During a global corporative food regime (1980–2008), the creation of the international legal framework for trade liberalization, the protection of intellectual property rights, and consequently the implementation of neoliberal policies at a national level have drastically changed the conditions for Mexican agricultural production. In this article, the origin of these significant changes is identified with an explanation of the food system’s structural transformation at an international and national level, as well as illustrated with the transnational agribusiness’ dominance in agricultural production. Subsequently, in this context an example of subordinated Mexican small scale maize production in the rural municipality of Tonatico, Estado de México, is analyzed. This is accomplished by illustrating the incremented exploitation of campesino production within the corporate food regime. The analysis at a local level is based on field work carried out while staying in the municipality.

Keywords: corporative food regime; transnational agribusiness; agricultural production; maize; agricultural inputs

Introduction
From the 1980s until today the Mexican agricultural sector has been restructured. Before, the sector was viewed as an important source of income for the country; it was the foundation for a low cost food production vital for the population and the economy, maintaining a growing urban population. Nevertheless, in the midst of crisis the starting point changed, and from that moment the governments have considered it more viable to import cheap basic food than to produce it in the country. Simultaneously, and not unrelatedly, the neoliberal model was introduced to the economy, which for the agricultural sector signified trade liberalization, market deregulation, privatization of state-owned companies, and eliminated or reduced subsidizes; this lead to the overall retreat of the state from the economy. As a result, the conditions for Mexican farmers were transformed, particularly for those growing basic grains on a small scale, since they during the next 35 years lost practically all their productive state support and, at the same time, were exposed to unequal international competition.

In this article we investigate what originated these changes by parting from existing literature and databases (ex. FAO, SAGARPA, INEGI). We then document how small-scale Mexican farmers, campesinos, have been affected by illustrating the case study of Tonatico, Estado de México. To answer these questions we work at three levels: first briefly at the international level; second at the national level, explaining the origins of the restructured agricultural production; and then third at a local level with a field study, providing an example of the situation for small scale farmers in Mexico during the corporative food regime.

Accordingly, the corporate food regimen and the following neoliberal policies, where the open deregulated food and agricultural input’s market is central, resulted in transnational agribusinesses dominance within the agriculture production at a structural, but also local, level. Empirically, this is demonstrated through their increasing role in agricultural production. We argue that this is the origin of the creation of a situation where Mexican campesinos (particularly in Tonatico) are exposed to the international market and therefore affected by an increased exploitation through the low prices paid for their products and the increasingly expensive agricultural inputs (seeds, fertilizers and agrochemicals), while simultaneously receiving little or no state support.

Consequently, the analysis is developed by parting from a historical structural approach, where the processes and their origins are central. The structural level is considered vital to understand the local and particular contemporary situation. From our perspective it is necessary to identify
the origins of agricultural conditions in a globalized world where the local is intrinsically related to the global.

Tonatico is a rural municipality, particularly interesting for this study since it has an unusually high number of small scale farmers using improved seeds compared to Mexico in general. As in most of the country, here we find a *campe...* production where the concept *campe...* refers to a form of production integrated into the capitalistic mode of production, but in a subordinated position since the producer is not separated from the means of production but is at the same time unable to create a profit due to the lack of access to capital. Thus, the exploitation of *campe...* production is based on an unequal exchange, which results in the *campe...* being insufficiently compensated to cover their labor costs (for a more extended discussion about the concept, see Bartra 2006: 242).

**The Corporative Food Regime (1970–2008)**

From the year 1982, with the first neoliberal Mexican president Miguel de la Madrid, until today, the structural adjustment programs have been implemented with the main objective to create an industrialized agricultural sector, in which capital accumulated at an international level could be invested. During the 1970s, the interest rate on international credits was very low and various countries, desperate for financing, took out large loans. In the following decade the interests grew rapidly and generated a debt crisis when the countries could not pay (Ugarteche 2009: 32). Due to this crisis, international institutions such as the World Bank and the International Monetary Fund (IMF) were able to demand implementation of the structural adjustment programs in exchange for renegotiating the loans. Together with the international framework for facilitating trade created on a global scale within the WTO, this constitutes an important part of what McMichael (2004) calls the corporative (or neoliberal) food regime, which implies the implementation of neoliberal policies at all the levels in this food system. As a result, this created the required conditions for augmented international trade and therefore also the adequate foundation for the increased role of transnational corporations in the world food system.

The conditions for the agricultural production at a local level are intimately related to the world food trade due to the liberalization and deregulation of trade and the protection of intellectual property rights. Since agricultural products and inputs are no longer protected by custom tariffs, their price is now directly linked to the international market, and therefore world trade has become a tool for transnational corporations to subordinate small scale agriculture production. With the development of technology, the agricultural production at a global level has been partially industrialized, and together with the neoliberal policies this has opened up the agricultural sector (seeds and land) for capital investments, a process in which the WTO has been vital.

The General Agreement on Tariffs and Trade (GATT, 1948) changed its name in 1995 and the WTO was established. Today it has 162 member countries which is the majority of all nation states in the world. The 60 agreements, which are the foundation of the organization, were mainly concluded during the round of negotiations called Uruguay (1986–1994), parallel to the neoliberal model. These agreements contain various themes such as merchandize, agriculture, services and rules about food sanitation. One, particularly significant for this investigation, is the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which is the legal framework to protect intellectual property rights (WTO, 2016). For the agricultural sector this implies that seeds that have been genetically modified (GMOs), transformed through hybridization or manual selections (improved seeds) can be commoditized and owned by corporations.

Without the WTO, intellectual property rights would not be globally accepted nor respected, as they are today in almost the entire world. As a consequence, the power over patented seeds, and their distribution, is in the hands of transnational corporations, which consequently has significant consequences for the world’s agricultural production, both locally and nationally. Nevertheless, it is relevant to emphasize that the WTO protects private not collective rights. Therefore, in communities where native seeds are still used, they are exposed to international competition and furthermore have no protection within the WTO. This is despite the fact that the small-scale farmers have for thousands of years bred and developed, for example, the large maize cob we are familiar with today. Subsequently, the rules of the WTO benefit transnational capital, with the argument that these rules will encourage technological development and generate economic growth. Here the inequality in this development is ignored.

