Food or Fuel: Globalization, BioFuel, and Sovereign Food Security in the Mexican Maize Industry

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Abstract

This paper analyzes the effects of globalized capitalism and internal economic culture shifts from small-scale farming-oriented to large-scale export-oriented farming have had on production and consumption in the Mexican maize (corn) industry, paying particular attention to how this shift has left local populations vulnerable to food scarcity and insecurity resulting from global corn market shifts. The research consists of a cross-comparison of previous works from a wide selection of scholarly journals, print, and online material, governmental and economic records, etc., as well as an analysis of the current situation of the Mexican corn industry and both its historical roots and future implications. The economic and political strategies the Mexican government used in attempting to increase profit and export industries, particularly in relation to agriculture, actually diminished the internal self-sufficiency of many Mexican communities and have led to harsh consequences for the agricultural sector that permeate the rest of society. This paper highlights the need for a reassessment of current policy, both domestically and multilaterally.

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Octavio Paz noted that the discovery of maize (corn) is to modern humans as the invention of fire was to the early hominids (Acedo, 2010). 817 million tones of the cereal grain, first domesticated by the indigenous populations in Mesoamerica, were produced worldwide in 2009. That same year Mexico alone produced more than 20 million tons of maize, making it the fourth highest producer of the crop

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globally. Maize has proven to have not only been a source of economic gain as a commodity, but also a relic of Mexican history and popular culture. Maize is a staple food in many Mexican dishes, including the most famous item, tortillas.

Maize is a crop in high demand as a source of food, but also, as a result of the global movement for more "sustainable" energy sources, a bio-fuel in the form of ethanol. The production of corn for use in ethanol production is consistently growing, leading to higher maize market prices. After the creation of the North American Free Trade Agreement (NAFTA), the production of maize shifted from local farmers to large-scale production of the crop by foreign owned agribusiness and multi-national corporations (MNO). With this came a decrease in Mexican exportation and local consumption of maize, and an increase in foreign imports (which are more subject to price fluctuations, cost hikes and scarcity) (Wise, 2012a, p. 18). Furthermore, the trade agreement between the US and Mexico has led to allegations of the US dumping subsidized maize in the region. Farmers contend that Mexican competitors are unable to compete in now duty and tariff-free markets, both at home and abroad (Acedo, 2010), especially considering that foreign competitors, particularly the US, use heavy farm subsidies to keep product costs low. That's not to say that the Mexican agricultural sector can only blame NAFTA for its setbacks; economic crisis brought on by oil price fluctuations in the 1980s led the Mexican government to seek out foreign assistance and increase economic production through harsh and wide-spread austerity measures, which will be discussed in detail later in this paper.

It is essential to understand that the decline of small-scale rural maize farming and the rise of agribusiness and foreign imports are inextricably linked and mutually reinforcing economic situations. Pre and post NAFTA economic policies both within the US and Mexico created an economic foundation that would favor a burgeoning large-scale farming market (both at home and abroad) over a local, subsistence, small-scale rural maize market. This has led to decreased internal production and increased foreign importation of goods, as well as increased foreign investment and ownership of arable land. These changes have left rural populations vulnerable to price fluctuations, market instability, food scarcity and elevated levels of poverty and unemployment (which would inevitably lead to internal migration and external emigration). Many of these market instabilities are due to a lack of domestic self-sufficiency and changes in the maize industry (particularly in relation to the corn-ethanol boom). Governmental reforms aimed at increasing food security and economic development through widening international trade markets

for maize have inevitably created sequences of food insecurity and threats to food sovereignty by eliminating local production and removing internal safety nets to counteract the effects of global maize market shifts.

Food security and food sovereignty

For this paper, it is essential to understand what is exactly meant by the terms food security and food sovereignty. As defined by the World Health Summit of 1996, food security exists "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active lifestyle" (World Health Organization, 2013). The World Health Organization bases this on three pillars: food availability (consistent and sufficient food), food access (sufficient ability to obtain food through resources like purchasing power and transportation to it), and food use (appropriate knowledge on nutrition and adequate sanitation). Having access does not imply that the food be produced internally or locally, thus food security can be used to defend the opening of markets and liberalizing of trade, as recently applied by various government officials. The Food and Agriculture Organization of the United Nations (FAO) introduced the terms "food self-sufficiency" (domestic production of foods) and "food self-reliance" (domestic availability) in relation to global food security. As FAO noted,

> Some commentators do not regard self-sufficiency as an economically sound alternative, given the much greater worldwide capacity to produce food than to consume it, the few restrictions on the exports of food items in countries with excess capacity, and the availability of international transport. Instead, what countries need, it is argued, is sufficient capacity to generate the foreign exchange necessary to import whatever quantities they consume over and above what it is efficient to produce, based on comparative advantage. (2003)

It is observed that recently food security has been applied to a pro-trade liberalization model favoring importing through reduction in trade barriers and subsidy programs based on who can most efficiency and economically produce a good (comparative advantage). This argument has met contention from grassroots organizations, non-governmental organizations (NGOS), and farming communities/ alliances. They argue for a new definition for establishing the right to food, known as food sovereignty. In 2007 the International Nyéléni Forum for Food Sovereignty was held in Mali. It was organized by an alliance of social justice organizations, including Via Campesina, the International Planning Committee for Food Sovereignty, and The Development Fund. Their declaration defined food sovereignty as,

"the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems" (Nyéléni, 2007). This is understood to not only be requiring adequate access, availability and use in relation to food, but focuses on the need for self-sufficiency through domestic production of food to meet these goals. The declaration further states, "Food sovereignty prioritizes local and national economies and markets and empowers peasant and family farmer-driven agriculture, artisanal - fishing, pastoralist-led grazing, and food production, distribution and consumption based on environmental, social and economic sustainability" (p. 1). This conceptual framework shifts the focus on agriculture and food production away from simple economic standpoint to one with focuses on culture, social justice, and environment too. Later in this paper, food sovereignty will be discussed in relation to local resistance movements to the increased foreign owned and dominated maize industry that affects the Mexican maize market today.

