

THE TORTILLA CRISIS IN MEXICO (2007): THE UPWARD TREND IN COMMODITY PRICES, FINANCIAL INSTABILITY AND FOOD SECURITY*

Lais Forti Thomaz**

Carlos Eduardo Carvalho***

ABSTRACT

The paper analyzes the origins of the soaring in the price of corn tortillas that provoked a wave of popular protests in early 2007 in Mexico. Similar manifestations elsewhere and the uptrend in commodity prices, recovered in 2010, increased the concerns about food security for countries dependent on food imports. The interest in the Mexican episode is justified by the complexity it presents. As for other products, the rising price of corn was influenced by the combined effects of increased global demand, speculative movements in financial markets and the allocation of a portion of grain to produce ethanol in the U.S. The biggest increase of tortillas, however, occurred before the peak of corn prices, and slowed down while the corn was still rising, suggesting the existence of problems in price formation in Mexican markets. There are also the complex effects of heavy subsidies practiced by the United States, with a strong impact beyond a discussion on the support of subsidies in the United States.

Keywords: Tortilla Crisis; Mexico; corn; United States; biofuels.

RESUMO

O trabalho analisa as origens da forte alta dos preços das tortilhas de milho que provocou a onda de protestos populares do início de 2007 no México. Manifestações semelhantes em outros lugares e a tendência de alta das *commodities*, retomada em 2010, acentuaram as preocupações com a segurança alimentar de países dependentes da importação de alimentos. O interesse pelo episódio mexicano se justifica pela complexidade que apresenta. Como em outros produtos, a elevação do preço do milho foi influenciada pelos efeitos combinados dos seguintes fatores: aumento da demanda mundial; movimentos especulativos nos mercados financeiros; e destinação de parte dos grãos para produzir etanol nos EUA. A alta mais forte das tortilhas, contudo, ocorreu antes do pico de preços do milho, e desacelerou enquanto o milho continuava a subir, o que sugere a existência

* The authors thank the suggestions and criticism from Cesar Morales, of the Economic Commission for Latin America and the Caribbean (Cepal), Marcos Antonio Cintra, from Ipea, participants in the III Seminar on International Relations Research, of Itamaraty (March 2011), and the anonymous commentator in *Tempo do Mundo*.

** Doctorate student at the San Tiago Dantas Post-graduation Program in International Relations – São Paulo State University Julio de Mesquita Filho (UNESP), Campinas State University (UNICAMP), São Paulo Pontifical Catholic University (PUC-SP). Electronic address: laisthomaz@gmail.com.

*** Professor at the Economics Department of PUC-SP and the San Tiago Dantas Post-graduation Program in International Relations – UNESP, UNICAMP, PUC-SP. Electronic address: cecarv@uol.com.br

de problemas na formação dos preços nos mercados mexicanos. Há também os efeitos complexos dos pesados subsídios praticados pelos Estados Unidos, de forte impacto no México com o Tratado de Livre Comércio das Américas do Norte (Nafta). O trabalho discute este conjunto de elementos explicativos para a crise de 2007 e faz uma análise da sustentação dos subsídios nos Estados Unidos.

Palavras-chave: Crise das Tortilhas; México; milho; Estados Unidos; biocombustíveis.

1 INTRODUCTION

On January 31 2007 tens of thousands of people protested in Mexico City against the soaring prices of *tortillas*, from US\$ 5.00 a year before to up to US\$ 20.00 in some regions, demanding the lowering of prices and changes in economic policy (DENIS, 2007; ABC, 2007; CONTEXTO, 2007). Recently inaugurated President Felipe Calderón faced similar protest all over the country (NAVARRO, 2007).

Mexico consumes 630 million *tortillas* a day (SMALL, 2007), a staple for more than 50 million people, despite a reduction of consumption between 1998 and 2007 as a result of *per capita* income rise and the withdrawal of price subsidies (GILES, 2008). Corn is the main ingredient for *tortillas*, and because of its significance in the national economy and identity, many Mexicans agree with the expression “*sin maiz no hay país*” (“without corn there is no country”). (ESTEVA e MARIELLE 2003). The Government reacted by setting *tortilla* prices at US\$ 8.50 through the Agreement to Stabilize *Tortilla* Prices (AEPT), besides taking other steps to combat speculation and ensure supply. The President announced his willingness to enforce the law and fight against speculators, who were denounced as responsible for the rise deemed unjustified. (SÓLIS, 2007).

The *tortilla* crisis exposed a food security problem in Mexico. Similar situations recurred in following years in several countries: very strong fluctuations in food prices in a context of trade liberalization and definition of production policies and domestic offer based only on prices. The worsening of the financial crisis in the United States, in September 2008, brought down economic activity and commodity prices around the world, as well as otherwise affecting food producing countries (MAYER, 2010, p. 74).

Two relatively new problems came to the fore: *i*) food security risks, caused more by the uptrend in prices than by a contraction of offer; and *ii*) risk that strong price fluctuations generate balance of payment problems in food importing or exporting countries.

The national concept of security, sometimes criticized for emphasizing only military or state-centric issues, was challenged by problems previously considered irrelevant and which acquired great prominence in international relations. Buzan

and Waever (2003) developed the concepts of “securitization”¹ and “de-securitization” in order to characterize issues that were not considered as essentially questions of security but that became threatening to it. Regarding the food scope, Buzan, Waever and Wilde (1998) stated that

What constitutes an existential economic threat depends upon the referent object. For individuals, economic security can be understood most clearly in terms of basic human needs. Individuals live or die (or in the case of malnutrition in children, have their development as human beings compromised) according to the provision of the basic necessities for sustaining human life: adequate food, water, clothing, shelter and education. So-called food security and call to eradicate mass starvation are clearly within the realm of human needs, as a disaster relief (BUZAN, WÆVER, WILDE, 1998).

Concerns with food security predate the *tortilla* crisis. In the 2003 report on Trade Reforms and Food Security, the United Nations Food and Agriculture Organization (FAO) discusses its evolution as an operational public policy concept and points out more than two hundred definitions that appeared since the 1970’s. The official definition adopted since 2001 in *The State of Food Insecurity* is:

Food security exists when all people, at all times, have physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle.

Food securitization became a very important issue for the international community and has required action from national States. Ziegler (*apud* CHADE 2009, p. 11), a former UN rapporteur for the right to food, stressed that “in 2008 hunger killed more people than all wars taken together during the same year”. Jamil Chade (23010, p. 23) argues that for about twenty years the International Monetary Fund (IMF) and the UN itself gave up helping small farmers in poor countries, which aggravated the problems when prices of commodities rose.

Interest for the Mexican case is also justified on account of some peculiarities. Internally, the crisis was fueled by the oligopolistic structure of the *tortilla* market and by speculative movements in Mexican markets (table 1). Externally, the crisis questioned the effects of the trade and financial opening. Mexico liberalized its market through the North American Free Trade Agreement (NAFTA) and the United States kept the subsidies to its production, which lowered corn prices with harmful effects to small Mexican farmers and increased the power of the large producers. Despite having increased its output of white corn, basically used as human food, Mexico was unable to attend to its demand of yellow corn,

1. This term is used in international relations to designate something that was not considered a security concern and becomes one, either circumstantially or lastingly. The meaning has nothing to do with the concept of securitization in economics, which refers to the process of rendering financial assets (securities) negotiable.

used for animal fodder, starch production and biofuels. Mexico became a large importer of yellow corn. When the United States started subsidizing its ethanol production, thus increasing demand for yellow corn, speculative movements on price trends² of the two varieties of corn arose, with combined expectations of growing incentives to biofuels, strong rise of oil prices, instability in commodity markets and movements toward devaluation of the dollar.

This paper intends to analyze the reasons of the *tortilla* crisis in order to identify the determining causes for what happened at the time and, as much as possible, to distinguish what was unique to the Mexican case and what can be ascribed to international problems and trends. More widely, the aim is to understand the causes and implications of Mexico's transition from self-sufficiency to the situation of importer of the most relevant item of its agricultural activity and its people's nourishment, as well as the determining factors of the strong rise in corn prices, among which is its use for biofuels, after many years of a long price-reducing effect provoked by United States' subsidies.

For this end the text contains three other sections, besides this introduction. The second one summarizes the processes that stimulated the strong instability of commodity prices in the past few years. The third analyzes the Mexican agricultural structure and issues relating to the country's food security with regard to corn and *tortillas*. The fourth section presents a wide panorama of the subsidies to corn and ethanol in the United States. A short final section shows the conclusions and research indications.