The WTO’s main objective is to facilitate international trade, and its official founding argument is that all countries should specialize in products and services particularly adequate for their conditions through ‘the comparative advantages’. Consequently, the increased trade will supposedly benefit everyone due to the economic growth generated within the model of the so-called ‘free’ trade. Without the creation of such an institution regulating an important part of international trade, the corporative food regime would not have been implemented to the extent it has been today at a global, national and local level.

In the corporative food regime the development towards a worldwide food system controlled by a few corporations has been created due to the tendencies concerning the centralization and concentration of capital, which are inherent contradictions of capitalism. These are amplified during crises (when large corporations buy smaller ones who are not able to survive the crisis), and it is also intensified by eliminating trade obstacles since the capital is given more space to operate. This explains how the largest transnational agribusinesses that have initiated dominance in the food system will continue to grow and constantly acquire more power.

One example of this in the world food system is the transnational corporation Cargill, which grew rapidly in the economic world crisis: ‘During the most critical moments of the world food crisis 2007–2008, the agribusiness registered records in profit. Cargill reported increased earnings almost 70% percent comparing to 2007, and 157%
since 2006’ (Vargas & Chantry 2001: 21). This corporation not only buys and distributes maize but works in all levels of the food system and therefore has power over different steps in the food chain. ‘Cargill’s negotiation is to be a buyer, raw material provider and product processor. [...] Its clients and partners are McDonald’s, Kraft, Nestlé, Coca-Cola, PepsiCo, Kikkoman, Wal-Mart and Unilever’ (Chauvert 2010: 49). Here the lack of competition between corporations demonstrates that it is necessary to create low prices that benefit the consumers, according to neoliberal theory. This also illustrates that the corporations increase their dominance at the same time as people are affected by the consequences of crisis through, for example, the augmented food prices (as during the food crisis 2008–2014, see Rubio 2014). The capital’s centralization and concentration increases with the inequalities between the economically richest and poorest.

The other vital example is the global seed market, the foundation of food production, where 82% of the seeds for agricultural production in the world are patented by private corporations (ETC-group 2011: 25). Today, the seven largest agribusinesses in the seed market control 71% percent of the market (ETC-group 2015). Monsanto is another transnational corporation that profits from the corporative food regime; it is the world’s largest corporation in the seed market. Between the years 2007 and 2014 (during the worldwide economic crisis) this transnational agribusiness augmented its sales by 174%, according to the corporation’s own annual reports (Monsanto, 2014).\(^5\)

In 2013, Monsanto controlled 26% of the world’s seed market, and together with two other companies, Dupont (USA) and Syngenta (Switzerland), they represent more than half (55%) of the market (ETC-group 2015), which is possible due to the WTO’s legal framework and the implementation of the neoliberal policies at the national level. This concentration of the seed market implies a competition deficit and results in a situation where there is a risk that the seed prices increase due to the small number of corporations controlling their production and distribution. In this way, instead of competition between corporations in a “free” market, there is a kind of oligopoly filled with conglomerates and collaboration between corporations who, according to neoliberal theory, should be competing.

The same transnational agribusinesses mentioned above are found within the agrochemicals market, where likewise there is a concentration and centralization of the capital. For example, Syngenta is also the second leading agribusiness in the world when it comes to agrochemicals, and we find Monsanto ranked as the fifth largest in the same list. The five principal transnational agro-industries control 69% of the global agrochemicals market: Syngenta, Bayer (Germany), Basf (Germany), Dow (USA) and Monsanto (ETC-group 2015). As McMichael explains (2009: 286–287): ‘Within the terms of the corporate food regime, neoliberal policies (particularly liberalization and financial deregulation) have encouraged agro-industries consolidation, including strategic alliances between agribusiness, the chemical industry and biotechnology’. This means that the transnational agro-industries have increased their power within and are increasingly penetrating, and therefore controlling, the food system: ‘Companies seek to either capture new markets through direct purchasing of crops and processed food, or to directly organize agricultural production’ (McMichael 2000: 4).

**Import of Cheap Basic Grains**

During the corporative food regime Mexico has lost at a national level its food self-sufficiency. This has been replaced with an external food dependency, which implies cheap grain imports, mainly from their neighbor to the north, the United States of America (USA). Although self-sufficient in the middle of the 1960s, during the agricultural year 2014/15 Mexico imported 30% of the maize consumed and 56% of the wheat. Also, in the year 2015 the country imported 80% of its rice consumption (SAGARPA, 2016). As a part of the neoliberal model, signing the North American Free Trade Agreement (NAFTA, implemented 1994) with the USA and Canada, contributed to the amplification of the food dependency (import of basic grains and agricultural inputs), since 80% of all Mexican trade is with the USA. Here we argue that this agreement has created unequal competition between the Mexican campesinos and the highly intensive large-scale agricultural production, with access to technology and vast subsidizes, in the other two countries, consequently transforming the conditions for the Mexican farmers’ agricultural production.

The technological tools used by the farmers in the USA are significantly different from the ones we find in most parts of Mexico. The Mexican campesinos have no or very little access to the technology used by their northern neighbors. An example of this is that ‘the USA farmers have 1.6 tractors for every worker in agriculture, Canada 1.8, while Mexico only has one tractor for every 51 workers’ (Flores 2003). This results in significantly distinct agricultural production output, for example in 2014 the maize yield in Mexico was 3.3 ton/ha, in Canada 9.3 ton/ha and in the USA 10.7 ton/ha, which means that the average output is in Mexico only one third compared to the two countries in the north (FAO, 2016).

Nevertheless, the essential contribution to the unequal exchange is the large subsidizes still existing in the developed countries. In an economically asymmetric world the developed nation-states have had the power to decide which part of the neoliberal policies they are willing to implement. Inconsistently, the so-called “free” trade agreements are promoted, but at the same time, they (for example, the European Union and the USA) do not want to risk their national food production, and therefore they subsidize, and instead of reducing (as in the underdeveloped countries) they enlarge. A vital example in our context is the USA program *Farm Security and Rural Investment Act of 2003*, which has created a major increase in the subsidies for basic grain production. The support and subsidies to the farmers in this country have demonstrated the following tendency: ‘in real terms the subsidized have augmented 48% reaching 8.3 billion dollars in 2004, while in Mexico subsidizes, adjusted to inflation, were reduced...
with 39% to only 842 million dollars’ (Wise 2008: 168). This development has continued, according to Rubio (2014: 179). In 2008, with the New Farm Bill, subsidies for the agricultural sector were further increased. As a result, the farmers in the USA are able to sell their products at prices significantly lower than the Mexican farmers.