I. Trade Liberalization, NAFTA, and the Movement to Large Scale Export Industries

Pre-NAFTA maize production in Mexico.

Maize largely exists in two forms: hybrid yellow maize, which is largely used for industrial means, such as for livestock feed, and is produced within the United States; and white, which is the majority produced in Mexico and is centrally used for food there. The U.S. corn production is characterized by large-scale agricultural production in the Midwest with a heavy reliance on machinery, chemicals, and high yield crop varieties (particularly genetically modified hybrids [GMOs]). In contrast, Mexican maize production is largely produced through small-scale, labor-intensive farms. For small scale farmers, cornfields utilize Mesoamerican traditions of intercropping maize, beans, and squash, usually on small lands (up to 5 hectares) (Hufbauer & Schott, 2005, p. 328; Fitting, 2010, p. 8).

Since 1917 with the abolishment of the encomienda system after the Mexican Revolution, Mexicans have practically applied communal ownership with individual use of farming land through the Ejido program. This program was an important component of larger land reform that would later redistribute land in 1934 away from wealthy landholders to usually poor rural and indigenous campesinos (farmers). Ownership was communal which ensured that it was locally operated (the Mexican government restricted selling of land to larger conglomerates or to foreign investors) and governmentally secure (a safety net, if you will) (Brown,

2004, p. 5). From the 1930s thru the 1980s, Mexico followed an import substitution policy, placing "high restrictions on foreign investment and control[ling] the exchange rate to encourage domestic industrial growth (Villarreal, 2010, p.2)." This also extended to the agricultural and livestock production industries. In the 1980s, various governmental programs existed to ensure high prices for domestic maize through protectionist and internally centered economic policies. The National Company for Popular Subsistence (La Campania Nacional de Subsistencia Popular, or Conasupo, hereafter NCPS) controlled the Mexican corn industry through subsidizing products for local consumption, namely by millers who crafted tortillas, and managing import numbers of foreign-produced maize. Other programs, such as BanRural, provided credit to small-scale farmers, and institutions such as Programa Nacional Semillas (PRONASE) provided publically funded agricultural inputs to farmers throughout Mexico (Keleman, 2009, p.18). All of these programs represented a larger institutional policy framework that favored a strong state-agricultural relationship, particularly in the sense that it fostered domestic production for domestic consumption.

However, economic crisis would shift Mexican policy from import substitution and protectionism to neoliberal reform. This crisis was brought on in 1982 with a drop in oil prices, leading Mexico to default on its international debts. Seeking consul and assistance from the International Monetary Fund and the United States, Mexico was prescribed harsh and sweeping austerity measures that created an economic shift from state controlled to market controlled industry (Villarreal, 2010, p. 3-4). Under the leadership of President Miguel de la Madrid (1982-88) and later Carlos Salinas de Gortari (1988-1994), the government focused on privatization, devaluation of the Mexican peso, reduction in state expenditures, and liberalization of the country's markets and land to foreign investment and ownership (once previously prohibited against in the post-Revolution constitution). This led to the privatization of 750 state enterprises, with huge job losses, breakdown in labor union contracts and increased concentration of wealth in the hands of a few (Lee, 2002, p. 573). In 1991, the constitutional right to Ejido land was eliminated due to government complaints of low productivity, and these lands became available for private sell. Maize subsidy programs were largely disbanded or reduced in size and scope. Namely, the NCPS slowly moved to a "last resort buyer" model (where the government as a last option will buy maize at average international prices and then distribute to local millers) in the mid 1990s and then was finally dismantled, like many of its sister programs, at the end of the decade after NAFTA was intro-

duced (Hufbauer & Schott, 2005, p. 337). As pointed out by Angeles Villarreal in 2010, "Mexico's unilateral reform measures included eliminating state enterprises related to agriculture and removing staple price supports and subsidies" (11). This privatization and deregulation was pursued to encourage competition through market forces, attract foreign investment, and relieve the Mexican government of large scale state spending. It is important to note that many early subsidy programs remained, but were at times reoriented to focus more on large-scale agro-industry (agribusiness) as an economic avenue (Keleman, 2009, p. 20-21). Economic crisis caused the Mexican government to shift its agricultural relationship away from supporting subsistence farming, and instead, to foster large-scale farming with the hope of entering and competing in larger domestic and international markets.