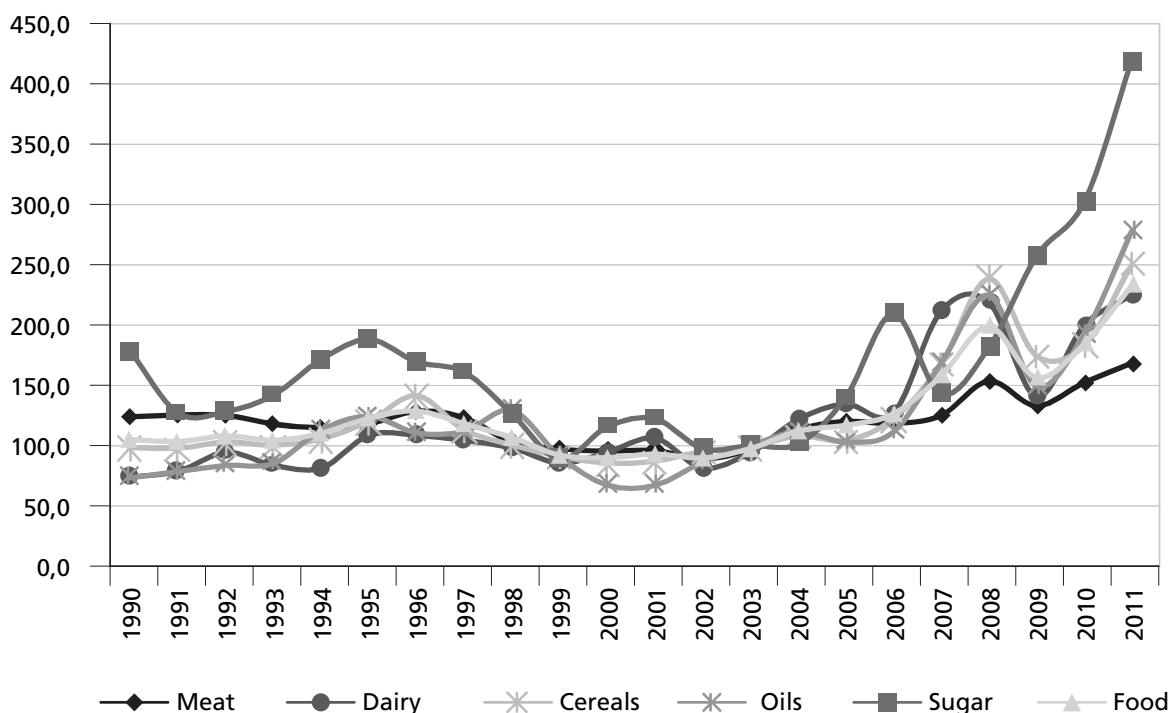
2 THE UPWARD TREND AND THE VOLATILITY IN COMMODITIES; DEMAND, CLIMATE, FINANCIARIZATION.

The uprising trend in commodities prices and their volatility (chart 1) are the subject of growing concern in recent years. "In 2006, the FAO Food Price Index stood at 122 points. It rose to 214 in June 2008 and dropped to 140 in March 2009. It reached 215 in December 2010" (SILVA, 2011).

A number of factors are usually picked out as responsible for these trends, but there is much controversy about each one's weight (SILVA, SCHETZ and TAVARES, 2008; PRATES, 2011). A schematic split of the analyses on the relative weight of such factors identifies two fields: the "fundamentalist" one looks for explanations in the offer and demand conditions; the other stresses the strong instability effects of financial markets.

2. "In view of the lack of standardized products and the absence of efficient information systems, the market of physical products rests on a context of trust and not on standards. While in other markets the corn with high value-added (as it can be for its oil contents, color, etc.) is differentiated, in Mexico prices continue to be formed from the price of yellow corn" (Sagarpa, 2010).

CHART 1
Commodities price indexes (2002-2004 = 100)



There is ample agreement in the fundamentalist field on the effects of the increase in demand stemming from changes in eating patterns in the most populous Asian countries, but there are divergences on the magnitude of the effects of the demand for biofuels, whether for direct use (as corn for ethanol) or by the occupation of fields previously utilized for food production. On the supply side, it is pointed out that production continues to increase, which should moderate prices, but the counterpoint of the more frequent occurrence of climate problems is stressed, albeit in certain periods and regions.

Pressures coming from the rapid growth of Asia suggested the term “sino-centric world”, characterized, among other factors, by the prolonged increase of the demand for commodities in general. In the case of foodstuffs, it is argued that this trend should persist for a long time, with changes in eating patterns of countries in rapid process of growth and the combined effect of urbanization and income increase. As is well known, the lower the *per capita* income in a country, the higher the income elasticity for food products, besides the larger amount of grains required to feed livestock for beef production.

On the supply side, despite the increase in food production, “extreme climate events, increasingly frequent unsettle the economic calculations of producers and feed speculation” (SILVA, 2011).

The impact of climate change in agriculture has been quite evident in the past few years. Drought and floods are recurrent in some areas. Among the 37 countries presently in crisis, 22 suffered adverse climate conditions and six experienced an exceptional deficit in food/input production (Lesotho, Somalia, Zimbabwe, Swaziland, Iraq and Moldova). The others face wide difficulties in access to food (provoked by climate changes, internal displacements, conflicts, economic limitations) or severe food insecurity in some regions. Prospects for Ethiopia, Kenya, Somalia and Zimbabwe are also worrying. In the long term, climate changes will probably reduce global food production, keeping prices at a high level for a long time (VIGNA, 2009).

Fear of food shortages impels many strongly import-dependent countries to make purchases ahead of time in spot markets in order to build stocks or in financial markets in future operations, which greatly increases pressure on demand in some moments (BID, 2011, p. 3).

The other field stresses the so-called “*financiarization*³ of commodities” to explain price instability. As is well known, food prices are increasingly formed in organized markets, with high liquidity and very connected with other financial markets (stocks, currency exchange), which favors the action of speculators and traders (large corporations that commercialize these products) who can operate in all markets. Thus, food prices come to embody volatile expectations on short term interests and currency exchange, on longer term trends such as dollar depreciation and possible re-evaluation of other currencies, and on the profitability of financial assets in general. Schulmeister (2009) proposes the expression “bull-bear assumption”⁴ to characterize the volatility effects of financial markets on commodity prices in spot markets.

With the financial deregulation and wide interconnection among markets, commodities became the target of speculative movements, following the intense price fluctuations of financial assets and currencies.

The *financiarization* of commodity markets derived from the incorporation of stock exchanges and over the counter markets that trade in derivatives linked to those goods by the financial globalization process. Historically, such derivatives were used as a hedging instrument against the high volatility of the prices of those items by the so-called commercial investors (producers and consuming industries). Since the start of the 1990’s, financial (or non-commercial) investors came to treat these goods as a new class of financial assets, side by side with stock, bonds and real estate. In the beginning, when the participation of such

3. The term *financiarization* is used here to indicate only the strong interconnection of speculative markets with the commodity markets. As is well known, in economic literature the term has meanings that point to an alleged growing predominance of financial activity over the production of goods and services.

4. In the United States stock trade jargon *bull* designates expectations of rise and *bear* those of decline.

instruments in investment fund portfolios was still small (mainly hedge funds), investment in commodities markets arose as an excellent alternative to diversify risks due to the low historic correlation with the yield from securities or stocks. (...) After the outbreak of the subprime crisis, investments in those markets gained additional push due to the strategy of loss mitigation on the part of several investment funds of a more speculative character using the other classes of financial assets by means of the increase in their positions in derivatives linked to commodities, which pushed up, above all, the prices of grains and oil in the Chicago Exchange (PRATES, 2011, p. 12-13).

In the same vein, Mayer (2010) argues that the motivations to operate in commodities are linked to the fact that in the long run the same average yield from applications in stocks can be obtained, but with lesser volatility.

Another stimulus is the relationship between future markets and inflation:

Unlike stocks and securities, future commodity contracts also possess good properties as a hedge against inflation, since their yield is positively correlated with it. Such contracts are wagers against future raw material prices, such as energy and food, which weigh heavily on the basket of goods that make up the price indexes. Besides, since they reflect information on expected changes in commodity prices, future prices rise or decrease in accordance with the fluctuation of expectations about future inflation (MAYER, 2010, p. 77).

In this way, applications in commodities were a more profitable alternative, mainly after the crises of “dot com” corporations in 2000, and even more in the initial phase of the subprime crisis, between mid-1970’s and September 2008.

Schulmeister (2009) also agrees that the *bull-bear* hypotheses are a better explanation for the rise in commodity prices than the fundamentalist theories, also because food production broke records in 2007, which should have inhibited price rises.

Financial speculation entered the agenda of the financial G20, with the suggestion of measures to contain commodity speculation proposed by the French president Nicolas Sarkozy, besides the “reorganization” of the international monetary system (NETTO, 2011).

Besides this set of factors, the analysis of price formation should include the question of the effects of long-term subsidies from the central countries to their producers, which depress prices and lead to disorganization of the productive structures in many agricultural countries. In 2008, food prices fell but hunger got worse because small producers in debt were no longer able to buy seeds and fertilizers (CHADE, 2009, p. 32; THE ECONOMIST, 2010). Without support from their governments, small producers in the poor-

est countries cannot have enough incentives to produce and neither do they benefit when price rises occur.

Added to these factors was the search for the substitution of fossil energy by biofuels, with the rise in oil prices and global concern over the environment. The *tortilla* crisis brought to the fore a confrontation between international entities and organizations that question the production of the so-called “green fuels”, on the one hand, and biofuels producing countries and ethanol entrepreneurs in the United States, on the other.

There is wide disagreement over this question. FAO questions the high subsidies by rich countries to the production of biofuels, which utilize 5% of grain production and contribute to the prices rise (CHADE, 2009, p. 25). The papers *How Biofuels Could Starve the Poor*, by Rudge and Senauer, and *Food for Fuel?*, with the participation of Dashle, both published in *Foreign Affairs* in 2007, strongly blamed biofuels for the rise in food prices.