In the year 2013, the USA exported 20% of all maize internationally traded (FAO, 2016), which implies 1/5 of the global market. Therefore, it is possible to argue that this country’s subsidies have contributed to the under-valued international market price of the 1990s (Rubio 2014). As mentioned above, due to the deregulated maize market in Mexico the paid producer price is directly inter-related to the maize price on the international market. Furthermore, in 2008, after a gradual elimination during 15 years within NAFTA, the total liberalization of beans and maize import was completed, and currently there are no custom tariffs on the trade of the four basic grains between the three countries. As a result, the wheat price in Mexico has occasionally fallen to 40% under the international market price, and in the case of maize 25% below (Wise 2008: 167). Concerning rice, ‘the USA is selling it in average 20% below the production cost’ (Perales et al 2008: 153). This unequal competition is called dumping and means that the merchandise is dumped on the consumers in the underdeveloped country at prices that are not possible for the Mexican farmers to compete with since they are below production cost.

Through signing NAFTA, president Carlos Salinas de Gortari (1988–1994) continued the expansion of the neoliberal model, and also extended the policies to include the deregulation of the agricultural inputs market; fertilizers, agrochemicals and seeds. To implement NAFTA it was required that Mexico signed the TRIPS – within the WTO framework, as mentioned above – with the purpose of protecting intellectual property rights at a national level. This was indispensable in opening up of the seed markets and securing the transnational corporations’ access to distribute and sell improved seeds in Mexico.

Furthermore, the neoliberal governments gradually dismantled and privatized state-owned companies including, among others, the ones that produced and distributed agricultural inputs. The deregulation and trade liberalization generated a significant import of these products. Concerning seeds, PRONASE (National Seed Producer) was the state monopoly in the improved seed market since its foundation in 1961. PRONASE’s principal objective was to create and distribute low cost seeds, but it was criticized for its inefficiency, which was used as an argument for its privatization (Salcedo 1999: 15). Its elimination process began in the 1990s and was concluded in 2002. The import of maize seeds more than doubled between 1990 and 2012 (from 4 853 tons in 1990 to 10 812 tons in 2012, INEGI, 2015).

The state fertilizers monopoly, FERTIMEX, was privatized in 1992 leaving the Mexican farmers to buy their fertilizers from private corporations with prices controlled by the international market. In 2013, 66.7% of the fertilizers consumed in the country were imported (FAO, 2016). As a result, the farmers are exposed to a more vulnerable situation, and it becomes a problem when the price of fertilizers increases, as between 1990 and 2012 when these prices tripled on the international market (USDA, 2014).

Furthermore, the import of the agrochemical pesticides has constantly increased since the 1990s, and the import value has been multiplied 13 times between 1990 and 2013 (FAO, 2016). The neoliberal policies emphasized in this article – initialized at an international level and then also implemented at a national level, together with the reduction of state subsidizes (for example the elimination of price guarantees) – restructured the agricultural sector, amplified the import of basic grains and created an agricultural production dependency on imported inputs from transnational agroindustrial corporations.

**Tonatico**

The analysis at a local level pretends to contribute with a reflection on the structural historical processes. It demonstrates an example of the overexploitation of campesino maize production during the corporate food regime in which the majority of the world’s agricultural producers are exposed to international trade and the transnational corporations’ dominance. Therefore, they are subordinated to the heavily subsidized agroindustrial production in the developed countries – in our case, the USA – which is something all campesinos have in common living within the frame work of trade liberalization.

The case study analysis is based on 35 semi-structured interviews (including the municipality president, the alderman of agriculture and his secretary, a retired farmer, the director of the local hospital, the historian of the village, a teacher, an employee in the secretary of agriculture, nine housewives and 18 campesinos), and participant observation (living in Tonatico a total of five weeks, understanding the agriculture production and consumption patterns through participating in social events and conversing with the villagers). The campesinos are ejidatarios, which means that their land is social property and they have usufruct right to their part; two of them are women and the age span is between 25 and 90. Since the ejidos mostly are inherited by men, less women have land titles. In our case, the campesina Agustina has a husband who has migrated to the USA and Soledad is a widow.

Table 1 below illustrates approximately what and how many hectares each campesino cultivates. The product mentioned is their main one; they also frequently cultivate further food on a lesser scale for family consumption or selling. The field work was realized when living with a family in the community Salinas, part of Tonatico: firstly during the autumn of 2010, then at the beginning of 2011 with a final recollection of information in the beginning of 2012. The sampling method was purposive based on the knowledge and recommendations of the host family, which hence created a link to the informants by having someone known as a reference. The central idea was to identify the main changes in the agricultural production but also the campesinos’ investment costs and the price paid for the final product, this together with the objective to understand their living situation in the context of the corporate food regimen and dominance of the transnational corporations.
Firstly, this chapter centers on a brief analysis of the general agricultural production in Tonatico. Then we focus on maize production since it is the most important grain in Mexico, not solely as food but also as a vital part of the country’s history, culture and traditions. Mexico is a part of the region Mesoamerica where maize was domesticated about 5000 years ago (Castaños, 2008: 86). Its significance in today’s society can be traced at various levels, for example, in each different native religion we find one or several maize gods the required maize tortilla accompanies practically every meal. In the maize production analysis, we emphasize the cultivation cost and compare it to the producer paid prices in the harvest of 2010. Hence, it is possible to understand how campesino labor is exploited and subordinated through the extraction of labor value when selling their product for a price fixed at an international level. Finally, in the context of this agricultural production, the farmers’ living situation in the municipality is demonstrated by stressing some of campesino families’ forms of resistance.