NAFTA and trade liberalization

Following the economic crisis of the 1980s in Mexico and subsequent crises during the early 1990s, the country was exploring new avenues for increasing economic viability and production. Out of this economic downturn, and the subsequent stress on trade liberalization, came The North American Free Trade Agreement, more colloquially known simply as NAFTA. This multilateral free trade agreement was signed in 1994 by Canada, the US and Mexico and sought to eliminate trade and investment barriers between the three countries. The agreement allotted for immediate reduction in trade barriers for some industries, but more sensitive markets, namely agriculture, were given a phase out period. This was not strictly followed, however, particularly in relation to maize in Mexico. Initially to ensure the protection and stability of the Mexican corn industry, there were strict quotas with enforced over quota tariffs for U.S. imports of maize that would slowly phase out from 1994 to 2008, with the goal of eventual elimination. This was not always upheld. As presented in *NAFTA Revisited* by Gary Clyde Hufbauer and Jeffrey J. Schott, "the Mexican government allowed tariff-free corn imports to exceed NAFTA mandated TRQs [tariff rate quotas] since 1994…, partly to satisfy the demands of the Mexican livestock and starch industries" (328). This translated to two billion dollars lost in tariff revenue, with at last two thirds lost on yellow corn imports (328-29).

NAFTA granted larger market access to U.S. firms in service sectors, ensured foreign direct investments in Mexico (namely from nationalization and government intervention, a poli-economic trend during Import Substitution Industrialization [ISI] movements in Latin America), and preserved intellectual property rights for U.S. corporations (Villarreal, 2010, p. 7). These measures were imple-

mented to support an evolving international export maize industry, particularly one that relied on foreign direct investment to reach fruition.

Increased competition and declining Mexican markets

Foreign importation over domestic production can lead to lack of self-sufficiency in a nation. Mexican agricultural imports from the United States increased from $3.6 billion in 1993 to $7.9 billion in 2003 (Villarreal, 2010, p. 13). Dominance of importation within Mexico is exacerbated by foreign countries, namely the US's, unequal economic policies and subsidizing programs, as well as internal roadblocks such as poor transportation, government assistance and start up resources (Hufbauer & Schott, 2005, pp. 336). Self-sufficiency relates to the level of dependency a nation has on imports. Ratios for this are determined by looking at domestic production versus domestic consumption, particularly of food. The United Nations Conference on Trade and Development (UNCTAD) pointed out the notion that, "to decrease exposure to food insecurity is to increase the self-sufficiency ratio" (2013, p.8). Following economic reforms in pre- and post-NAFTA Mexico, the self-sufficiency ratio for Mexican maize experienced a significant drop. The domestic production to domestic consumption ratio dropped from .91 in 1991-1993 to .77 in 2005-2007; this reflects a growing dependency on maize imports in Mexico (UNCTAD, 2013, p. 9). As of 2010, Mexico imported more than one-third of its corn, the majority from the US; this is a significant increase from an earlier number of 7% in pre-NAFTA 1990s (Wise, 2012a, p. 6). This creates an increased trade deficit and costs Mexico $2.5 billion per year in maize imports (Fernandez, Wise, and Garvey, 2012, p. 2).

The United States heavily subsidies their corn industry, despite NAFTA and World Trade Organization (WTO) provisions that prohibit such economic practices. U.S. subsidy programs and legislative measures, such as the 2008 Farm Bill, are aimed at protecting US farmers from an often precarious market, but have questionable economic outcomes for foreign competitors, particularly those in unprotected, liberalized markets, and small competitors. From 1998-2000, US agricultural subsidies were equal to $20,803 per producer compared to $720 per producer in Mexico (Hufbauer & Schott, 2005, p. 296). U.S. corn receives $3.7 billion annually in government subsidies, making it on a crop-by-crop basis the largest recipient of subsidy support. Larger agribusiness in the U.S., which account for 70% of market corn exports, benefit from these subsidies by being able to produce more product for less capital (Hufbauer & Schott, 2005, p. 339). This creates market favoritism away from small producers, even in the US. Allegations of product dumping have

been leveled at the United States since the implementation of NAFTA. As Timothy Wise of Tufts University argued, "the best estimate of the impacts of U.S. policies on exports is the so-called 'dumping margin': the percentage by which export prices are below production costs. The average margin for corn was 19% which resulted in a 413% increase in U.S. exports, 66% decline in Mexican real producer prices, and a $6.5 billion estimated cost to Mexican producers over a 9 year period from the 1990s to 2005 (Wise, 2009, p. 3).

Rural farmers are also facing difficulties in sustaining internal agricultural production of maize due to a number of public policy failures, weak infrastructure, and institutional missteps. As Julie Stanton argued in the *Journal of Agribusiness* in 2000, "in a very real sense, the adjustment to removal of both domestic support structures and barriers to external competition may be especially painful for smaller producers, a group which is often the target of poverty alleviation measures" (p. 174). She goes on to argue that there exists a delay between "public sector withdrawal of services and their replacement by private enterprises" (p. 174). In other words, although governmental measures were looking to have market controlled industry, (with goals of greater competition, international trade, and private sponsorship/investment), to benefit local production of maize, many rural farmers, particularly those with smaller economies of scale, have not been able to effectively and securely enter into the market or receive sufficient assistance. They are essentially not competitive enough to compete domestically and internationally, and access to resources to become more competitive is untenable. Economically, with the devaluation of the peso and the removal of government subsidies directly for agricultural goods and tools of production, Mexico was left with less cash flow and higher priced inputs (p. 177).