The controversy grew with Chakraborty's article (2008) in *The Guardian*, stating that a reserved World Bank document attributed to biofuels the 75% rise in food prices. However, Ferran Tarradellas, from the European Parliament's Industry committee, said that the supposed paper had been refused by the bank and that the report finally adopted indicated the rise in oil prices as the main factor responsible for the problems (CORREIO DO PATRIOTA, 2008).

Another study, from the International Food Policy Research Institute (IFPRI) by Mark Rosegrant (*apud* VON BRAUN, 2008), acknowledges that the impact of biofuels should have been of 30% in the weighted average of grain prices and of 39% in the case of corn, the highest rise among grains. This same study presents two future scenarios:

- 1) based on the plans of the current biofuels producers and on the identification of countries with a high production potential, the impact would be of 26% on corn and 18% on oilseeds in 2020; and
- 2) based on a more drastic expansion of biofuels, assuming a doubling of the rate of expansion of production over the levels of the first scenario, corn prices would rise 72% and that of oilseeds 44%.

There is a large variety of analyses due to the diversity of focus and of vested interests. For Machado (2008) the debate is conditioned by groups opposed to the production of biofuels, ranging from interests linked to oil to “World Bank, IMF, United Nations and European Union high officials, all of them pointing an accusing finger to the shifting of plantations to ethanol production and hence to food inflation”. The author also mentions the action of lobbyists hired by

the Grocery Manufacturers Association (GMA), which brings together powerful groups from the food and beverage sector – Coca Cola, Nestlé, Campbell, Sara Lee, Procter & Gamble and Unilever.

To blame ethanol for the crisis became a matter of passion. Not even within the United Nations specialists agree. The British John Holmes defended ethanol, while another faction in the organization argued for a moratorium in the production of that biofuel. The UN ended by admitting that ethanol production could be one of the factors responsible for the crisis, but only subsidized production. That is, the American (from corn) and the European (from grain). For this reason the organization requested rich countries to restrict subsidies to the sector. No government, however, listened to the UN (CHADE, 2009, p. 26).

One must add that Brazil tried to defend itself from criticism against the impact of ethanol on food production by arguing that its production is based on sugar cane, which is able to generate fuel with much higher efficiency at much lower cost than corn ethanol.

Even so,

There is a risk that high demand for ethanol might stimulate bigger farmers to change their food production from foodstuffs to sugar cane in order to supply ethanol industry. In São Paulo, the biggest producer of ethanol from sugar cane among the Brazilian states, there was a rise of more than 300.000 ha for sugar cane production last year. At the same time, the area devoted to other cultures shrunk by approximately 170.000 ha. While sugar cane is not as critical for food security as corn, wheat or rice, the probability of competition with relation to the production inputs (land, water, fertilizers) could lead to a decline in food production. Thus, regulation and agro-ecological zoning are essential in Brazil to prevent the reconversion of food production areas into sugar cane crops (VIGNA, 2009).

In the beginning of 2010, the Environmental Protection Agency (EPA) of the United States, assisted by the Institute of International Trade and Negotiations (Icône) unveiled the results of a research that describe ethanol from sugar cane as an “advanced fuel” which reduces carbon dioxide emissions (CO₂) by 61% in comparison with gasoline, thus contributing to the reduction of the emission of greenhouse gases.

In Section 4 the arguments in support of biofuels producers regarding such accusations will be reviewed, but before that let us discuss how Mexico became an importer of its basic foodstuff.

3 MEXICO: DEPENDENCE FROM THE UNITED STATES, CORN PRODUCTION AND PROBLEMS IN DOMESTIC MARKETS

3.1 Adherence to NAFTA⁵ and the effect of subsidies in the USA on Mexican corn production

Critical evaluations on the effects of NAFTA highlight the impoverishment of Mexican producers in the face of competition of strongly subsidized corn in the United States. This kind of subsidies is condemned by the World Trade Organization (WTO).⁶ It is estimated that corn prices have fallen by 70% as a result of such measures, which rendered its production by Mexican farmers impracticable. The pressure of imported corn discouraged and impoverished small farmers (SUBSÍDIOS..., 2003) and provoked sharp decline in rural employment (AUDLEY *et al*, 2004, p. 17, 20).

The free trade agreement allowed Mexico to maintain market protection for fifteen years, but growing demand led the government to liberalize imports just in the first few years of the treaty (UNITED STATES, 2009a). Imports topped by a large margin the quota established in NAFTA in almost every year since 1994 (chart 2) and imports came to represent one fourth of the offer between 2005 and 2008 (table 1).

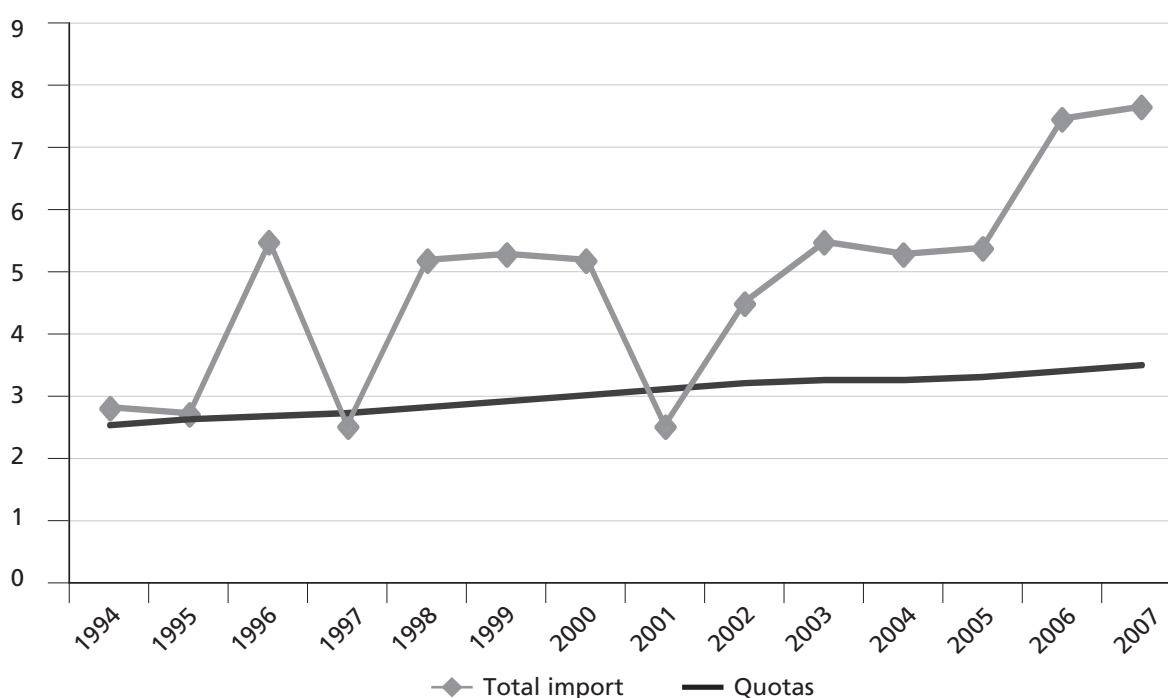
Mexican losses due to subsidies and other United States' commercial practices would have amounted to US\$ 11.1 billion from 1990 to 2008, according to Wise (2009, p. 23).

Assuming Mexican producer prices were depressed by the same percentage as the dumping margins, below-cost exports cost Mexican producers of corn, soybeans, wheat, cotton and rice an estimated \$9.7 billion from 1997-2005, just over \$1 billion per year. Corn showed the highest losses. Average dumping margins of 19% contributed to a 413% increase in U.S. exports and a 66% decline in real producer prices in Mexico from the early 1990s to 2005. The estimated cost to Mexican producers of dumping-level corn prices was \$6.5 billion over the nine-year period, an average of \$99 per hectare per year, \$38 per ton.

5. On Mexican objectives in NAFTA, see, for instance, Moreno-Brid (2009).

6. Domestic subsidies are measures aiming at supporting or protecting national producers through price guarantees or payments to them. They are divided into three types of "boxes": yellow, green and blue. In the yellow one are the subsidies most harmful to the market: minimum price policies, subsidized credits for current expenses, investment and commercialization, fiscal exemptions, complementary payments. In the yellow box are the direct payments and programs conditioned to mechanisms of production limitation, which are those that have the least negative impact on the commerce. In the green box are the subsidies that supposedly do not distort the market, such as infrastructure, research, sanitary and phytosanitary programs, agrarian reform and direct payments unlinked from production. The subsidies practiced in the United States were of the yellow box kind. With the 2008 Farm Bill, the global amount of subsidies stayed practically the same, but there was a migration from yellow box subsidies to the blue and green box kinds.

CHART 2
Corn imports originating in the United States and quota established by NAFTA (2004-2007)
 (In million tons)



Source: Mexico (2007, p. 10).