Mexico is a distinctly diverse country and has several variations within its agricultural production. The climate conditions, for example, range from jungle covered mountains in the south to a flat dryer climate in the north, which makes it complicated to generalize the farmers’ situations. However, the majority involved in agricultural production are small scale campesinos, and all of them have been exposed to the same political and economic restructuring of the agricultural sector during the last nearly four decades, which makes it relevant to investigate one case with its own particularities. Agricultural production in the country is in general still relevant from a social and economic perspective, illustrated through the 20.8% of the population that is rural (Banco Mundial, 2016).

Tonatico is located in central Mexico, two hours from Mexico City. The climate in the village is high subtropical, and the rain season is from the middle of June until the middle of September; the rest of the year is dry season. The municipality has 12 099 inhabitants (INEGI census, 2010) and there are no indigenous people in the area studied. In the context of the corporative food regime it is a particularly interesting place since there is an unusually (compared with the rest of the country) high number of small scale farmers using improved seeds, agrochemicals and fertilizers in their agricultural production, see Table 2 below. The interviewed confirmed the official numbers. Fidel informs us: ‘before we planted white and black maize [the native species in different colors and sizes], but now only hybrids’. This, however, does not imply that the state is supporting the Tonatico campesinos; rather, they do not have a choice, due to reasons explained below. It is not possible to cultivate in the municipality without applying chemicals.

There are two important aspects to emphasize when explaining why there is such a high use of agricultural technology in the municipality, when in general it is not so common in the Mexican countryside amongst campesinos. According to the findings in the field work, this situation is connected to a project called El Proyecto Llano de Solidaridad started by the former president Salinas de Gortari (1988–1994) and advocated in the municipality in the beginning of the 1990s (Montaño 2004). This was a part of the national program Solidaridad (Pronase, this according to contracts studied between the farmers and the authorities). Firstly, they built pumps to use the water from the river, and then they began to cultivate different products, with the help of irrigation, such as tomatoes, different kinds of chili, cucumber, etc.

During approximately three years, this cultivation generated jobs in the village since it required plenty of labor. People even arrived from other states to work on the project. It was a highly intensive production, and an elevated amount of agrochemicals were applied with small airplanes, which covered the entire production area and also the surrounding houses, according to the interviewed campesinos. Furthermore, many trees were felled before serving to separate the plots. These aspects of the project contributed to a radical change in the ecosystem, and

| Campesino   | Hectares | Product     | Age |
|-------------|----------|-------------|-----|
| Agustina    | 1        | maize       | 50  |
| Leonel      | 1        | maize       | 50  |
| Benito      | 1        | maize       | 30  |
| Fidel       | 1        | maize       | 50  |
| Juan        | 2        | maize       | 25  |
| Federico    | 2        | maize       | 90  |
| Soledad     | 3        | maize       | 45  |
| Carlos      | 3        | maize       | 55  |
| Guillermo   | 3        | maize       | 45  |
| Enrique     | 5        | maize       | 45  |
| Marco       | 6        | maize       | 80  |
| Héctor      | 8        | maize       | 70  |
| Humberto    | 50 (rent 46) | maize | 55  |
| Ricardo     | 1.4      | strawberries| 45  |
| Rodolfo     | 4        | greenhouse tomatoes | 55 |
| Cristobal   | 1        | greenhouse tomatoes | 30 |
| Armando     | 8        | onion       | 55  |
| Alberto     | 4        | onion       | 40  |

Table 1: Interviewed maize campesinos (approximated ages and all names are changed).

Mexico (national level) | Tonatico (local level)
------------------------|---------------------
Chemical fertilizers    | 26%                 | 61%                |
Improved seeds          | 14%                 | 47%                |
Chemical herbicides     | 17%                 | 53%                |

Table 2: Use of agrochemicals and improved seeds, percentage of the cultivated area (Censo Agrícola, Ganadero y Forestal, INEGI, 2007).
the consequences are still present 20 years afterwards. Nevertheless, the yield generated was not sufficient and consequently not profitable enough, so the project was abolished, the authorities withdrew their support and the land was returned to the campesinos without pay. According to the farmer responsible for the government connection during the project, the campesinos that had land included in the project were not paid since the government’s investment was mainly a loan and the profits created from the cultivation were supposedly absorbed by the debt. Another campesino, Ricardo, explains:

‘In the 1990s came the plague that made it difficult to sow. Before there had been a lot of trees here in El Llano [de Solidaridad] which prevented the plagues from spreading, then came the president of the republic, Salinas, they installed water pumps, took away the trees, and so came the plagues, since then it impossible to cultivate without a lot of chemicals. Before the tomatoes grew very beautifully without chemicals and greenhouses’.

Consequently, it is currently not viable to cultivate in the open air without fumigation or fertilizers because of a drastic increase in plague. The land does not produce without improved seeds, fertilizers and agrochemicals. This is relevant because it would explain the widespread use of the technological package (fertilizers, agrochemicals, improved seeds) in the village, compared to the rest of the country. The way that Salinas’ project treated the land contributed to the increased agro-industrial dominance in the production process. About this, Cristobal, tells us:

‘It was better before, we did not need so much fertilizers, without fumigation nowadays it does not give the same, the land has gotten tired; we do not get as much as we need to invest. Only if the price is right it’s possible to get the investment back. This harvest I did not get my investment back and there are more expenses needed to continue the cultivation. We have to find labor and pay so they can eat, if we do not, they won’t eat’.

It was also during the 1990s when the state-owned fertilizer company (FERTIMEX) was privatized, and the seed production and distribution monopoly (PRONASE) was dismantled (as mentioned above). Disappearing, these companies implied a further opening up of the agriculture production for the dominance of transnational corporations. It could additionally be seen as problematic since there is no control over the agrochemical quantities applied. Here there is a risk of constant incremented use, where the farmer intends to kill the plagues and get more output, but instead the plagues becomes more resistant.

These two aspects are central in the current situation where it is impossible or complicated to cultivate products like tomatoes and chili without greenhouses since the plagues destroy them. Before, these were produced in open air, and they obtained good quality and quantity without fertilizers or agrochemicals. In the case of maize, it is nowadays necessary to invest in improved seeds covered in chemicals so that it will not be eaten by insects and worms. According to don Humberto: ‘The worst is that the land is contaminated with plagues and that the inputs are much more expensive, the fertilizers, the seeds, because now each year you have to buy new seeds’. In this context there has been a drastic increase in the tomato, chili, and other vegetable production in greenhouses since the year 2000 until today. In 2001, the first greenhouse was built in the municipality and now there are 500 hectares of greenhouses (according to the agricultural responsible in the city council, 2016), as the image below (Figure 1).