Poor transportation and irrigation make it costly to internally produce and distribute corn as well. Currently, it is cheaper to ship corn from New Orleans to Mexico City via Veracruz than it is to deliver corn by rail from Sinaloa to the same location. Stanton argued that, "public investment in rural development in general (including irrigation) has steadily declined since the early 1980s, falling by over 88% between 1981 and 1995." She noted that poor government investment and maintenance in public irrigation systems has affected some 20% of once irrigated land (2000, p. 177). Most of Mexico's small-scale farming occurs on rain-fed lands, largely used for subsistence and partial income. Hufbauer and Schott noted, "Between 70 and 80 percent of total Mexican corn production is on rain-fed farms. About 30 percent of these rain-fed farms are ejidos, collective communities that are

usually poor" (2005, p. 331). Antonio Turrent Fernández, Timothy A. Wise, and Elise Garvey noted in 2012 that large industrial, commercial farms, with focuses on exporting, have maximized their yield potential through investment in key areas, particularly irrigation (p. 14). As Hufbauer and Schott argued, overwhelming lack of irrigation or under-irrigation in Mexico has resulted in insufficient corn production yields, especially in comparison to the US (2005, p. 331).

Formal credits combined with limited subsidy programs have replaced the pre-NAFTA aid programs and Ejido plots for farmers in Mexico. However, low access to formal credit and a mismanaged at best and corrupt at worst government subsidy program hinders producers from growing and modernizing farms for better competing. In 2007, only 4% of rural Mexican farmers reported access to formal commercial credit (Fernandez, Wise, & Garvey, 2012, p. 8). Villarreal noted, "those with small farms in the rural areas have difficulties finding access to credit. Without government guarantees, Mexican commercial banks often hesitate to provide loans because of the historically high default rate on agricultural loans" (2010, p. 14). Mexico has attempted to create programs for income support, dissemination of modern farming technologies and infrastructure assistance of Mexican farmers, particularly rural and poor ones, through subsidy programs like Alianza Para el Campo (Alianza), Produce Capitaliza, and Programa de Apoyos Directos Para el Campo (PROCAMPO (Keleman, 2009, p. 19). These programs, particularly PROCAMPO, have been criticized for their funding and monetary dissemination practices. Following a study by the Secretary of Agriculture, Livestock, Rural Development Fisheries and Nutrition (SAFARPA) 2002, it was observed that in the over 43,000 surveyed nearly half used PROCAMPO payments for food, transportation, clothing and medicines. Only 25% of the surveyed used the funds to actually prepare agricultural lands for planting (Keleman, p. 19) and only 6% of those surveyed reported improved opportunities for accessing technical agricultural assistance (Keleman, p. 21). This underscores the idea that these programs are efficiently helping farmers develop greater farming practices; they're tools of poverty reduction, but not in economically or agriculturally sustainable ways. Many medium- to large-scale farmers have received over-allotments of payments (greater than mandated), leading to allegations of poor financial management in PROCAMPO and favoritism towards larger commercial farms geared towards exporting (Palmer-Rubin, 2012, p. 153). Poor credit and subsidy tools ultimately reduce competition by eliminating necessary mechanization, modernization, and development.

All of these factors- unfair international economic and subsidy programs, poor

internal development (irrigation, transportation) and limited access to credit and government assistance- contribute to reduction in productivity, capacity and potential of local, small-scale rural farmers to actively compete in domestic and international markets. Lacking internal self-sufficiency by eliminating such a large avenue of domestic production leaves consumers vulnerable to harsh market fluctuations and maize commodity shifts.

II. Global Market Shifts and Their Effects

The production of corn ethanol, a biofuel, represents a major factor in these market shifts. Corn ethanol is produced through ethanol fermentation and distillation for its creation as a biomass and renewable energy source. Ethanol's status as pro-environment (The U.S. Department of Energy concluded that the biofuel results in a 19% decrease in greenhouse gases and other sources put it at nearly 50%), and it's supposed status as renewable (allotting that there is a feasible supply of corn feedstock) puts corn ethanol in high market demand (USDE, 2011). The U.S. was interested in the production of biofuels as an alternative to increasingly expensive oil and gasoline imports, which is reflected in national politics in the mid-2000s in the form of tax credits, protective tariffs and consumption mandates (Wise, 2012a, p. 3). The 2005 Energy Policy act laid out the first state mandates for incorporation of biofuels on the national level, which were later expanded upon in 2007 by the Energy and Independence and Security Act. These mandates sought to encourage domestic production of ethanol and other biofuels through enforced use and market incorporation. The corn ethanol production in the U.S. today is almost nine times what it was in 2000, coming at a staggering 13.7 billion (Wise, 2012a, p. 3). High gasoline prices encourage the production and consumption of corn ethanol, which leads to greater payments to larger scale producers, as the commodity price of corn increases.

However, this supposed prosperity does not take into account market fluctuations (particularly, price volatility that wanes and waxes over demand for corn); while farm subsidies in the US, previously discussed, absorb market costs for its local farmers, Mexican corn producers are left vulnerable to the shifts. Also, consumers of corn, particularly imported corn, face market food shortages when global demand for corn ethanol consumes the market share of maize, as well as when the prices reach unfeasible heights. Tufts University contends that the cost to Mexico of U.S. ethanol expansion since 2004 is as high as $1.5 billion dollars in the form of higher import costs (Wise, 2012a, p. 2). Currently the share of U.S. produced corn

going to ethanol production is at 40%, which rose from only 5% in 2000 (Wise, 2012b, p. 3). This represents a huge problem for developing or partially developed nations, as over the last fifty years many have gone from 'being small net exporters of agricultural goods to huge net importers" (Wise, 2012b, p. 4). This market expansion has led to global food price crises, particularly in 2007-2008 and again in 2010-2011 when agricultural commodity prices spiked. As Timothy Wise argued, "there is widespread agreement that biofuels expansion worldwide was a major contributor to the increases in agricultural commodity prices, through the direct diversion of food and feed crops to fuel uses and through the competition for land to grow energy-related crops" (Wise, 2012b, p. 5). This increase in pricing (not only for consumers, but for producers across a wide range of sectors) and land scarcity further hurt rural Mexican farmers and consumers.