TABLE 1
Foreign trade and corn food security
 (Million tons)

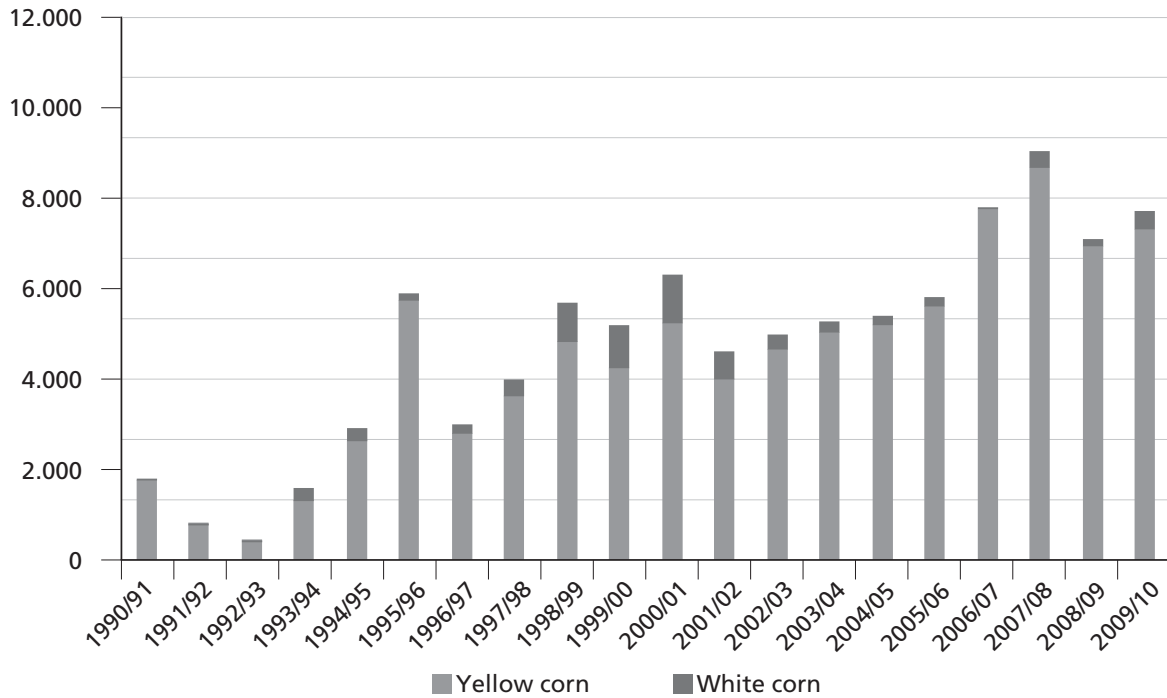
Year	Foreign trade			National offer	Apparent consumption	consumption per capita (kg)	Food security index (%)
	Production	Import	Export				
2000	17,56	5,33	0,0058	22,89	22,88	232,00	77
2001	20,13	6,14	0,0074	26,27	26,27	263,00	77
2002	19,30	5,50	0,1640	24,80	24,63	244,00	78
2003	20,70	5,74	0,0066	26,44	26,43	259,00	78
2004	21,69	5,52	0,0071	27,21	27,20	264,00	80
2005	19,34	5,74	0,0530	25,08	25,03	243,00	77
2006	21,89	7,61	0,0184	29,50	29,48	279,00	74
2007	23,51	7,95	0,2640	31,47	31,20	293,00	75
2008	25,12	8,20	0,2350	33,32	33,09	310,00	75

Source: Mexico (2009, p. 2).

Corn production in Mexico increased by 73% after NAFTA if compared with the 1984-1993 average, pushed by an expansion of irrigated plantations. Even so, the Mexican government had to top the export targets stipulated by NAFTA, especially with regard to yellow corn used as livestock fodder, and of starch products (chart 3) as outlined above.

CHART 3

U.S., corn exports to Mexico consist primarily of yellow corn (1990/91 – 2009/10)
(Mil. metric tons)



Source: ERS/USDA Feed Grains Database.

Mexico is practically self-sufficient in the production of white corn and depends on imports of yellow corn (MEXICO, 2007, p. 6). White corn, used mainly to make *tortillas* and other foods for human consumption, stands for less than 5% of Mexican exports. However, due to the growth of livestock consumption, more than 1 million tons of white corn were devoted to animal fodder in 2006. On the other hand, between 1995 and 2008, annual *per capita* consumption of *tortillas* dropped from about 120 kg to approximately 89 kg (ARREOLA, 2008, *apud* United States, 2009a). This caused exports of white corn from the United States to Mexico to fall almost uninterruptedly between 2000 and 2007. In 2008, however, exports of the white variety reached 528 thousand tons, the highest level since 2002 (UNITED STATES, 2009a).

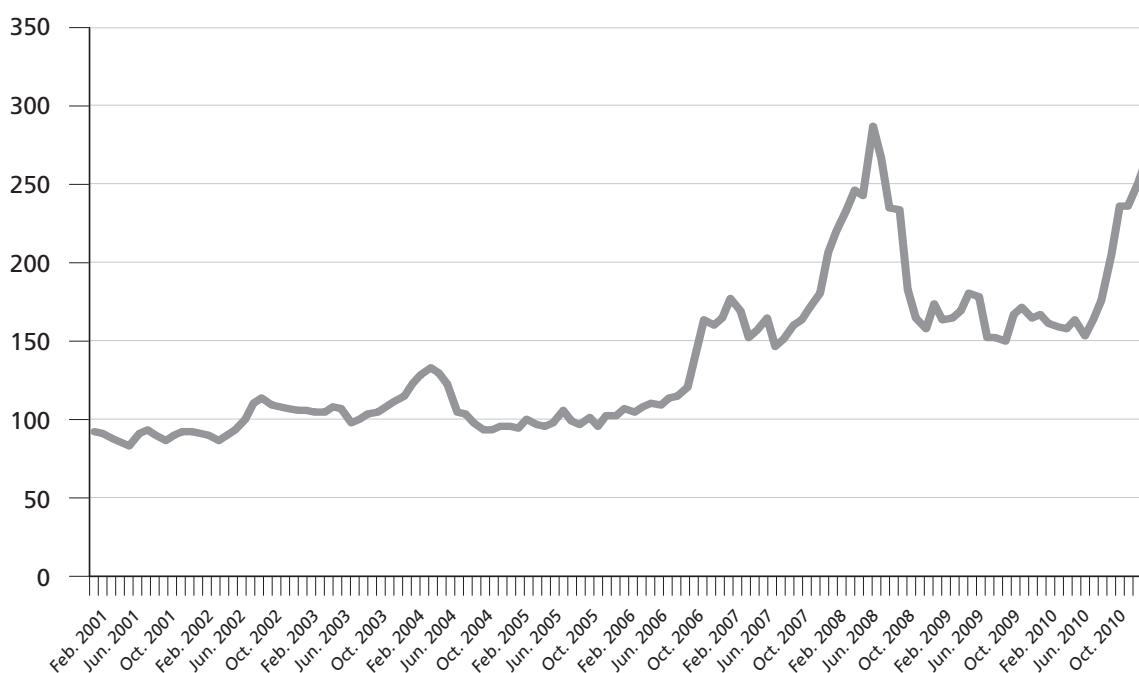
Divergences about the effects of NAFTA persisted in the face of the sharp rise in prices in 2007 and in the start of 2008.

For some economists, to blame NAFTA is a paradox: thanks to the treaty, they argue, Calderón was able to import urgently large quantities of corn in 2008 (...). IATP (Institute of Agricultural Policy and Trade) does not endorse this argument entirely, but stresses that the explosion of prices can help Mexican farmers to regain some competitiveness and increase production. About 2 million new hectares of corn should be sown this year (DENIS, 2007).

3.2 The 2007 crisis

The price of *tortillas* jumped from US\$5.00 in January 2006 to up to US\$ 20.00 one year later, when there were popular protests and the government decided to set the price at US\$8.50 in the (AEPT), under the justification that a just price for the population had to be maintained, speculation should be combatted and supply assured. It must be observed that the National System for Market Information and Integration (SNIIM) records average *tortilla* prices only since 2007 and that for January of that year the data show an average price around US\$14.00. Prices vary among the states and the US\$20.00 levels were probably the maximum in some of them.

CHART 4
Maize (corn) – Monthly Price
 (US Dollars per metric ton)



Source: USDA Market News *apud* Index Mundi (2011).

Modified by the authors.

Obs.: U.S. No. 2 Yellow, FOB Gulf of Mexico, U.S. price.

Corn prices showed a different pattern. According to CEFEP, corn jumped from US\$ 2.10 dls/bu in May 2000 to US\$3,52 dls/bu in June 2007, or 67,1% in seven years. From August 2007 to April 2008 the increase was 57,9%, peaking at US\$ 5.48 dls/bu in June 2008, 68% above August 2007 (as in all other markets, there was a sharp decline since mid-2008 and in October corn was back at US\$ 3.99 dls/bu – a fall of 27.2% below the June peak). Thus, the jump in the price of *tortillas* took place much before the strong increase of corn prices, which remained until mid-2008 as seen in chart 4.

However, even after the sharp decline in corn prices in 2008 (chart 4), the price of *tortillas* stayed at US\$ 9.17, well above levels prior to the 2007 increase (SNIIM, 2010). The sharp divergences between the prices of *tortillas* and corn may be ascribed to differences in market structure, with a strong concentration of companies in corn flour and high participation of small producers in *tortillas*.

The combination of such diverse market structures would help to explain, at least in part, the differences in price trends: the increase might have been induced by a rise in the price of corn flour, promoted by the large companies in the sector, where commercialization is dominated by only three enterprises: (SAGARPA, 2010, p. 175). According to data provided by Quintanilha (2008, p. 81), there are only 48 companies devoted to this sector, of which 22 concentrate 95% of the jobs and 99% of the added value. A single one, Gruma, commercializes 60% of the total.