According to the informants, large investments are necessary in the greenhouses and frequently the price paid for the final product is not enough to cover the costs (as mentioned by Cristobal). The tomato prices fluctuate and the income (if there is any) is low. There are exceptions: farmers who have more than one greenhouse and can therefore sell the products on different occasions during the year can in this way augment the possibility to sell when the prices are elevated. All of this means that a campesino with only one greenhouse is taking a higher risk by being exposed to the fluctuations of the market compared to those who have access to sufficient capital and can invest in several, since it elevates the chances to generate profits.

Actually, the only campesino interviewed that was able to generate a sufficient income, according to himself, was a farmer with four hectares of greenhouses where he grew tomatoes (which in the case of Tonatico substantial) (Rodolfo). Each greenhouse was a half hectare, and with the output 220–230 ton/ha he got a profit of 5.50 pesos/kg (0.4 dollar). In 2013, Mexico was the largest exporter of tomatoes in the world (FAO, 2016), which illustrates that labor intensive vegetables agriculture with access to capital and technology could be beneficial in the context of the corporative food regime.

A campesino maize production dependent of imported agriculture inputs

During the corporate food regime, the Mexican campesinos have had to survive with little or no state support (due to the deregulation of the input market, the elimination
of subsidies, trade liberalization and the privatization of state-owned companies). Furthermore, they are totally exposed to the international market price and therefore subordinated since they are, on one hand, integrated into a food system dominated by the transnational agribusinesses (as was illustrated in the previous chapter) and on the other required to purchase agricultural inputs (seeds, fertilizers and agrochemicals) from them. The technological package was introduced in Tonatico during the previous world economic model.

In the 1960–70s, with the Import Substitution Industrialization (ISI) economic model, the state supported and controlled technological development for the agriculture production. Nevertheless, the dispersion was unequal and only the socially privileged class had access to improved seeds and the capacity to cultivate them. When the neoliberal model peaked in the 1990s with the Llano project, according to the informants the agricultural technology increasingly spread in the municipality: first the improved seeds with fertilizers and agrochemicals, and subsequently tractors and machines to sow (in 2010 the majority used these machines). 'Before we sowed seeds from here and now the improved seeds, I have now used Tornado for about 5 years. There is almost nobody using the native seeds, all of us sow the improved seeds, the native do not give anything' (Marco).

The change was gradual and some did not start to use them until five years ago but today all of the maize campesino interviewed use cultivate the improved maize, even those from lower social classes. As mentioned above, today it is difficult to grow with the native seeds due to the risk of plagues and diseases. With the protection of intellectual property rights and the deregulation of the seed market at an international and national level, the seeds from the transnational corporations have penetrated the agriculture production in Tonatico. Furthermore, it is relevant to emphasize that there is an unequal exchange since the corporations have their rights protected (within NAFTA and WTO) and they decide the conditions for their distribution. When campesinos buy these seeds they are subordinated the transnational corporations and exploited due to their labor value being extracted when they pay with what they earned from the previous harvest.

Consequently, the transnational corporations’ world food system dominance is present through the application of their improved seeds and chemicals. The first (and currently the most common) seed used in the municipality is Tornado, and it is the property of the transnational agribusiness Syngenta. The second most common seed in Tonatico is Asgrow 7573, owned by Monsanto. All of the interviewed maize campesinos use either one of these two. According to maize campesino don Humberto, the Asgrow gives a higher yield, but it is also more expensive. This illustrates that even though the genetically modified maize seeds are prohibited for commercial use in Mexico, campesinos in Tonatico use seeds from the same transnational corporations, who control the international seed-market and are also the owners, producers and distributors of the majority of all genetically modified seeds in the global market. Therefore, these corporations not only control the foundation of maize production through the genetically manipulated ones but also through the improved seeds.

According to the maize campesino Federico, the native seeds are weaker than the improved; the plant grows quickly and can tumble in the wind. Moreover, the output is low and the final product weighs less and is more sensible to plagues. With the improved seeds the plagues and insects are eliminated with agrochemicals; they come from the store covered with chemicals and in the cultivation process more are applied. One of the agrochemicals the farmers use to eliminate weeds is Hierbamina, owned by Syngenta. They apply different chemicals against the plagues, like Tamaran from Bayer. Here we see the incrementing presence of Syngenta, Monsanto and Bayer in the agricultural production process at a local level; three of the largest transnational agribusinesses in the world that are protected by the rules in the WTO and the neoliberal policies that have opened up the markets.

Subsequently, due to the constant use of herbicides, it is now impossible to cultivate beans with maize, as was done traditionally, since the chemicals kill the bean plant. In this way, the maize cultivation is turning into a monoculture, even though it is cultivated in plots relatively small, where the fertilizers and agrochemicals are gradually eliminating the land’s natural nutrition. Ricardo the strawberry campesino states:

'It’s like with medicine, the doctor tells you to take a particular amount, not more nor less, then some people take less and some more, as they want, not what the doctor has recommended [...] In this way they liberate the plagues and they turn them increasingly resistant against the agrochemicals and it gets more difficult to combat them'.

The lack of control in the application of the chemicals and the environmental degradation have resulted in an increased dependency within a vicious circle where an increasing amount of fertilizers and other agricultural inputs are necessary to reach the same yield. With the privatization of FERTIMEX and the deregulation of the market the Mexican farmers are directly affected by the fertilizers’ international market price; when the input cost rises, and the price paid for the product does not, the exploitation of campesino labor increases. The increasingly expensive fertilizers are noted during the field work: 'Before the fertilizers had a very low cost, they were very cheap when we first started to use them, but today they are very expansive' (Leonel). From Mexico, oil is exported, and the fertilizers, made from oil, are imported. The result is that the profit from the process of making the fertilizers will remain outside of the country and the farmers will have to pay the increasing costs. Today the farmers in Tonatico are dependent on these fertilizers, hence Marco states: 'Without fertilizers there will be a bad harvest'.