This market shift towards ethanol production relocated 15% of global corn production from food and feed to fuel (Wise, 2012b, p. 2). These market shifts have a way of producing massive ripples that affect a long and broad range of industrial and public spectrums.

As the U.S. Congressional Budget Office asserted in 2009:

> The increase in the amount of corn used to produce ethanol has exerted upward pressure on corn prices, boosted the demand for cropland, and raised the price of animal feed. Those effects, in turn, have lifted the prices of many farm commodities (for example, soybeans, meat, poultry, and dairy products) and, consequently, the retail price of food. (Congress, p. 11)

Other factors, such as market speculation brought on by natural disasters, also influence the corn market and leave consumers and producers vulnerable. In January of 2012, severe draughts accompanied by freezing temperatures damaged cropland in nearly half the country (Zabludovsky, 2012). Later that year, CNBC reported, "The worst drought in more than 50 years in the U.S. has sent soybean and corn prices to new all-time highs, stoking inflation fears and prompting leaders to call for action against financial market speculators blamed for driving prices higher" (Jegarajah, 2012). Mexican President Felipe Calderon, in numerous public interviews, noted that foreign hedge funds, investment banks, and institutional investors contribute to market insecurity for corn through price speculator and dictation of markets, particularly during scarcities (like with natural disasters) (Jegarajah, 2012). This is intrinsically tied to a lack of self-sustainable, sovereign food production and a growing dependence on speculated foreign imports. Before the

1990s, food contracts in the forms of "futures contracts," were utilized by farmers to offset uncertainties, namely natural and weather circumstances. Farmers would sell their crop at a future time for a set price that was guaranteed (World Development Movement). If they had a good year, the person who bought the futures contract would benefit more than the original farmer, but if the farmer had a bad year, they would be protected against total crop and profit failure. Heavy regulation kept this sort of speculation and hedging between agricultural sectors. After extensive periods of deregulation and market liberalization, contracts could be bought and sold to outside speculators, foreign and domestic and agricultural and non-agricultural (investment banks, hedge funds, etc.; those groups that deal in non-commodity trading like with stocks and bonds) (World Development Movement). These deregulations lead to greater profit margins for extreme and sometimes unethical betting on food. "I don't want to use the word speculation but the point is four years ago, more than 90 percent of the purchases of grains and food came from companies related to production or distribution of grains," Calderon said. "Today, less than 60 percent are coming from those enterprises. More than 40 percent are operations related to financial institutions" (Jegarajah, 2012). Mike Masters, a fund manager at Masters Capital Management, testified in 2008 in front of the US Senate on the dangers and damages of speculation in the commodity market. Master, quoted in *The Guardian*:

> Let's say news comes about bad crops and rain somewhere. Normally the price would rise about $1 [a bushel]. [But] when you have a 70-80% speculative market it goes up $2-3 to account for the extra costs. It adds to the volatility. It will end badly as all Wall Street fads do. It's going to blow up (Vidal, 2011).

Essentially, this high speculation leads to greater price volatility and inflation through market distortions. These deregulation movements that opened up the possibility for increased speculation across borders and market sectors were originally created to allow for greater food security, but once again, resulted in food insecurity and lack of food sovereignty for Mexican maize farmers.

III. The Maize Reality: Effects on Livelihood, Wages and Employment

Some of the immediate outcomes these market shifts can have are food scarcity and price elevation, as previously discussed. This food scarcity presents a case of food insecurity to Mexicans, particularly those who are low-income or rural, as they are more vulnerable to increases in food prices. As the USDA Foreign Agricul-

tural Service argued in a 2010 GAIN report, "Food poverty is highest in the poorest regions, notably southern Mexico, reaching as high as 47 percent in Chiapas and averaging over 18 percent nationally. Unfortunately, the price of the food basket has risen significantly in recent years, while household purchasing power has deteriorated" (United States Department of Agriculture, 2010).

Production of maize has increased in the region, but real producer prices in Mexico have decreased as well. Essentially, they are producing more food for less money. Production of maize increased 50%, but prices, due to alleged U.S. dumping of subsidized corn, have dropped 66% through 2005 (Fernandez, Wise, and Garvey, 2012, p. 4). Despite cheaper production costs, there were no significant reductions in food costs, especially in Mexico (Public Citizen, 2004).

> Contrary to free-trade economic theory, however, Mexican consumers have not benefited from import competition and lower farm prices. The prices of goods in the basic food basket increased 257% during the NAFTA era, while the prices paid to agricultural producers for all goods combined rose only 185% (Public Citizen, 2004).