In the sector of production and sale of *tortillas*, the trend should be of an alignment of prices with those of flour and other costs incurred by the sector. It is a segment with a significant number of small size establishments, with eased access to new producers and competition with other products. Suffice it to recall that, as already mentioned, the consumption of *tortillas* had declined by 10% in the ten years prior to the crisis, due to the substitution by other products in the face of the increase of *per capita* income and the elimination of price subsidies (GILES, 2008).

The production of bakery and *tortilla* items generates 425.4 thousand jobs and congregates 121.000 economic units. 28% of total manufacturing production and 84% of the food industry subsector. This branch is mainly composed of family companies, with small size production units. *Tortilla* factories are usually smaller than bakeries and both use grains as raw material (corn and wheat) initially processed by the flour industry by grinding. The flour is then distributed to *tortilla* factories and bakeries (SAGARPA, 2010, p. 147).

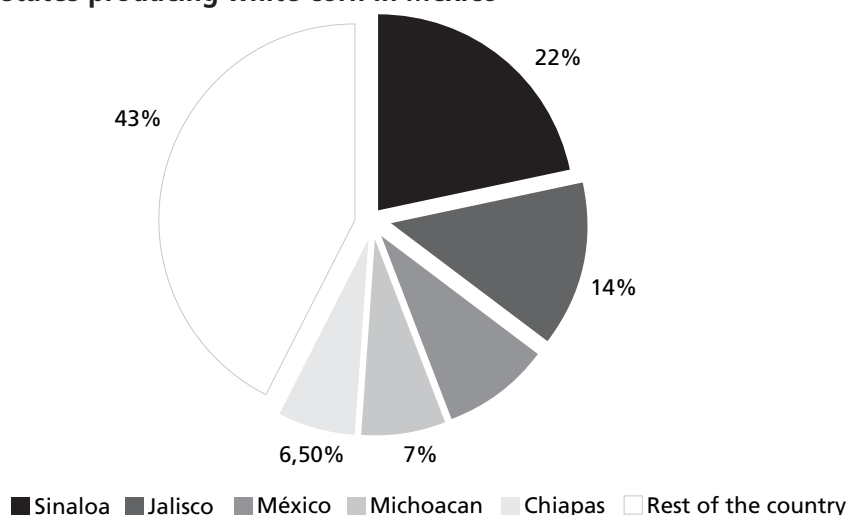
Notwithstanding, Gruma has a strong presence in *tortilla* sales, with 738 tons yearly, besides other foodstuffs from corn and wheat (QUINTANILHA, 2008, p. 91), which suggests a market structure in which there are also big producers and a large number of very small ones.

There are other problems to be considered in the formation of *tortilla* prices. According to the Federal Competitiveness Commission (CFC, 2010), there are several municipal regulatory barriers, which include limitations in the number of *tortillarias* and a minimum distance between them.

Another problem is the regional concentration of corn production in the states of Sinaloa and Jalisco (chart 5). The remaining Mexican states face transportation and storage costs, with a precarious structure in both sectors in Mexico.

The effects of the rise of oil prices must also be taken into account. Trucks obtained a market share in exports from the United States to Mexico, to the detriment of sea and rail freight, due to the greater flexibility allowed by the more extensive road grid (SALIN, 2010).

CHART 5
Main states producing white corn in Mexico



Source: Mexico (2009, p. 1).

4 THE UNITED STATES: SUBSIDIES AND BIOFUELS

4.1 Support policies to corn production in the USA

The production of corn and ethanol in the United States is concentrated in the “Corn Belt”, which brings together the states of Iowa (IA), Indiana (IN), Illinois (IL), Missouri (MO) and Ohio (OH), besides parts of South Dakota (SD), Nebraska (NE), Kansas (KS), Minnesota (MN), Wisconsin (WI), Michigan (MI) and Kentucky (KY). The ensemble is represented by the National Corn Growers Association (NCGA). Founded in 1957, it is a state federation, organized in councils and committees dealing with the development and implementation of programs and policies on the agriculture of corn at the national level to help protect and maximize growers’ interests. Despite having sprung from the need to ensure cheap food and an acceptable income for the producers, agricultural protectionism was maintained because of the strong political weight of those states, chiefly because congressional elections are carried out by districts, which often generate parochial action.

Such interests were already protected before NCGA came into being. The pattern of agricultural protection in the United States was framed by the 1933 Agricultural Adjustment Act (AAA), aiming at restricting offer in order to

increase the prices of seven basic commodities. Despite some changes, ulterior legislation consolidated this agricultural policy in the New Deal. The Commodity Credit Corporation, also created in 1933, was another tool that enabled the government to exert influence on the offer and the market prices of the production by means of “nonrecourse loans” (LIMA, 2008, p. 33). In this way it helps to keep a balanced and adequate supply of agricultural commodities and participates in their distribution, through the authorization to buy, sell, loan, make payments and other activities in order to increase production, stabilize prices and facilitate the commercialization of agricultural products.

According to Wise (2009, p. 8) the problem of overproduction, with high and low cycles, was practically inherent to agricultural production in the United States. The institution of the Department of Agriculture (USDA) aimed at managing and balancing offer and demand. A minimum price for foodstuffs was set, together with buffers for surplus production, besides programs to exempt land from cultivation. These measures had the objective of generating fair market prices to farmers by purchasing surpluses at times of high production and selling in the market at low production times.

The central issues behind this protectionist pattern are focused on the preservation of income in the agricultural sector, the search for productivity gains and cheap prices to the consumer, as well as the prevention of surplus offer of foodstuffs. This system of offer management stood at the base of agricultural policy in the United States until 1996, despite the fact that reforms instituted at the start of the 1970’s progressively weakened those policies. The Agricultural Act of 1996, popularly known as the Freedom to Farm Act, signaled the end of offer management. The term “freedom” refers to the dissociation between government payments and production decisions. Since then, farmers should take their planting decisions not in response to governmental price control incentives but according to the signals from the market, despite receiving “direct payment” from the government that takes into account their historical production. In this way, such payments were deemed less distorting and more pro-market, since it is up to the market to define prices and prevent overproduction. In practice, the program created an instant crisis. Millions of hectares of land previously kept uncultivated were brought back into production and prices plummeted, generating the risk of a rural banking crisis (WISE, 2009).

The result of the crisis was a set of emergency payments to farmers in order to compensate for the low prices, the so-called “market loss assistance payments” included in the 2002 Farm Bill as anti-cyclic payments. Such disbursements were combined with “loan deficiency payments”, based on the prices and production

of specific crops. These two programs, together with direct payments, formed the basis of agricultural subsidies after 1996.

The agricultural law of the United States, known as Farm Bill, is put to the vote every five years. In 2002 there were many complaints made by the international organizations with regard to its protectionist policy. In the case of corn, subsidies were ten times higher than the total agricultural budget (VIGNA, 2008).

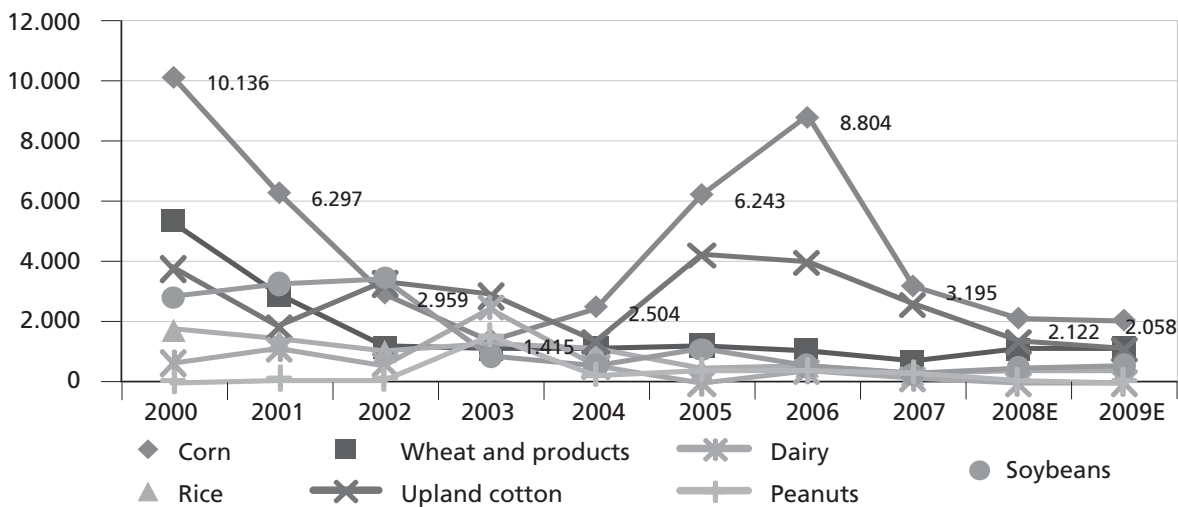
Despite the denunciations, additional subsidies were added, for instance, for the provision of irrigation, energy, agricultural insurance and soil conservation, as well as ethanol (from 2001). The result was an increase in payments of goods, from pre-1996 levels – about US\$ 10 billion yearly – to about US\$ 20 billion yearly (WISE, 2009). Such subsidies were renewed and once again increased in the 2008 Farm Bill, in which biofuels continued to be highlighted.

