

USDA Foreign Agricultural Service

GAIN Report

Global Agricultural Information Network

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Guatemala

Grain and Feed Annual

Corn

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Report Highlights:

According to new data and a recent crop assessment tour, Guatemala's corn production is steadily dropping. This is mainly due to depressed prices, increased production costs, contraband and increased competition for land from other more profitable crops. In addition, Guatemala has experienced drier growing conditions in the past few years that have negatively affected corn yields. The Ministry of Agriculture and Livestock (MAGA) has officially declared a drought for much of the corn growing area for 2018/2019, making producers eligible for government relief.

Commodities:

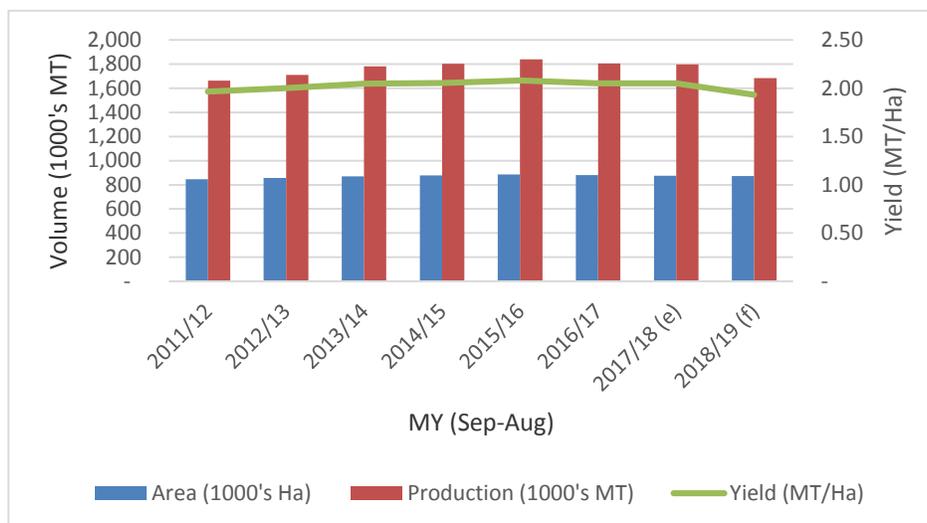
Corn

Production:

Per USDA's official numbers, corn production area and production have remained relatively stagnant over the past 10 years. These numbers, however, were based on official MAGA numbers that Post believes overestimate actual statistics. MAGA simply applies a growth factor to show an increase or decrease in production based upon anecdotal evidence. In a recent field evaluation conducted by FAS/Washington, significant reductions in both area planted and overall production across the country were observed. Reasons for the downward trend included: 1) depressed corn prices since 2012; 2) land use diversification; 3) contraband corn from Mexico, and; 4) regular dry periods during the peak of the growing season.

In Graph 1 below, during the period 2011/2012 – 2018/2019, area harvested was relatively stable increasing annually, on average, by 1.1 percent resulting in an average production increase of 2.5 percent over the same period. The slight increase in production can also be attributed to a 1.4 percent increase in average yields during those same years. In 2016/2017 however, the trend began to shift downward and Post expects the trend to continue this year and into 2018/2019 for both area harvested and production. Post revises 2016/2017 area planted down to 880,000 hectares and in 2017/2018 to 876,000 hectares and 872,000 hectares in 2018/2019, a figure similar to area planted in 2011/2012. Average national yields have remained constant at roughly 2.0 MT/Ha, with a drop estimate to 1.9 MT/Ha for 2018/2019, due to extended dry weather during July-August 2018, which MAGA officially declared a drought.

Graph 1
Guatemala Historical Corn Production (2011/2012 – 2017/2018e)



Source: MAGA, AgroCifras 2016, Guatemala's Situational Report for White Corn, 2017, FAO's situational report on 2018 dry spell, and USDA's own estimates from the field

Corn occupies 40 percent of total agricultural land-use in Guatemala. Corn is produced under commercial and non-commercial systems. Commercial areas represent roughly 42 percent of total corn production area. Yields vary from 4.5 MT/Ha up to 7.6 MT/Ha, under the most optimal production conditions. Commercial areas (lower than 1,000 meters above sea level) are more suitable for planting hybrid seed. Most of the commercial production is in the Northeast department of Peten, part of the Southern Coast, and in the Eastern part of Guatemala bordering Honduras.