This is also tied in with the liberalization policies of peso devaluation, deregulation and reduction of government subsidies that reduced real wages for both industrial and agricultural Mexican workers. Raj Patel and Gisele Henriques noted in their IRC Americas Program post, "Over the NAFTA period the domestic price for corn has fallen. But the price of corn food –especially the Mexican staple, the tortilla – did not decrease; in fact, it has increased 279%" (2004). It would seem, then, that large agribusiness was creating a larger margin for profit by controlling not only the production price, and keeping it low to eliminate independent domestic producers, but also the consumer cost, and keeping it high to maximize profitability.

In an article in the *Ecologist*, Mexican consumer Lorenzo Canseco Hernandez discussed the effect these rising costs of maize have had on his purchasing power in relation not only to food, but also to other household needs. Prices in his community have nearly tripled for corn, and have tripled, or even quadrupled, in the case of corn tortillas, a staple in his house. Hernandez stated:

> The effect is that everything that we earn, the most part of it goes on corn and food, but there are also other important things we need money for, like our houses and other things, but we normally don't have any money left over for anything else (Levitt, 2011).

Both financial and nutritional poverty accompany raising food costs. The UK based non-profit, World Development Movement (WDM), estimated that nearly 44 million people were driven into extreme poverty by increasing food prices in the latter half of 2010. An estimated 40 million Mexicans live on less than five US dollars a day, with many gaining half their daily calories from tortillas (Levitt, 2011). The WDM contends that these rising costs for staple foods, such as tortillas, increases the risk of malnutrition in impoverished Mexican communities, as smaller quantities of expensive commodities needed for a more well rounded diet (including fruits, vegetables and proteins) are bough (World Development Movement). The USDA Foreign Agricultural Service documented that at least 10 percent of all Mexican residents across the country have suffered from inadequate access to food in 2010, with the numbers reaching as high as 25 to 35 percent of residents in certain Mexican states (United States Department of Agriculture, 2010). It was unsurprisingly noted that in 2008, the areas with the highest percentages of food poverty, Chiapas (47%), Guerrero (42%) and Oaxaca (38%), were also recognized states with the greatest concentration of corn producers, where seasonal, subsistence farming occurs on small plots of land, with no irrigation and low yields (read: non-competitive) (Navarro, 2007; USDA, 2010, p. 4).

Agricultural production is the main source of livelihood for 8 million rural farmers, or about 7 percent of the total population, who produce crops such as maize, avocado, etc. for export and domestic consumption on landholdings of 5 hectares or smaller (Hufbauer & Schott, 2005, p. 334). Most of these small-scale farms and Ejido plots are located in the more rural and impoverished areas of southern and central Mexico. Most of the larger, more industrialized farms are concentrated in northern Mexico and although successful, export-oriented farmers represent only 3% of private farmers, they own 30% of arable land (Hufbauer & Schott, 2005, p. 335). Agribusiness companies like Birdseye, Green Giant, Campbell's Soup, Hunt, Arthur Daniels Midland, Conagra, Cargill, and Tyson have taken up roots in the area and have experienced skyrocketing profits since the trade reforms (Patel & Henriques, 2004).

Employment in agriculture has been steadily declining in Mexico from the early 1990s to today. While agriculture once claimed 1/4th of the total employment in Mexico, it now only accounts for 14%, with the GDP contribution nearly twice as high in the 90s as it is today (UNCTAD, 2013, p. 9). UNCTAD found in 2004 that as the real price of corn drops, the corn industry faces employment reduction. They argued, "the sharp increase of imports of cereals and meat products has had a

negative impact on employment" (p.11). Their study also elaborated, "Agriculture does not only account for direct employment in the primary sector but agricultural production is also linked to employment in other sectors such as those producing inputs (upstream, e.g. fertilizer) and those in downstream sectors (e.g. transport and other services sectors)" (p. 9). This further demonstrates the disruption in the economic system of small-scale farmers, largely located in the southern and central areas, and the rippling affect the diminishing of agriculture in that area has had on other industries.

With this decrease in employment ushers an increase in internal migration and emigration. The deregulation of Mexican land through the weakening of the Ejido program, elimination or diminishing of farm subsidies, and drops in real prices for maize forced many rural farmers to migrate to more urban areas in search of unskilled work in the manufacturing sector (Beam, 2011, p. 11-12). Particularly, rural to urban migration occurred from the south of Mexico to the more industrialized north. Lt. Commander Patrick J. Beam of Newport Naval War College explained, "states with high levels of foreign direct investment, trade, and maquiladoras all increase labor demand, raising wages and lowering unemployment, increasing migration to those states" (2011, p. 11). These farmers went from owning their own means of production, labor and product, to living in shantytowns (as many city and state-wide governments lacked the housing infrastructure to support such large internal movement) for low-skill, low-wage work (Beam, 2011, p. 12).

It is estimated that nearly half a million undocumented immigrants enter the U.S. annually (Hing, 2010, 20). Bill Hing of Temple University argued that the increase in illegal immigration from Mexico to the U.S. was both internally and externally encouraged through the elevation of the U.S. agricultural market over the Mexican one. Hing argued in 2010:

> U.S. agricultural subsidies often support large-scale agricultural operations that create demand for immigrant labor. At the same time, these subsidies negatively affect agricultural production in developing countries that cannot afford to subsidize farms to the same degree and indirectly promote rural emigration. The result is both greater demand for and greater supply of guest workers (p. 23).

Essentially, the U.S. was creating demand both within Mexico and its own borders. It can also be argued that the increase in large-scale agricultural operations in the north of Mexico (both domestically and foreign owned), also supported southern to northern Mexican migration.