In May, 2008, the U.S. Congress passed the Food, Conservation, and Energy Act of 2008, the new farm bill that will accelerate the commercialization of advanced biofuels, including cellulosic ethanol, encourage the production of biomass crops, and expand the current Renewable Energy and Energy Efficiency Program. Section 9003 provides for grants covering up to 30% of the cost of developing and building demonstration-scale biorefineries for producing “advanced biofuels,” which essentially includes all fuels that are not produced from corn kernel starch. It also allows for loan guarantees of up to \$250 million for building commercial-scale biorefineries to produce advanced biofuels. (U.S. DEPARTMENT OF ENERGY, 2008).

It must be stressed, however, that the onus of these subsidies was transferred from the consumers to the taxpayers, which represented a tremendous benefit for the interests of agribusiness, because the majority of crops in the United States is not sold in the form of foodstuffs directly to the consumers, but as raw material for agribusinesses, food producing companies, clothing manufacturers and others. These subsidies resulted in a stable offer of raw materials at low prices for the entrepreneurs (WISE, 2009, p. 8).

In any case, according to the Environmental Working Group, from 2005 to 2009 corn subsidies were of US\$ 73,8 billion, in the form of direct payments, crop insurance, loans and anti-cyclical payments. The most important programs were; Production Flexibility (US\$ 16.3 billion), Loan Deficiency (US\$ 13.5 billion), direct Payments (1.,9 billion), Crop Insurance Premium Subsidies (US\$ 11.6 billion), Market Loss Assistance (US\$ 8.5 billion) and Counter Cyclical Payments (US\$ 5.4 billion). Besides, the corn sector is among those that benefit most from the Commodity Credit Corporation (CCC) (chart 6).

CHART 6
CCC Net Outlays by selected commodities (2000-2009)
 (US\$ millions)



Source: United States (2008).
 Modified by the authors.
 Obs.: E = Estimate.

With these incentives, corn production, according to the National Agricultural Statistics Service (NASS) of the USDA, posted an exceptional increase in 2007, partially compensated by a reduction in soy hectares in the Corn Belt and the Great Plains, as well as less hectares of cotton and rice in the Delta and the Southeast. Farmers expected to plant 67.1 million hectares of soy, the lowest total since 1996 – a decline of 8.4 million hectares (or 11%) since 2006. The area of cotton plantations was also reduced, with a total of 12.1 million hectares, that is, 20% less since 2006.

Still according to NASS, in 2009 corn producers already intended to plant 85 million acres. This represents a decline of 1% with regard to the previous year and 9% less than 2007. Even so, it would be the third largest planted area since 1949. The largest reductions were in North Dakota and Colorado, with 250 thousand and 200 thousand hectares, respectively. In California there were 120 thousand hectares less than in the previous year, while producers in Iowa, Michigan, Minnesota, Pennsylvania and Texas intended to reduce 100 thousand hectares of the area of corn plantations. The largest increases were expected in Missouri, up to 250 thousand hectares, South Dakota, up to 150 thousand hectares, and Illinois, up to 100 thousand hectares.

An analysis of corn production in the United States from 2005 to 2009 shows that only the chief states are considered as part of the Corn Belt, concentrating 44% of the production in average. The total production in the country reached 93,527 acres – an increase of almost 20% in comparison with the previous year. By its turn, in the years 2008 and 2009 there was a reduction of that planted area, according to NASS and the USDA.

4.2 Incentives to ethanol production

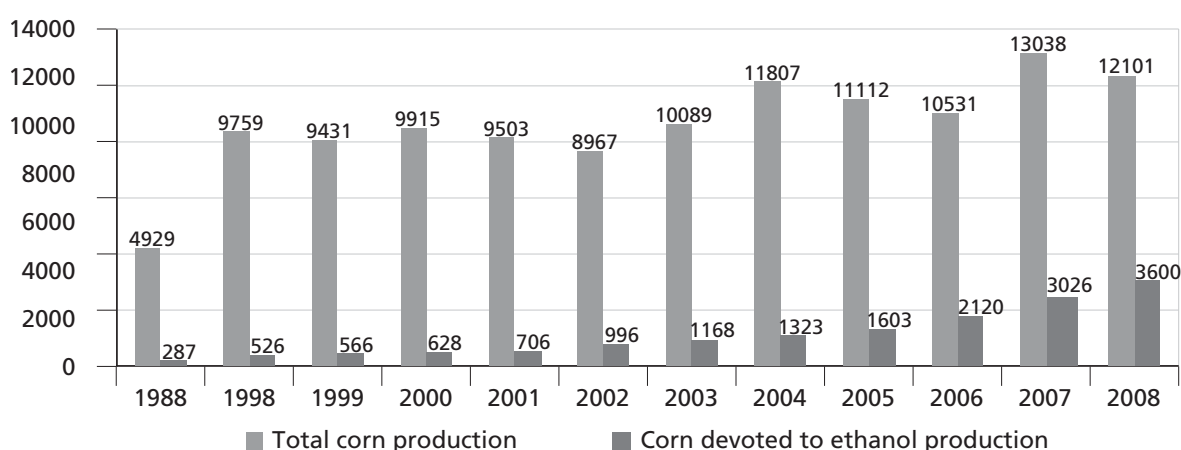
Due to the demand for bio-fuels, producers have started to pressure the government in order to obtain biggest incentives to the development of technologies for a more efficient ethanol production from corn. In October 2004, President George Bush enacted HR 4520, the American Jobs Creation Act of 2004 (JOBS Bill), which created the Volumetric Ethanol Excise Tax Credit (VEETC). This is a fiscal credit program dealing with the mix of ethanol and gasoline, with a credit of US\$ 0.51 ascribed to each gallon of ethanol added to gasoline. Besides, there is a tariff protection of US\$ 0.54 on each imported gallon. In the 2008 Farm Bill, VEETC was reduced to US\$ 0.45 per gallon.

Based on chart 7, one can say that in 2006 20% of the corn production was used for ethanol in the United States. In 2007 that proportion increased to 23% and in 2008 to approximately 30%. This means that the production of corn for ethanol represented about 12% of the world total corn production (SILVA, SCHETZ and TAVARES, 2008).

Table 2 shows the high correlation between ethanol producing states and the capture of the largest share of federal subsidies to corn, as measured by the Environmental Working Group. The ten states with largest ethanol producing capacity receive more that 80% of all federal subsidies to corn, topping the national average. The most extreme case is Illinois, whose farmers receive about 30% of subsidies per hectare more that the national average. Iowa does not lag very far behind, with 23% over the average. Nebraska, which has a higher ethanol producing capacity (2nd place in the ranking) than Illinois, does not receive as many subsidies. Even Indiana, 6th in the ranking, receives more incentives. Once again, this is only understandable because of the lobbyists from the associations of these states in the Corn Belt.

CHART 7

Total corn production in the United States and corn production devoted to ethanol
(Million tons)



Source: National Corn Growers Association (2009) and United States (2009b).

TABLE 2
Differential subsidy capture for large ethanol – producing states

State	Ethanol production		Capture of federal subsidies			
	Capacity (mmgy)	National rank	% of national total (1994 - 2004)	Rank, share of national total	Corn subsidy/Acre of corn planted, 2004	Subsidy/Acre as % of average
Iowa	1,962	1	19	1	68.32	123
Nebraska	1,051	2	12	3	58.68	106
Illinois	881	3	16	2	71.4	128
South Dakota	703	4	4	8	37.2	67
Minnesota	594	5	10	4	52.23	94
Indiana	392	6	8	5	65.82	118
Kansas	268	7	3	9	65.82	92
Wisconsin	228	8	4	7	51.1	88
Michigan	207	9	3	11	48.89	97
Missouri	155	10	3	10	53.82	91
Total top 10	6,440		81		59.83	108 ¹
National					55.6	100

Source: United States (2006b); Environmental Working Group's Farm Subsidy Database; and United States (2006a).
Note:¹ Weighted average values for top ten, based on group share of total acreage planted with corn in 2004.

Through specific studies by LECG Corporation, a specialized consultant and support company, the Renewable Fuels Association demonstrates the way in which the industry of ethanol contributed to the economy of the United States: in 2007, the number of jobs generated by the ethanol industry in the sector of corn was of 84,191, and came to represent 43% of the total jobs created by that industry. In total, however, more than 230 thousand jobs are said to have been created in the ethanol productive chain. The combined expenditures for annual operations, transport of ethanol and capital spent for new facilities under construction should have added US\$ 47.6 billion to the gross national product (GNP).

Thus, this study states that the ethanol industry should have financed itself in 2007. Family income added to the GNP should have been of approximately US\$ 4.6 billion. The whole of the 6.5 billion liters produced in 2007 were commercialized, which generated a cost estimated at US\$ 3.4 billion linked to the two main federal incentives, the VEETC and the Small Ethanol Producer Tax Credit.⁷ With this, the ethanol industry should have generated a surplus of US\$ 1.2 billion for the Federal Treasury. Besides, it should have generated about US\$ 3.6 billion in added revenue for local and state governments. So, according to the LECG, ethanol should have reduced the dependence on imported oil and lowered the trade

7. The Small Ethanol Producer Tax Credit is a fiscal incentive of the value of US\$ 0.10 per gallon of ethanol sold and used by the purchaser in the purchaser's trade or business to produce an ethanol fuel mixture. Small ethanol producers, who make not more than 60 million gallons of productive capacity of any type of alcohol, must be registered in the Internal Revenue Service (IRS) to qualify for this credit. (The Alternative Fuels and Advanced Vehicles Data Center, U.S. Department of Energy).

deficit of the United States. That is, the production of almost 6.5 billion gallons of ethanol should have meant that the United States would have needed to import less 228.2 million barrels of oil in 2007 for gasoline production which equals approximately 5% of total crude oil imports by the country. Such is the economic relevance of the corn and ethanol sector in the United States.

