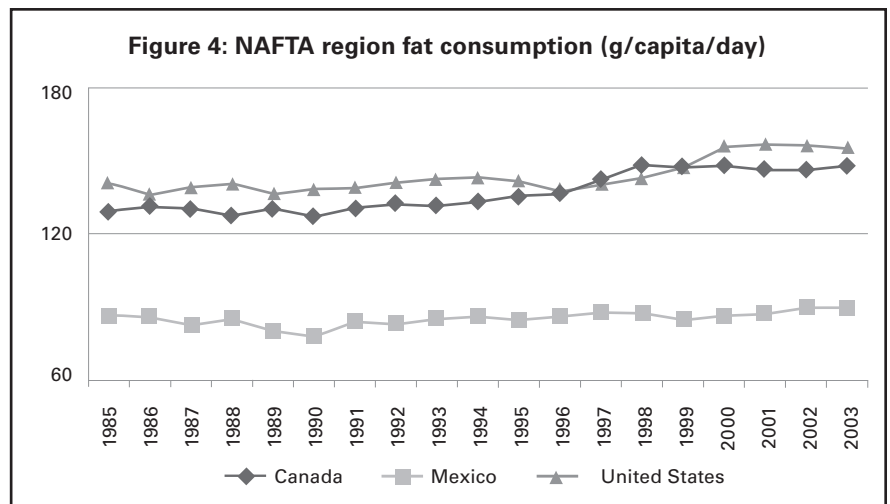
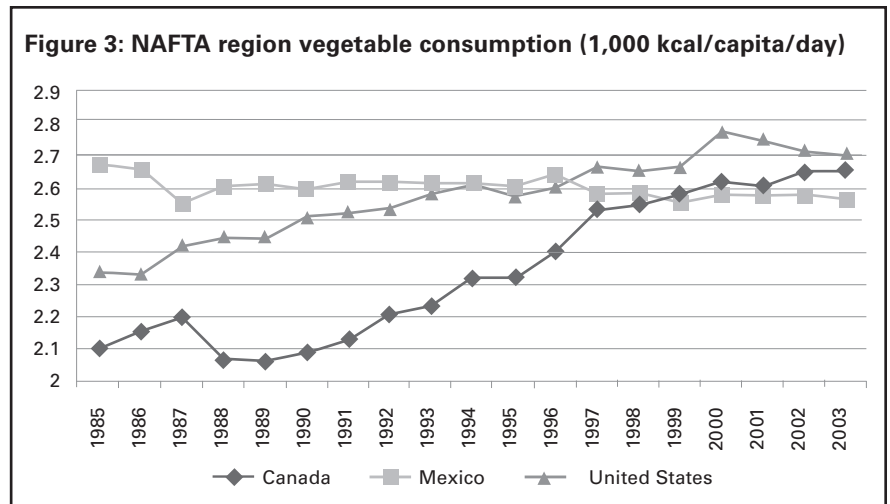
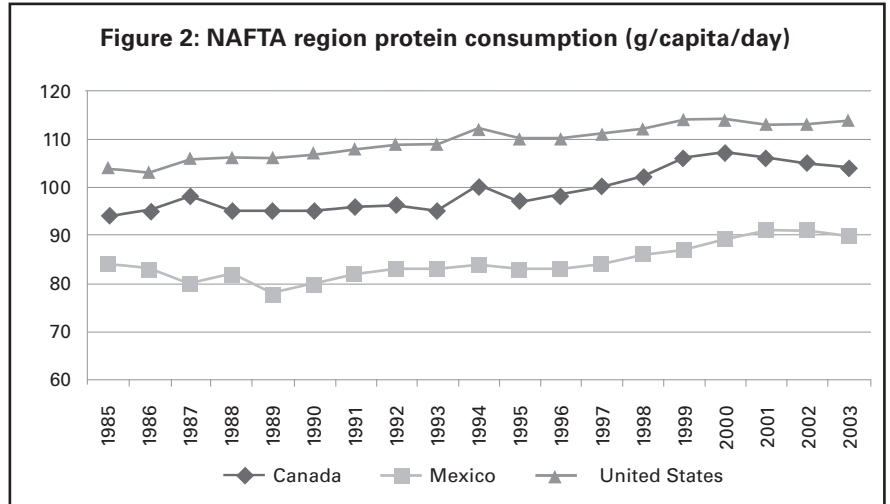
Mexican economists have corroborated these trends, which clearly indicate an unfavorable evolution of Mexican food consumption relative to those of Canada and the United States. Transgenics arrived in Mexico together with the massive economic and social dislocations of NAFTA: 2 million jobs lost in the countryside; mass migrations of campesinos to cities or to North America; and a mere 1.7% annual national economic growth rate, compared with an average 6.1% during the previous four decades.¹¹ In short, the negative impacts of trade liberalization, which greatly expanded U.S. and Canadian transgenic exports, have been far greater for Mexico than for its two NAFTA partners even prior to the 2008 food price crisis. Once the crisis started, these disproportionately negative impacts only deepened.