The costly inputs, above all the fertilizers, are here identified in the figures provided by the interviewed campesinos and accordingly illustrated with calculations of how much they could earn from their maize production.
Consequently, we identify serious problems with the cultivation of the most important basic grain for the Mexican population, even though they have access to the technological package. It is demonstrated how, in this case, access to technological packages in the context of the corporative food regime results in profits for the transnational agribusiness, since they produce the inputs and elevated costs as well as the low prices paid for the final product produced by small scale farmers.

To understand the maize campesino production we will apply the cost and price paid given in the interviews to develop an approximate calculation of income. It is relevant to emphasize that the campesinos interviewed have somewhat distinct conditions. An example of these differences is that in the year 2010 the ones who cultivated more could sell their maize for a higher price, some of them for 3 pesos/kilo (0.23 dollars, e.g. Humberto), while the campesinos selling less maize received a smaller amount, around 1.30 pesos/kilo (0.1 dollars, e.g. Marco). Nevertheless, we will use an average of what the campesinos referred to in the interviews since not all of them knew, or would say, how much they invested in their harvest and what they paid for their products. It is somewhat complicated to compare the producers with more hectares to the small scale campesinos due to the fact that the former apply more fertilizers and choose expensive ones since they have more capital to invest. This accordingly affects their output in a positive way. Consequently, with access to more capital, the income could be higher and the differences in output could be as elevated to between 5 (as the minimum when applying the technological package) and a maximum 10 tons/hectare (according to the campesino Humberto). In general, when using improved seeds and agrochemicals, the costs increase but the output is 2.5 tons/hectare and without destroyed plants from plagues or diseases, the farmer would lose 14 000 pesos (1 080 dollars). This implies that, if the harvest is ‘good’ with sufficient rain and without destroyed plants from plagues or diseases, the output could reach 10 ton/ha. This would make it possible to gain 120 peso/day (minimum wage in 2010 was 55 pesos/day). However, if the output is less there would be less income and maybe even significant losses. Looking the official figures tells us that the average campesino in Tonatico did not receive minimum wage if they cultivated 4 hectares in 2010.

To access the basic food basket in Mexico, the income necessary for a family (including 5 people) was three minimum wages when the field work was carried out (Lozano et al, 2011: 3). Consequently, the maize cultivation in Tonatico does not cover the social reproduction of the campesinos families, which implies an overexploitation, and sometimes, not even the investment costs. This illustrates that it is very complicated to survive on maize production for a campesino in Tonatico within the context of the corporative regime due to the elevated investment costs and the low prices paid for the maize. It was learned through the participant observation that they frequently continue to cultivate maize, although there is no income, since they prefer to eat the maize from their own production. Even though these campesinos have access to the technological package, they have not succeeded to create a sufficient income from the production, and they cannot survive solely on agriculture.

| Output ton/ha | Expenses, pesos/ha | Producer price paid, pesos/ton | Producer price paid, pesos/ha | Income, pesos/ha |
|---------------|-------------------|-------------------------------|-------------------------------|-----------------|
| 5             | 16 000            | 2 500                         | 12 500                        | −3 500          |
| 10            | 16 000            | 2 500                         | 25 000                        | 11 000          |

Table 3: Maize cultivation (data average from the interviews, harvest 2010).

| Output ton/ha | Expenses, pesos/ha | Producer price paid, pesos/ton | Producer price paid, pesos/ha | Income, pesos/ha |
|---------------|-------------------|-------------------------------|-------------------------------|-----------------|
| 2.36          | 16 000            | 3 500                         | 5 900                         | 8 260           |

Table 4: Maize cultivation (SAGARPA, harvest 2010).
they need other incomes since the investments are too high and the prices paid are too low. The small scale campesino in Tonatico cannot compete with the subsidized maize producers in the USA because their conditions are fundamentally different.

**Forms of resistance**

Even though Tonatico is a rural municipality and the principal occupation is agricultural production, the village is not self-sufficient throughout the whole year with the products cultivated. According to the interviewed women, working housewives married to campesinos, a part of the year it is necessary to buy basic food such as maize and beans, although they themselves cultivate them. Furthermore, the several workers from the municipality Tortilerias explained that half the year they can access maize from local production, but for the other half they are obligated to look elsewhere for supply. This is directly related to the agrarian cycle; during and after the harvest all of the campesinos have an abundance of products but, contradictorily, it is not enough for the entire year. When the bean and maize reserves are finished, people, even though they grow the grains, sometimes have to buy them since they are an indispensable part of everyday consumption.

The interviews with the campesino wives identified a questionable consumption quality in their families, as a result of the low prices paid for the products cultivated and the expensive input costs, all in the context of the corporative food regime. According to Rosario, ‘[The income from the agriculture] does not cover everything we want to buy, sometimes I don’t bring meat nor fruits because it is not enough for everything, I buy one thing and not the other’.

Since it is difficult to survive solely on agricultural production, all the campesinos depend on other incomes. In Monica’s family they cultivate maize, she informs: ‘We are seven in the family, four children. The men work in the greenhouses’. Other examples are some in the family working at the municipality center in a nearby village or for the state. These family members will contribute to the survival of the household with their salary.

The families have different ways to survive and various forms of resistance, since they must resist malnutrition and overexploitation when their agricultural production does not provide enough. Something learned through participant observation is that some women do ‘small jobs’, like weave scarves which they sell at the weekend market in the municipality center. They can also sell earrings, perfumes, creams or clothes to their friends and neighbors in the village. Furthermore, when it is high season and tourists come to visit the municipality resort (pool) constructed from the natural hot spring, some work with selling sweets, food and handicrafts. Others work in the greenhouses picking, planting or fumigating vegetables, and they also grow on their plots for household consumption, all of which complements the household expenses.

Another common form of resistance that is vital for the communities’ survival is migration, even though families are torn apart and it implies a risk without a visa since they have to walk through the desert to cross the border. The migrated often send money to their families in Tonatico. Rosario tells us: ‘One of my sons is in the United States, sometimes he sends money but it is hard since he’s married and has a child’.