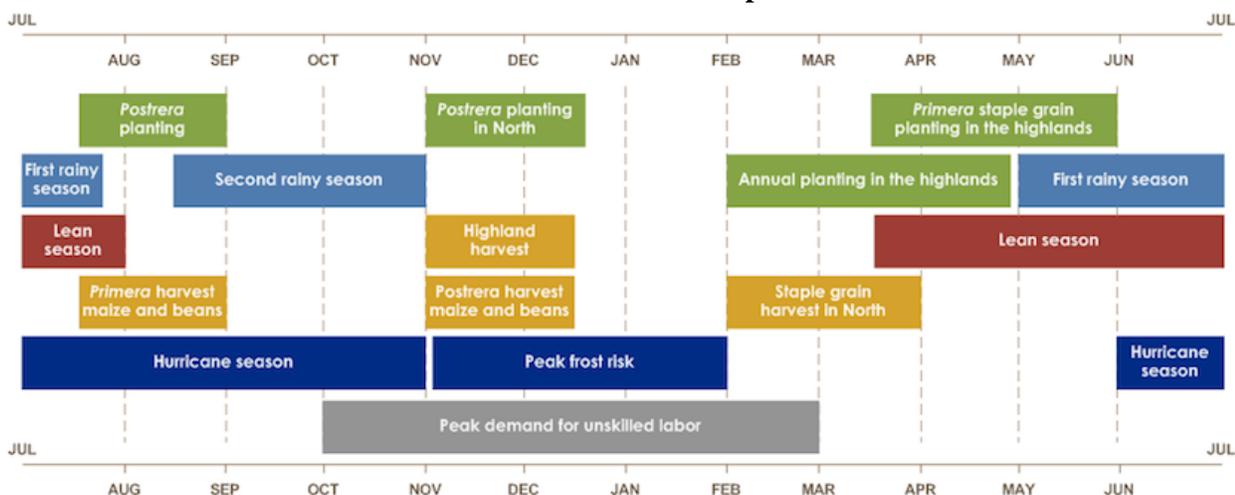
Land size in commercial production areas may vary from two to 140 hectares per farmer, as bigger production operations continue shifting to other crops. A total of 510,000 hectares are devoted to commercial corn production. Commercial areas may produce up to three harvests a year, but the majority of farmers plan for two harvests. Due to increasing input costs, farmers will sacrifice yields and final production by applying two fertilizations in the commercial areas, instead of the three required by the crop.

Non-commercial corn occupies 58 percent of total planted area of corn. Subsistence farming produces the majority of non-commercial corn and is located largely in the Western Highlands. Corn production in the highlands, higher than 1,000 meters above sea level use local corn varieties. On average these varieties produce yields of 1.1 MT/Ha. Fertilizing practices in the highlands are poor to non-existent, which combined with delayed improvements in genetics, and steep production terrain, have attributed to consistently low yields. Local seed varieties have the potential to produce higher yields comparable to hybrids, but require precise cob selection and a strong fertilizer program, which is not the general practice. Land parcels in the highlands average between 0.02 to 0.05 hectares, of which 80 percent are owned and 20 percent are rented. The production cycle runs from May to December and may extend into January, taking as long as 10 months from planting to harvest.

Figure 1 shows planting and harvest seasons. Commercial production has two production cycles per year. The first or “primera” harvest occurs between late July and the end of September. Depending on the rainy season pattern, farmers may plant as early as the end of April or as late as June. The second or “postrera” goes from August to December in the South and Eastern areas of Guatemala, and from November to April in the Northern areas. Most of the planting in the highlands takes place between April and June, after the frosts disappear, and the harvest is concentrated from November to early January. Since the biggest national harvest starts between August and September, Post recommends September to August for corn marketing year.

Figure 1

Graphic representation of the planting and harvest seasons for corn production in Guatemala, associated with climatic seasonal patterns



Interpretation: Green: Planting; Blue: Rainy season; Red: Lean season; Orange: Harvest; Deep Blue: Weather risks; Gray: Labor demand for agriculture

Source: FewNet, 2018, <http://fewnet.net/central-america-and-caribbean/guatemala>

Commercial corn production systems vary by region. In the North, planting and harvesting are mechanized. In the East and South, manual harvests are common. Some areas use sprinkler irrigation systems. On subsistence farms, production is manual, and depends entirely on rain to determine planting and harvesting. Crop rotation in the commercial corn producing areas is not common. However, it is a common practice in the highlands to double crop corn with black beans, squash, and other crops. In commercial areas, where there is an opportunity to plant a third crop, when economic factors warrant, small and medium farmers plant beans with corn. This technique extends the three-month corn production cycle to six months. The beans climb around the corn stalk; while the corn dries, (the stalk is folded downward to avoid excess moisture). The bean crop, under this system, becomes a cash crop and represents profit depending on relative prices.