This emigration and migration leads to complex culture shifts that have yet to be fully analyzed. Farming traditions, community and familial structures, regional land compositions, population demographics, public infrastructures etc. are all affected by the mass movement of people and labor.

Conclusion

The Mexican corn industry is facing complex, dynamic, and multi-faceted problems and successes in an age of rapid technological growth, increased international, multilateral and regional trade, and fierce capitalistic competition and market fluxuation. Maize is for many Mexicans a symbol of cultural and economic tradition, acting as a means of economic support, subsistence, and heritage. The sweeping movements of the late 80s and early 90s forever shaped and altered the economic policies of most countries in the world and provided the foundation for a huge economic paradigm shift in the Mexican government's policies on trade, internal investment and market goals. Food security was ideally to be reached through open markets, international investment, and deregulation; the common ideal being that with wider markets come wider food options, availability, and investment. Although this trade liberalization may have benefited certain industries (particularly low skill industrial ones) and perhaps the agricultural elite, it has served to alienate the majority of corn producers in the country: small-landholding subsistence farmers. Decreased internal production from traditional growers (encouraged by unequal competition from larger foreign and domestic agribusiness producers and insufficient sponsorship of small to medium local farms) lead to increased importation of corn. A burgeoning biofuel market, natural disasters, and an increasingly speculation-driven commodity market wreaked havoc on international maize prices, leading to unemployment, elevated poverty levels, food shortages and varied market decline within the import-dependent Mexico. Lack of government safety-nets, in the form of regulations on speculations, import quotas, subsidies etc. (which are ironically utilized by the U.S., Mexico's free-trade ally and mentor), left farmers and consumers vulnerable to price volatility. Potential food security declined with food sovereignty as food insecurity leapt forward by bounds. Pre-existing inequalities in dietary availability, employment, real wages, income, and migratory patterns were exasperated and are now reaching impressionable highs.

This is not to say that NAFTA was not beneficial to Mexico; it has provided economic growth in some markets, as discussed. This paper also accepts that facing a lack of modernization, the Mexican maize industry was doomed to face severe cuts

and retarded growth. It is essential to recognize, though, that the Mexican government, starting in the mid 80s and fully realized through NAFTA, helped spur this decline from which there have been disastrous results across a wide range of varied markets and socio-cultural factors. A World Bank report noted the strong correlation between trade liberalization and the exasperation of income inequality for the poorest 40% of the population (Levitt, 2011). Patel and Henriques empathetically reasoned:

> Inequality threatens the economic gains made in other sectors of society. Sustained economic growth cannot be achieved without equality–and the more unequal a society is, the more likely it is to suffer from political and social unrest. In Mexico the richest 10% of the population receives 42% of total national income, while the poorest 40% receives just over 11%. (2004)

Consumers, producers, officials and civilians must ask themselves, who are these policies intended to help? How are they increasing security, peace, and development, particularly through food security in relation to the maize industry, and how are they simply reproducing inequalities? People of Mexican consumer Lorenzo Canseco Hernandez's community say, "la maize es la vida [maize is our life]" (Levitt, 2011). Let's ensure the continued relevancy, sovereignty, and prosperity of both.

Notes

Kelly Couch, from Myrtle Beach, SC graduated from the College of Charleston spring of 2013 with a Bachelors of Science n Anthropology and a Bachelors of Arts in Latin American and Caribbean Studies. Kelly's senior Independent Study, "Food or Fuel: Globalization, BioFuel and Sovereign Food Security in the Mexican Maize Industry," was inspired by her previous research in international political economy and social justice movements in relation to food production. The paper was supervised by Dr. Douglas Friedman. Kelly is planning to intern in New York City in the fall of 2013 and hopes to pursue a PhD in Anthropology and Political Economy in the future.

References

Acedo, A. (2012, October 25). The fight for corn [Web log post]. Retrieved from http://www.cipamericas.org/archives/8337

Beam, P. (2011). *Economics and migration: NAFTA's impact on Mexico*. Retrieved from http://www.dtic.mil/dtic/tr/fulltext/u2/a555126.pdf

Brown, J. (2004). *Ejidos and communidades in Oaxaca, Mexico: impact of the 1992 reforms*. Rural Development Institute. Retrieved from http://www.landesa.org/wp-content/uploads/2011/01/RDI_120.pdf.

Congress of the United States, Congressional Budget Office. (2009, April). *Impact of ethanol use on food prices and greenhouse-gas emissions*. Retrieved from http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/100xx/doc10057/04-08-ethanol.pdf

Fernández, A., Wise, T., Garvey, E. (2012, Oct.). Achieving Mexico's maize potential. Global Development and Environment Institute Working Paper No. 12-03. Retrieved from http://www.ase.tufts.edu/gdae/Pubs/wp/12-03Turrent-MexMaize.pdf

Fitting, E. (2011). *The struggle for maize: campesinos, workers, and transgenic corn in the Mexican countryside*. Durham, N.C.: Duke University Press.

Food and Agriculture Organization of the United Nations, Commodities and Trade Division, Commodity Policy and Projections Service. (2003). Chapter 3. Trade liberalization and food security: conceptual links. In *Trade reforms and food security: conceptualizing the linkages.* Retrieved from http://www.fao.org/docrep/005/y4671e/y4671e07.htm

Hing, B. (2010). *Ethical borders: NAFTA, globalization, and Mexican migration*. Philadelphia, PA: Temple University Press.