According to the interviewed the vast majority of the international migrants travel to Waukegan in Illinois. Even though migration dates back to the first half of the twentieth century, since the crisis in 1982 it started to increase and through the 1990s it augmented even more in the context of the neoliberal model and the Llano project. This is also noted by a decrease of students in the schools, according to a local teacher. In 2005 it was calculated that at least 5000 people from Tonatico lived in the USA (Sandoval & Guerra 2010: 53), which is approximately one third of the population. According to Martinez (2004), 80% of the population in Tonatico receives remittances from abroad since the migrants send their families a part of their salary. Nevertheless, some of the migration is temporary and many return to their home when they can but others testify that it has been decade since they have seen their children.

Consequently, in spite of the importance of family in Tonatico (and in Mexico), in many cases its members are on different sides of the Mexican-USA boarder, and this is noticeable in the interviews with the women. As Teresa explains, ‘I had 11 children but now there is only one left at home. I have two sons in the United States but right now there is no work, they have been there for 15 years, they almost never call me to tell me about their lives. They left since the labor here is not worth anything’.

All of the interviewed have at least one family member in the USA, sometimes more than half of their family. Guadalupe in Salinas tells us:

‘My children have migrated, I only have a daughter here with me, the others are over there and they are married, but now they do not have employment and almost do not work even though they want to. It was 13 years ago I saw my daughter. They suffer coming and going since they do not have papers’.

Due to the economic crisis of 2008, it was harder in 2010 for migrants to find employment. Nevertheless, very few returned. They simply kept on looking, probably due to the fact that in Mexico it is even more difficult to find work.

**Conclusion**

This article has emphasized the importance of, and demonstrated the connection between, the corporative food regime at an international level and the overexploitation of maize campesinos in a rural municipality. Within this food regime the transnational corporations’ dominance has been established with a legal framework for trade liberalization and the protection of intellectual property rights in the WTO. This dominance has been demonstrated within the agricultural production through the transnational agribusinesses’ prominent role in the oligarchic inputs markets: patented seeds, fertilizers and agrochemicals. These inputs have penetrated the Mexican market through the neoliberal model.
Due to the debt crisis of 1982, international institutions such as the World Bank and IMF were able to promote economic restructuring programs in exchange for the renegotiation and increased loans for underdeveloped countries. That same year the Mexican government initiated the implementation of neoliberal policies, changing the conditions for farmers’ agricultural production. With deregulation of the market and privatization of state-owned companies, the input production and distribution were opened up. The culmination was signing NAFTA, which created an unequal exchange between the heavily subsidized large-scale intensive agricultural production in the USA and the Mexican campesinos.

The implications for maize campesinos in Tonatico have been illustrated in this article with a case study where we have found that agricultural labor is overexploited in the context of the world dominance of transnational agribusiness. The municipality has particularities which have resulted in the creation of a small scale campesino production with access to a technological package: they use improved seeds, fertilizers and agrochemicals since it is essentially impossible to produce without them. The improved seed is property of transnational corporations like Syngenta and Monsanto. The agrochemicals, which they also apply in their production process, are owned by Syngenta and another transnational corporation, Bayer. In this way, the connection between international, national and local has been established, and the conclusion is that these corporations have a growing role in the agricultural production at a local level in the context of the corporate food regime. The campesinos are exploited and dominated since the inputs are bought with the labor surplus created during the production process.

As a result, in light of the corporative food regime and the transnational agribusiness’ dominance, the agricultural production in Tonatico is not competitive on the international market. The unequal competition results in a situation where the campesinos cannot survive on maize cultivation, a vital grain for Mexican food, traditions and culture. The elevated inputs costs and the low price paid to the farmers result in overexploitation through the dispossession of farmers’ labor, as what they are paid does not cover the labor value and sometimes not even the production cost (Rubio 2014).

Since the campesinos in Tonatico cannot survive solely on their agricultural production, they use several forms of resistance to create further incomes, such as other jobs and/or migration. The continued agricultural production would not be possible without the fact that one third of Tonatico’s population resides in the USA and sends money home to their families.

Mexico is importing cheap basic grains and expensive agricultural inputs, causing the price paid for their products to diminish and at the same increase their costs. The result is less income for cultivation, and this could be a threat towards the future of campesino maize production.

Notes

1. The Spanish campesinos concept illustrates a class perspective. A class with a subordinated position in relation to the dominating industrial sector dominance, particular within each capitalistic economic model, which implies that the campesino labor surplus is extracted and they are therefore overexploited since the price paid for their products do not cover the campesino labor value (Rubio 2012: 51–53).

2. Due to the agrarian reform (1934–1992) the average size of the land is 7.5 ha (INEGI, Censo Agrario 2007) per farmer which implies that the majority of the Mexican farmers are small scale.

3. Friedmann (2009: 1) defines a regime as: “a specific set of (often implicit) relationships, norms, institutions and rules which around the expectations of all relevant actors converge”. To understand the food part of the concept McMichael (2009: 281) explains: “The food regime has always been a historical concept. As such it has demarcated stable periodic arrangements in the productions and circulation of food on a world scale, associated with various forms of hegemony in the world economy: the British, the American and the corporate/neoliberal”.

4. Marx explains (2001: 529): "When the mass of wealth, which works as capital, augments its concentration in the hands of capitalistic individuals increase". The capital expands in quantity, but, at the same time, the number of capitalists diminish and the capital is increasingly concentrated which decreases the competition and changes the market’s conditions since it is an arena where not all the corporations compete with the same conditions.

5. From net sells of 856.3 million in 2007 to 14.86 billions of dollars in 2014.

6. Ejido is an exclusive collective land tenancy for Mexico created legally in the Constitution 1917 after the revolution and implemented during the XX century agrarian reform which prohibited selling the land. Legally, since the constitutional reform of article 27, this land can now be sold.

7. With this concept it is referred to what Marx calls the "livelihoods necessary for self-preservation and reproduction" (2001: 164).

Competing Interests

The article is derived from the author’s PhD thesis: Food Dependency in Latin America: case study Mexico (Spanish, 2009-2012), Posgrado de Estudios Latinoamericanos, Universidad Nacional Autónoma de México (UNAM) carried through with a scholarship from the public institution the Consejo Nacional de Ciencia y Tecnología (Conacyt).