Guatemala produces 85 percent of the white corn it consumes, but only 15 percent of the yellow corn. In total corn, around 50% is locally produced and the rest is imported. Since 2015/2016, harvested area has fallen steadily leading to decreases in corn production over the same period. In addition, Post-revised production numbers in 2018/2019 will be lower than 2017/2018 mainly due to crop loss brought on by drought conditions in July and August 2018¹. The September-November harvest will be negatively affected from the drought, and it accounts for roughly 52 percent of the total annual harvest. Corn losses vary by region, but range from 20 percent up to 90 percent in some areas.

¹ USDA References:

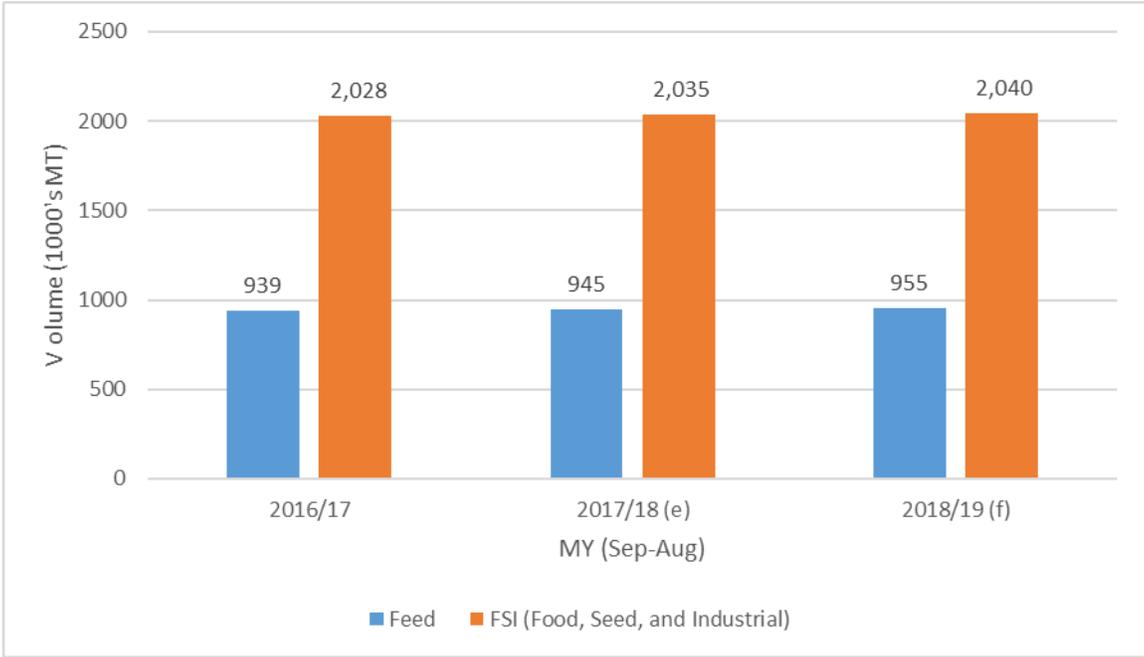
- IPAD – <https://ipad.fas.usda.gov/>
- Crop Explorer v1.0 – <https://ipad.fas.usda.gov/cropexplorer1.0/Default.aspx>
- Crop Explorer v2.0 – <https://ipad.fas.usda.gov/cropexplorer/Default.aspx>
- NASA GIMMS – <https://glam1.gsfc.nasa.gov/>
- NASA GIMMS (user's guide) – <https://glam1.gsfc.nasa.gov/doc/details.html#About>
- GADAS – <https://geo.fas.usda.gov/GADAS/index.html>

In 2017/2018 Post estimates that corn production will fall six percent compared to the previous year to approximately 1,796,000 MT.

Consumption:

Graph 2 shows Guatemala’s corn consumption. Feed for 2018/2019 represents roughly 32 percent of total corn consumption, compared to FSI (Food, Seed, and Industrial), which represents the remaining 68 percent. Post revised consumption estimates. For 2018/2019, corn used for feed consumption is forecast at 955,000 MT, a slight increase from 2017/2018 estimate of 945,000 MT. FSI, similarly, is forecast at over 2.0 million MT for 2018/2019, virtually unchanged from the 2017/2018 estimate. Overall, revision of Post numbers correspond to reductions in feed numbers, accompanied by corresponding increases and adjustments for FSI.