Hufbauer, G. & Schott, J. (2005). *NAFTA revisited: achievements and challenges*. Washington, D.C.: Peterson Institute for International Economics.

Jegarajah, S. (2012, Sept. 11). Recalling 'tortilla riots,' Mexico President warns about food crisis. *CNBC.* Retrieved on April 20, 2013 from http://www.cnbc.com/id/48996423.

Keleman, A. (2009, Feb. 03). Institutional support and in situ conservation in

Mexico: biases against small-scale farmers in post-NAFTA agricultural policy. *Agriculture and Human Values*, 27, 13-28. doi: 10.1007/s10460-009-9192-y

Lee, S. (2002). *Mexico and the United States.* Tarrytown, New York: Marshall Cavendish Corporation.

Levitt, T. (2011, Sept. 13). Mexico's poor suffer as food speculation fuels tortilla crisis. *The Ecologist*. Retrieved from http://www.theecologist.org/trial_investigations/1051194/mexicos_poor_suffer_as_food_speculation_fuels_tortilla_crisis.html

Navarro, L. (2007, May 7). The new tortilla war [Web log post]. Retrieved from http://www.cipamericas.org/archives/747

Nyéléni. (2007, Feb. 07). *Declaration of Nyéléni.* Retrieved from http://www.nyeleni.org/IMG/pdf/DeclNyeleni-en.pdf

Palmer-Rubin, B. (2010). Decentralized agricultural support programs in Mexico: resource allocation and obstacles to access for low-income producers. *Mexican Rural Development Research Reports*, No. 6, Woodrow Wilson International Center for Scholars, Mexico Institute. Retrieved from http://www.wilsoncenter.org/.DesarrolloRuralMexicano

Patel, R. & Henriques, G. (2004). NAFTA, corn, and Mexico's agricultrural trade liberalization [Web log post]. Retrieved from http://www.cipamericas.org/archives/1009

Public Citizen (2004). The ten year track record of the NAFTA: the Mexican economy, agriculture and environment. *NAFTA at Ten Series*. Retrieved from http://www.citizen.org/documents/NAFTA_10_mexico.pdf

Stanton, J. (2000). The role of agribusiness in development: replacing the diminished role of the government in raising rural incomes. *Journal of Agribusiness*, 18(2), 173-187. Retrieved from http://www.jab.uga.edu/Library/S00-03.pdf.

United Nations Conference on Trade and Development. (2013). *Mexico's agriculture development: perspectives and outlook.* Retrieved from http://unctad.org/en/PublicationsLibrary/ditctncd2012d2_en.pdf

United States Department of Agriculture, Foreign Agricultural Service. (2010). *Food security and nutrition in Mexico. GAIN report* NO. MX0043. Retrieved from http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Food%20Security%20and%20Nutrition%20in%20Mexico_Mexico_Mexico_7-9-2010.pdf

United States Department of Energy. (2011, Aug. 23). *Biomass program: ethanol myths and facts*. Washington, D.C. Retrieved on April 20, 2013 from http://www1.eere.energy.gov/bioenergy/printable_versions/ethanol_myths_facts.html

Vidal, J. (2011, Jan. 22). Food speculation: 'people die from hunger while banks make a killing on food' [Web log post]. *The Guardian* and *The Observer*. Retrieved from http://www.guardian.co.uk/global-development/2011/jan/23/food-speculation-banks-hunger-poverty

Villarreal, M. A. (2010, June 3). NAFTA and the Mexican economy. Congressional Research Service. Retrieved from http://www.fas.org/sgp/crs/row/RL34733.pdf

Wise, T. (2009). Agricultural dumping under NAFTA: Estimating the costs of U.S. agricultural policies to Mexican producers. Retrieved on June 16, 2013 from http://www.ase.tufts.edu/gdae/Pubs/rp/AgricDumpingWoodrowWilsonCenter.pdf

Wise, T. (2012a, May). *The cost to Mexico of U.S. corn ethanol expansion*. Global Development and Environment Institute Working Paper No. 12-01. Retrieved from http://www.ase.tufts.edu/gdae/Pubs/wp/12-01WiseBiofuels.pdf

Wise, T. (2012b, Oct.). *The cost to developing countries of U.S. corn ethanol expansion*. Global Development and Environment Institute Working Paper No. 12-02. Retrieved on June 16, 2013 from http://www.ase.tufts.edu/gdae/Pubs/wp/12-02WiseGlobalBiofuels.pdf

Wise, T. (2011, Jan/Feb.). *Mexico: the cost of US dumping*. Boston, MA: Tufts University. Retrieved on April 20, 2013 from http://www.ase.tufts.edu/gdae/Pubs/rp/WiseNACLADumpingFeb2011.pdf.

World Development Movement. (*n.d.*) What is the problem? Retrieved on April 20, 2013 from http://www.wdm.org.uk/stop-bankers-betting-food/what-problem.

World Health Organization. (2013). Food security. Retrieved from http://www.who.int/trade/glossary/story028/en/

Zabludovsky, K. (2012, Jan. 30). Food crisis as drought and cold hit Mexico. *New York Times*. Retrieved on April 20, 2013 from http://www.nytimes.

com/2012/01/31/world/americas/drought-and-cold-snap-cause-food-crisis-in-northern-mexico.html?_r=1&