In response to several charges from the bio-fuels versus foodstuffs dilemma, NCGA has mobilized and called upon its members for action to communicate directly with the foodstuffs producing industries involved in the GMA, which denounce corn from farmers and the U.S. ethanol production. NCGA points to three main companies: General Mills, Kraft Foods and Lakeside. NCGA members argue that the grains most used for human consumption are wheat and rice, which are not used for bio-fuels production, but whose prices also increased in the period under study. Only 10% of American corn is used in products for human food, such as corn syrup, starch and cereals. They also say that corn production per day is greater than in any period and that corn scarcity is unthinkable. Ethanol production would separate starch from the other components, which, even in lesser quantities, still contain protein and other nutrients and can be used. An issue that cannot be neglected is that farmers have searched for new technologies to increase corn production and at the same time reduce the acreage occupied by that production. As Silva, Schetz and Tavares stress (2008, p. 9), “the offer of arable land is a function of the technology used”, and this also becomes an argument for the production of bio-fuels, inasmuch as their producers have increasingly looked for technological innovation in this regard.

Finally, these producers try in all possible ways to inform the population that they should not be seen as the sole or chief culprits for those food crises and that they are only looking for energy independence, which would contribute to the interest of all American citizens, just as the argument for strategic independence vis-à-vis the Middle Eastern countries.

5 CLOSING REMARKS

The *tortilla* crisis is a very complex event, in its causes and in the circumstances it occurred. As far as its immediate origins are concerned, there are well-known problems such as world demand for foodstuffs and the speculative processes in commodity markets besides the use of foodstuffs for bio-fuel production, despite a large increase in the output of food products. Less attention has been given to internal factors, such as market concentration and price hardening; present in the cases of corn flour and of *tortillas* in Mexico themselves. There are also the heavy subsidies with which the United States protects its producers, depressing the prices of imported corn and weakening the small Mexican producers.

The interaction among all these determinant factors reinforces the need for approaches that try to consider the ensemble of factors and analyze each one's peculiarities. In other words, the question is to analyze the international processes linked to the rise in food prices but also the specific aspects of processing and commercializing domestic markets.

The significance of internal issues in Mexico is apparent in the low synchrony between *tortilla* and corn prices: the peak in *tortilla* prices predated in over a year the peak in corn prices, and *tortilla* prices remained high even when those of corn started to decline. The analysis of this process suggests the relevance of the capacity of the large producers of corn flour and of *tortillas* to induce the formation of prices, including on account of the interest to follow the speculative processes in international markets.

It is important to stress that despite an increase in its production, Mexican demand for corn accelerated further, turning Mexico into an importer of an essential item in its basic basket. This became a problem of food security when corn prices soared in the international market, with high demand and speculative movements fueled by United States subsidies, which was linked to the use of corn for ethanol.

A very relevant element is the persistence of subsidies in the central countries and their consequences in low income countries. The losses incurred in periods of low prices practiced by the United States were very significant for the Mexicans. The protectionist policies adopted render more difficult action on equal terms in commodity markets. As examples of this question the effects of Mexican adherence to NAFTA on the agricultural development of the country were examined.

American producers of corn and bio-fuels struggle to keep protection mechanisms under the argument that the corn destined to bio-fuels is not the same corn that would be used for human consumption. At the same time they try to increase the productivity of their crops, which can increase the offer, but with prices backed by governmental support policies in the United States.

REFERENCES

AUDLEY, J. *et al.* **Nafta's promise and reality**: lesson from Mexico for the hemisphere. Washington: CEIP, 2004.

BID – BANCO INTERAMERICANO DE DESENVOLVIMENTO. Preços dos alimentos em nível recorde: um déjà vu de 2008? **Carta Mensal**, n. 174, fev. 2011. Available at: http://www.iadb.org/intal/aplicaciones/uploads/publicaciones/P_INTAL_ICM_174_ANALISIS1_2011.pdf.

BUZAN, B.; WAEVER, O. Security complexes: a theory of regional security. In: _____. **Regions and powers: the structure of international society**. London: Cambridge University Press, 2003.

BUZAN, B.; WAEVER, O. WILDE, J. Security: a new framework for analysis. **Lynne Rienner Publishers**, Boulder, 1998.

CFC – COMISIÓN FEDERAL DE COMPETENCIA. Monopólios, obstáculo para reducir precios. In: **Concanaco Servytur**. [s.d.]. (Nota Económica, n. 133). Available at: <<http://www.concanaco.com.mx/comercio-concanaco-servytur/comercio-interior/nota-economica/347-nota-economica-133.html>>. Accessed 2 jul. 2010.

CHADE, J. **O mundo não é plano: a tragédia silenciosa de 1 bilhão de famintos**. São Paulo: Saraiva, 2009.

CHAKRABORTY, A. Secret report: biofuel caused food crisis. **The Guardian**, 3 July 2008. (Internal World Bank study delivers blow to plant energy drive). Available at: <<http://www.guardian.co.uk/environment/2008/jul/03/biofuels.renewableenergy>>.

CONTEXTO. Telemundo. **Sin maiz no hay pais**. 1 fev. 2007. Available at: <<http://www.youtube.com/watch?v=le4B4GBqmo8>>.

CORREIO DO PATRIOTA. **Entrevista a Timothy Searchinger: os biocombustíveis causam fome e levam à destruição das florestas**. 29 set. 2008. Available at: <http://www.correiodopatriota.com/index2.php?option=com_content&do_pdf=1&id=1407>.

DENIS, A. La crise de la tortilla enflamme le Mexique. **Les Echos**, 28 mar. 2007. Available at: <<http://archives.lesechos.fr/archives/2007/lesechos.fr/03/28/300156076.htm>>.

EWG – ENVIRONMENTAL WORKING GROUP. **Farm subsidy database**. Available at: <<http://farm.ewg.org/progdetail.php?fips=00000&progcode=corn>>

ESTEVA, G.; MARIELLE, C. (Coords.). **Sin maíz no hay país**. México: Consejo Nacional para la Cultura y las Artes, Dirección General de Culturas Populares e Indígenas; Museo Nacional de Culturas Populares, 2003. Available at: <<http://www.slideshare.net/CEJmexico/sin-maiz-no-hay-pais/download>>.

FAO – ORGANIZAÇÃO DAS NAÇÕES UNIDAS PARA A AGRICULTURA E ALIMENTAÇÃO. Food security: concepts and measurement. In: **Trade reforms and food security**. Roma, 2003b. Available at: <<http://www.fao.org/docrep/005/y4671e/y4671e06.htm>>.

_____. **Food commodity price index**. Mar. 2011. Available at: <<http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/>>.

FINANCIERA RURAL. **Dirección general adjunta de planeación estratégica y análisis sectorial: monografía del maíz grano**. Mar. 2009. Available at: <<http://www.financierarural.gob.mx/informacionsectorrural/Documents/Ma%C3%ADz.pdf>>.

GILES, C. La venta de tortillas ya no es un buen negocio; el consumo disminuyó: SE. **La Jornada**, 23 fev. 2008. Available at: <<http://www.lajornadaguerrero.com.mx/2008/02/23/index.php?section=politica&article=010n2soc>>. Accessed: 9 mar. 2011.

IISD – INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT. **Biofuels – at what cost?** Government support for ethanol and biodiesel in the United States: 2007 update. Oct. 2007. Available at: <http://www.global-subsidies.org/files/assets/pdf/Brochure_-_US_Report.pdf>.

KABC – TV LOS ANGELES. **Tortilla price protest hits Mexico city**. 31 Jan. 2007. Available at: http://abclocal.go.com/kabc/story?section=news/national_world&id=4991825>.

LIMA, T. **Desafios internacionais à política agrícola norte-americana: o contencioso do algodão entre Brasil e Estados Unidos e o CAFTA-DR**. 2008. Dissertation (Master) – Programa de Pós-Graduação em Relações Internacionais San Tiago Dantas, UNESP-UNICAMP-PUC/SP, São Paulo, 2008.

MACHADO, A. Jornal de Washington desvenda ação de lobbies atrás da questão do álcool e do choque da comida **Cidade Biz**. 19 maio 2008. Available at: <http://cidadebiz.oi.com.br/paginas/43001_44000/43604-1.html>.

MAYER, J. The Financialization of commodity markets and commodity price volatility. *In*: DULLIEN, S. et. al. **The financial and economic crisis of 2008-2009 and developing countries**. Geneva: UNCTAD; United Nation Publications, 2010. Available at: <http://www.unctad.org/en/docs/gdsmdp20101_en.pdf>.

MÉXICO. Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación. **Servicio de Información Agroalimentaria y Pesquera (SIAP)**. 2009.

_____. Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA). **Retos y oportunidades del sistema agroalimentario de México en los próximos 20 años**. Out. 2010. Available at: <<http://www.sagarpa.gob.mx/agronegocios/Documents/pablo/retosyopportunidades.pdf>>.

_____. Cámara de Diputados. Centro de Estudios de las Finanzas Públicas (CEFP). México: **El Mercado del Maíz y la Agroindustria de la Tortilla**. Fev 2007. Available at: <<http://www.cefp.gob.mx/intr/edocumentos/pdf/cefp/cefp0042007.pdf>>.