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Increasing transgenic corn and transgenic-fed meat imports to Mexico led, on the one hand, to making more peasants redundant; on the other hand, it allowed for an increase in meat consumption, partly at the expense of vegetable consumption, by those who could afford it. In a country where purchasing power is deeply unequal, mass-produced transgenics fostered a high-protein diet for the few.

The large population of Mexicans with very low purchasing power is extremely vulnerable to price shocks, like so many in the developing world, where the proportion of family budgets spent on food is about four times larger than in developed nations. An average 15% increase in Latin American and Caribbean consumer price indexes in 2006–07 pushed the rate of indigence in the region “by almost three points from 12.7% to 15.9%,” according to the UN Economic Commission for Latin America and the Caribbean (CEPAL), meaning almost 16 million Latin Americans became destitute as a result of high prices.¹²

The idea, then, that we can solve the food crisis by simply increasing yields is problematic in world where most people go hungry not because there isn’t plentiful food, but because they cannot afford what food exists. Importing cheaply produced transgenics did nothing to shield Mexicans from the onslaught of high corn prices: When prices increased by 15% in December, consumption dipped by 30%.¹³



WHATEVER LEVEL OF TRANSGENIC CULTIVATION MEXICO undertakes in the future is unlikely to help feed the country. Even if transgenic varieties were proven to be more efficient and environmentally friendly, their adoption in developing countries does not constitute a transfer of technology. Rather, U.S.-based companies sell transgenic seeds, often packaged together with herbicides and other agrochemicals, on a contractual basis to farmers for each season. More direct adoption of transgenic crops in Mexico will likely increase the country's dependence on high-input, capital-intensive agriculture and further threaten peasant production. It will, in other words, exacerbate the negative social effects already familiar from the Green Revolution—the Rockefeller Foundation's effort to “modernize” agriculture, which began in Mexico during the 1940s with the introduction of industrial farming technology.

Furthermore, it is larger, more capitalized farmers who adopt transgenics to produce soybeans and corn for the lucrative export market, diverting land for domestic food production. Thus the paradox of Argentina: The second-largest transgenic cultivator after the United States, and one of the world's top agricultural exporters, saw growing internal hunger in the early years of the 21st century.¹⁴

While peasant production isn't highly productive in economic terms (i.e., in terms of turning a profit), it effectively provides nourishment for those who depend on it for sustenance and otherwise have few alternatives in an economy that fails to provide sufficient employment for urban migrants. Replacing peasant agriculture with industrial agriculture for export, of which biotech is a crucial component, forces peasants to depend on remittances from relatives abroad and therefore increases food insecurity, even if overall production increases.

Study after study has demonstrated the limitations of corporate-driven biotechnology, including strong doubts about its effective economic performance, its associated rise in pesticide use, its strong bias in favor of large transnational corporations, and its limited benefits to small farmers or the hungry.¹⁵

Our findings support the view that, while agricultural production and productivity are increasing, the benefits of capitalized farming are not necessarily accruing to small farmers or the hungry.¹⁶ With the introduction of agricultural biotechnology in Latin America,

regional and social polarization is quickly expanding beyond what the Green Revolution produced, as fewer and larger farmers dominate agriculture while others are bankrupted. These trends will likely be aggravated by the recent food price inflation. Excluding a bottom-up process of plant breeding and technological innovation that is effectively people- rather than profit-centered, the current form of biotechnology development can hardly help alleviate the food crisis.

In June 2008, the FAO concluded its summit in Rome with a declaration calling on governments to commit \$20 billion for “agriculture research,” provide food aid, and spark “a new green revolution.” However, the FAO declaration takes no official position for or against transgenics. In a hopeful development, and despite the best efforts of Ed Schafer, the USDA secretary, transgenics didn't get much attention at the summit as a possible solution to the food crisis.¹⁷ The FAO's declaration makes proposals that include important measures that could help lead to a sustainable agriculture, and its statement on “biofuels” reflects skepticism on the subject. More importantly, though, the declaration is notable for its focus on small-peasant farmers and the importance of maintaining biodiversity.

The wholesale subscription to the ideology of neoliberal globalism, and its consequent economic and policy paradigm, can carry a very high price for the people in developing countries. Our analysis suggests the wisdom of reinstating policies supporting local agriculture, increasing local food production, and decreasing the reliance on imports, without moving into all-out protectionism.

Supporting small-scale producers has at least two long-term advantages. First, even if they are not nearly as efficient as the more capitalized (and subsidized!) farmers of the North, small-scale producers have been able to feed millions of peasant families.¹⁸ Keeping farmers on the land, as opposed to economically inducing them to migrate, also preserves rural communities as vibrant entities. Many studies have found that migration from rural communities sharply increases work for the women who remain. Second, small-scale production has also been found to be important for preserving plant-biological diversity. The FAO took steps to endorse supporting small-scale production with its 2008 declaration. It is time for states to listen. **□**

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