Author information

PhD in Latin American Studies from UNAM, with the thesis: ‘Food dependency in Latin America: the Mexican case’ (2012). B.A. in Latin American Studies at Gothenburg University, and partially, Stockholm University, master in Global Studies at the former. Since 2013, a university teacher at the undergraduate level in the Escuela Nacional de Trabajo Social (ENTS), UNAM, in Rural Problems and Human Rights, and furthermore completing a Post-doctoral fellowship at the IIS, UNAM, with the project "The
increasing role of transnational agribusiness in Mexican agricultural production: the case of Tonatico, Estado de México’.

The article is derived from the author’s PhD thesis (Jönsson 2012).

References
Banco Mundial 2016 [online] http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators (Last accessed 23 September 2016).

Bartra, A 2006 *El capital en su laberinto. De la renta a la tierra de la vida*. Universidad Autónoma de la Ciudad de México, Centro de Estudios para el Desarrollo Rural Sustentable y la Soberanía Alimentaria, Editorial Itaca, México.

Castaños, C M 2008 *Desarrollo rural alternativa campesina*. Editor responsable: V H Palacio Muñoz, Universidad Autónoma de Chapingo, México.

ETC-group (Action Group on erosion, technology and concentration) 2011 “¿Quién controla la economía verde?” http://www.etcgroup.org/es/content/2%2BF%40qu%231%29controlar%231%2a-la-econom%231%2Da-verde (Last accessed 7 July 2016).

ETC-group 2015 “Mega-Fusiones a nivel global en el sector de insumos agrícolas” Informe 2013. http://www.etcgroup.org/es/content/mega-mergers-global-agricultural-inputs-sector (Last accessed 7 July 2016).

FAO 2016 Food and Agriculture Organization of the United Nations [online] http://faostat3.fao.org/home/E (Last accessed 7 July 2016).

Flores, V J J 2003 *Integración económica al TLCAN y participación estatal en el sistema de innovación tecnológica en granos y oleaginosas en México*. Universidad Nacional Autónoma de México, Instituto de Investigaciones Económicas, Plaza y Valdés, México: 255 p.

Friedmann, H 2009 “Discussion moving food regimes forward – reflections on symposium essays.” *Agriculture and Human Value*, 26: 335–344. http://link.springer.com/article/10.1007%2Fs10460-009-9225-6 (Last accessed 7 July 2016).

Jönsson, M 2012 Dependencia alimentaria en América Latina: el caso de México. Unpublished thesis (PhD), Posgrado de Estudios Latinoamericanos, Universidad Nacional Autónoma de México (UNAM).

Lozano, L, Otero, I and Vázquez, N 2011 “México: resultados de la política económica aplicada a los trabajadores (2006–2011) Reporte de Investigación No. 92” Centro de Análisis Multidisciplinario (CAM), Facultad de Economía, UNAM, México.

McMichael, P 2000 “The power of food” *Agriculture and Human Values* 17: 21–33. http://www.springerlink.com/content/h023225826852049/fulltext.pdf (Last accessed 7 July 2016). DOI: http://dx.doi.org/10.1007/A1007684/27140

McMichael, P 2004 “Global development and the corporate food regime”. Prepared for Symposium on New Directions in the Sociology of Global Development, *XI Congress of Rural Sociology*. Trondheim, Noruega. https://devsoc.cals.cornell.edu/sites/devsoc.cals.cornell.edu/files/shared/documents/McM-global-dev-corp-regimeFR-pdf.pdf (Last accessed 7 July 2016).

McMichael, P 2009 “A food regime analyze of the “world food crisis””. *Agric Hum values* 26: 281–295 http://www.springerlink.com/content/l3534kg71820323/fulltext.pdf (Last accessed 7 July 2016).

Monsanto 2014 [online] http://www.monsanto.com/investors/pages/financial-highlights.aspx (Last accessed 2 June 2014).

Montaño, M T 2004 “Reconocen en fracaso del plan agrícola del CSG”. El Universal, 27 June 2004, México http://archivo.eluniversal.com.mx/ciudad/60461.html (Last accessed 18 July 2016).

Perales, S A, et al 2008 “Apertura comercial y su impacto en la cadena agroalimentaria del arroz” in José Antonio Avila D. et al (editores) *Presente y futuro del sector agrícola mexicano en el contexto del TLCAN*, El colegio de México, Universidad Autónoma de Chapingo, México: pp. 143–168.

Rubio, B 2012 *Explotados y excluidos. Los campesinos latinoamericanos en la fase agroexportadora neoliberal. 4ª Edición*. Plaza y Valdés, México.

Rubio, B 2014 *El dominio del hambre. Crisis de hegemonía y alimentos*. Universidad Autónoma Chapingo, Colegio de Postgraduados, Universidad de Zacatecas, Juan Pablos Editor, México.

SAGARPA 2016 Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación, México [online] http://www.siapi.gob.mx/cierre-de-la-produccion-agricola-por-estado/ (Last accessed 1 June 2016).

Salcedo, S 1999 “Impactos diferenciados de las reformas sobre el agro mexicano: productos regionales y agentes.” Red de Desarrollo Agropecuario, Comisión Económica Para América Latina y el Caribe (CEPAL) http://www.cepal.org/publicaciones/xml/7/4627/lcl1193p.pdf (Last accessed 7 July 2016).

Sandoval, F E A and Guerra, G E 2010 *Migrantes e indígenas: Acceso a información en comunidades virtuales interculturales*. Universidad Autónoma Indígena de México, Universidad Autónoma del Estado de México. http://www.eumed.net/libros/2010b/684/indice.htm (Last accessed 7 July 2016).

Ugarteche, O 2009 *Historia crítica del FMI*. Instituto de Investigaciones Económicas (IIS), UNAM, México.

Wise, T A 2008 “Estado de emergencia para el maíz mexicano. Proteger la agrodiversidad apuntalando la economía campesina”. In J. Luis Seefoó Lujan (coordinator), *Desde los colores del maíz. Una agenda para el campo mexicano*. El Colegio de Michoacán, México: pp. 167–198.

WTO 2016 World Trade Organization [online] https://www.wto.org/ (Last accessed 7 July 2016).