MORENO-BRID, J. C. La economía mexicana frente a la crisis internacional. **Revista Nueva Sociedad**, n. 220, mar./abr. 2009. Available at: <<http://www.nuso.org>>. Accessed at: 2 jul. 2010.

NATIONAL CORN GROWERS ASSOCIATION. **World of Corn**. 2009.

NAVARRO, L. H. La nueva guerra de la tortilla. **La Jornada**, 12 jan. 2007. Available at: <http://www.jornada.unam.mx/2007/01/12/index.php?section=opinion&article=010a1pol>

NETTO, A. Nova proposta francesa no G-20 agrada ao Brasil. **O Estado de S. Paulo**, 17 fev. 2011. Available at: http://www.estadao.com.br/estadaodehoje/2011/02/17/not_imp680551,0php.

PRATES, D. M. O novo ciclo de preço das commodities. *In*: Grupo de Economia FUNDAP. **Boletim de economia**, mar. 2011. Available at: <http://novo.fundap.sp.gov.br/arquivos/PDF/Boletim_Economia_2.pdf>.

QUINTANILLA, R. H. Monopolio, precio de la tortilla y estancamiento de la economía mexicana. **Economía Informa**, n. 351, mar./abr. 2008. Available at: <<http://www.economia.unam.mx/publicaciones/econinforma/pdfs/351/03rogelio.pdf>>.

RUNGE, C. F.; SENAUER, B. **How biofuels could starve the poor**. May-Jun. 2007. Available at: <<http://www.foreignaffairs.com/articles/62609/c-ford-runge-and-benjamin-senauer/how-biofuels-could-starve-the-poor>>.

SALIN, D. L. **U.S. Grain and soybean exports to Mexico: a modal share transportation analysis, 2007-2008**. Jan. 2010. Available at: <<http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5081717>>.

SCHULMEISTER, S. **Trading practices and price dynamics in commodity: markets and the stabilizing effects of a transaction tax**. Vienna: Austrian Institute of Economic Research, Jan. 2009. Available at: <http://www.steuer-gegen-armut.org/fileadmin/Bildgalerie/Kampagnen-Seite/Unterstuetzung_Wissenschaft/09_Wifo-Transaktionssteuer.pdf>.

SILVA, J. G. Respostas à nova alta dos alimentos. **Valor Econômico**, São Paulo, 16 Jan.2011. Available at: <http://www.valoronline.com.br/impreso/opiniaio/98/369051/respostas-a-nova-alta-dos-alimentos>>.

SILVA, J. G.; SCHETZ, G.; TAVARES, L. Em busca da produção sustentável de biocombustíveis. **Revista Política Externa**, São Paulo, v. 17, n. 2, set./nov. 2008.

SMALL, D. El etanol y el libre comercio en México presagian inflación, hambruna y emigración en masa. **Executive Intelligence Review (EIR)**, v. 24, n. 4-5, 24 mar. 2007. Available at: <http://www.larouchepub.com/spanish/reir/ejemplar_gratis/ee_etanol_hambruna.html>.

SNIIM – SISTEMA NACIONAL DE INFORMACIÓN E INTEGRACIÓN DE MERCADOS. **Precio promedio de las tortillas**. [s.d.]. Available at: <<http://www.economia-sniim.gob.mx/Tortilla.asp>>.

SÓLIS, J. S. Acuerdan tortillas en US\$8.50 el kilo. **Es Mas**: Noticieros Televisa, Cidade do México, 18 jan. 2007. Available at: <http://www.esmas.com/notici-erostelevisa/mexico/597001.html>>.

SUBSÍDIOS agrícolas dos ricos prejudicam países pobres. **Com Ciência**, 10 out. 2003. Available at: <<http://www.comciencia.br/reportagens/agronego cio/02.shtml>>.

THE ECONOMIST. **Dare to grow more**: high food prices are not all bad news. 2 Dez. 2010. Available at: <<http://www.economist.com/node/17627826?storyid=17627826&CFID=151438752&CFTOKEN=26285761>>.

U.S. DEPARTMENT OF ENERGY. **New farm bill speeds commercialization of advanced biofuels**. 28 May 2008. Available at: <http://www1.eere.energy.gov/biomass/news_detail.html?news_id=11789>.

UNITED STATES. Department of Agriculture. National Agricultural Statistics Service. **Crop Production 2005 Summary**. Washington, Jan. 2006a.

_____. **Nebraska Energy Office**. July 2006b.

_____. Department of Agriculture. **Commodity Credit Corporation Charter Act**. May 2008. Available at: <http://www.fsa.usda.gov/Internet/FSA_File/charteract2008.pdf>.

_____. _____. **Nafta at 15**: building on free trade. Mar. 2009a. Available at: <http://usda.mannlib.cornell.edu/usda/ers/WRS/2000s/2009/WRS-03-31-2009_Special_Report.pdf>.

_____. _____. National Agricultural Statistics Service. **Crop Production 2008 Summary**. Washington, Jan. 2009b.

VIGNA, A. Sem “tortillas” nem empregos. **Le Monde Diplomatique**, 4 abr. 2008. Available at: <<http://www.diplomatique.org.br/artigo.php?id=164&PHPESSID=7344ed5e82e51d5534f731688bd39468>>.

VIGNA, E. **Reunião da FAO é considerada um fracasso pela sociedade civil**. Brasília: Instituto de Estudos Socioeconômicos (INESC), 2009. VON BRAUN, J. **Biofuels, international food prices, and the poor**. 12 Jun. 2008. (Testimony to the United States Senate Committee on Energy and Natural Resources). Available at: <<http://www.ifpri.org/publication/biofuels-international-food-prices-and-poor>>.

WISE, T. A. **Agricultural dumping under NAFTA**: estimating the costs of U.S. Agricultural Policies to Mexican Producers; Mexican Rural Development Research Reports; Global Development and Environment Institute; Tufts University, Dez. 2009. Available at: <<http://www.ase.tufts.edu/gdae/Pubs/rp/AgricDumpingWoodrowWilsonCenter.pdf>>.

COMPLEMENTARY REFERENCES

ARSENAL INVESTIMENTOS. **Um exercício sobre a inflação global**. 13 maio 2008. (Mimeo).

BANXICO – BANCO DE MÉXICO. **INPC Commodities**. [s.d.]. Available at: <<http://www.banxico.org.mx/graph/test/?s=SP74626,CP154,8&period=Men&l=es>>.

BELLO, W. Como fabricar uma crise global. Tradução de Naila Freitas. **La Jornada**: Carta Maior, 1 jun. 2008. Available at: <http://www.cartamaior.com.br/templates/materiaMostrar.cfm?materia_id=15022>.

BOZZO, C. Inflação deve ser controlada até 2009. **Gazeta Mercantil**: Internacional, 9 jun. 2008.

CÁRDENAS, I. **La batalla por medir la inflación**. Red Voltaire, 1 Sept. 2009. Available at: <<http://www.voltairenet.org/article161902.html>>.

CONCEIÇÃO, A. Rússia proíbe exportação de grãos até novembro de 2011. **O Estado de S. Paulo**, 2 set. 2010. Available at: <http://economia.estadao.com.br/noticias/not_34035.htm>.

DASCHLE, T.; RUNGE, C. F.; SENAUER, B. Food for Fuel? **Foreign Affairs**, Set.-Out. 2007. Available at: <<http://www.foreignaffairs.com/articles/62845/tom-daschle-c-ford-runge-and-benjamin-senauer/food-for-fuel>>.

FAO – ORGANIZAÇÃO DAS NAÇÕES UNIDAS PARA A AGRICULTURA E ALIMENTAÇÃO. **Trade reforms and food security**. Roma, 2003a. Available at: <<http://www.fao.org/docrep/005/y4671e/y4671e06.htm>>.

GUZMÁN, G. R. Incremento de los precios del maíz y la tortilla en México: problemas del desarrollo. **Revista Latinoamericana de Economía**, v. 38, n. 151, out./dez. 2007. Available at: <<http://www.ejournal.unam.mx/pde/pde151/PDE151000406.pdf>>.

INDEX MUNDI. [s.d.]. Available at: <<http://www.indexmundi.com/commodities/?commodity=corn&months=120>>.

LECG Corporation. Available at: <<http://www.lecg.com/>>.

NASS – NATIONAL AGRICULTURAL STATISTIC SERVICE. [s.d.]. Available at: <<http://www.nass.usda.gov/>>.

NCGA – NATIONAL CORN GROWERS ASSOCIATION. [s.d.]. Available at: <<http://www.ncga.com>>.

RFA – RENEWABLE FUELS ASSOCIATION. [s.d.]. Available at: <<http://www.ethanolrfa.org>>.

SALAZAR, J. A. C. Crisis alimentaria, TLCAN y soberanía Alimentaria. *In*: SEMINARIO DE ECONOMÍA AGRÍCOLA, 28., 2008, Ciudad del México.

SEIBEL, F. A crise das tortillas, no México: inflação por causa do etanol. **Portal Revista Exame**, 3 maio 2007. Available at: <<http://portalexame.abril.com.br/revista/exame/edicoes/0892/negocios/m0127992.html>>.

VEIGA, J. E. D. **Metamorfoses da política agrícola dos Estados Unidos**. São Paulo: Annablue, 1994.