Graph 2
Guatemala Corn Consumption (2016/2017-2018/2019)



Source: MAGA’s Situational Report for White Corn, 2017, MAGA’s Supply and Utilization Balance Sheet for 2016/2017, and Post own estimates

Food, Seed, and Industrial (FSI) Consumption

Per capita corn consumption is estimated at 173 kilograms, mostly consumed in the form of white corn tortillas. All corn dough is produced from native corn genetics, which correspond to local white,

yellow, red, and black corn varieties. In urban areas, corn flour is mainly produced from white corn, sourced from white corn hybrids imported from Mexico and the United States. Only 10 percent of hybrid corn is locally sourced. Corn dough or corn flour for tortillas undergoes a process called “nixtamalization,” which consists of soaking corn kernels in lime, a technique used by the Mayans to help break down the kernel for grinding and provides added calcium to the resulting dough or flour. By law (Presidential Decree 298-2015)² it is mandatory that corn flour in Guatemala be fortified with Vitamin B Complex (B1, B2, B3, B9, B12), iron, and zinc.

At least 95 percent of white corn consumption in Guatemala is in the form of tortillas. The other 5 percent is consumed fresh and in processed foods. In addition to corn flour, white corn is used to produce whole cereals and corn-soy blends, mostly consumed as porridge. Industrial corn flour production accounts for 50,000 MT of white corn use. The local industry has a milling capacity of 3,000-3,500 MT per month, and a storage capacity of 37,000 MT.

Due to a lack of both production and post-harvest technologies, much of the corn is highly contaminated with both aflatoxins and fumonisins. These toxins are, on average, 10 times more prevalent in Guatemalan corn compared to the rest of the world according to many studies³. Both aflatoxins and mycotoxins represent serious health concerns, and are especially harmful to children under five years old.

Guatemala produces seed corn. Seed corn for non-commercial production is obtained directly from the previous harvest. Without precise selection of the harvested seed, the productivity and quality of the next harvest can be seriously compromised. The National Institute for Science and Technology in Agriculture (ICTA) from the Ministry of Agriculture and Livestock (MAGA) devotes some time and effort to improving hybrid corn and local varieties, mostly suited, however, for lowland corn production. The Ministry of Agriculture assigns roughly \$4 million on an annual basis to ICTA to develop new hybrids and varieties for the main staples (corn, beans, and potatoes). Less than 1,000 MT of hybrid seed is imported, mainly sourced from Mexico, Brazil, and the United States. Imports of corn seed have significantly dropped since 2014/2015, as many commercial farmers continue to shift to other more profitable crops, such as fruits.

Corn in Guatemala has no other industrial use, aside for food and feed. Ethanol production in Guatemala is made from sugar cane, as it is a more efficient bioenergy raw material compared to corn.

Feed and Residual Consumption

As shown in Graph 2, feed accounts for roughly 32 percent of total corn consumption in Guatemala. The feed industry in Guatemala has storage capacity for 92,000 MT of yellow corn. Yellow corn is

² <http://incap.int/index.php/es/noticias/1171-guatemala-cuenta-con-acuerdo-gubernativo-sobre-la-fortificacion-con-micronutrientes-de-la-harina-de-maiz-nixtamalizado>

³ <https://academic.oup.com/jn/article/137/12/2723/4750747>, <https://academic.oup.com/jn/article/134/4/711/4757175>, <https://www.wageningenacademic.com/doi/abs/10.3920/WMJ2014.1736>, https://www.researchgate.net/publication/255717409_Fumonisin_biomarkers_in_maize_eaters_and_implications_for_human_disease, <https://www.ncbi.nlm.nih.gov/pubmed/24375966>, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3820424/>, <https://www.ncbi.nlm.nih.gov/pubmed/26264677>

combined with soybean meal for pork and poultry feed. Formula proportions of corn and soybean meal vary depending on commodity prices. Currently the feed industry is not using significant volumes of corn gluten meal and distiller's dried grains with solubles (DDGS). The Guatemalan feed industry is highly sophisticated and supports one of the largest poultry industries in Central America. Guatemala's poultry industry has one of the best feed conversion ratios in poultry meat production. Poultry consumption accounts for 65 percent of meat protein consumption in Guatemala. Annual per capita consumption for 2017 was 162 eggs and 17.7 kg of chicken according to local industry.

Domestic Consumption

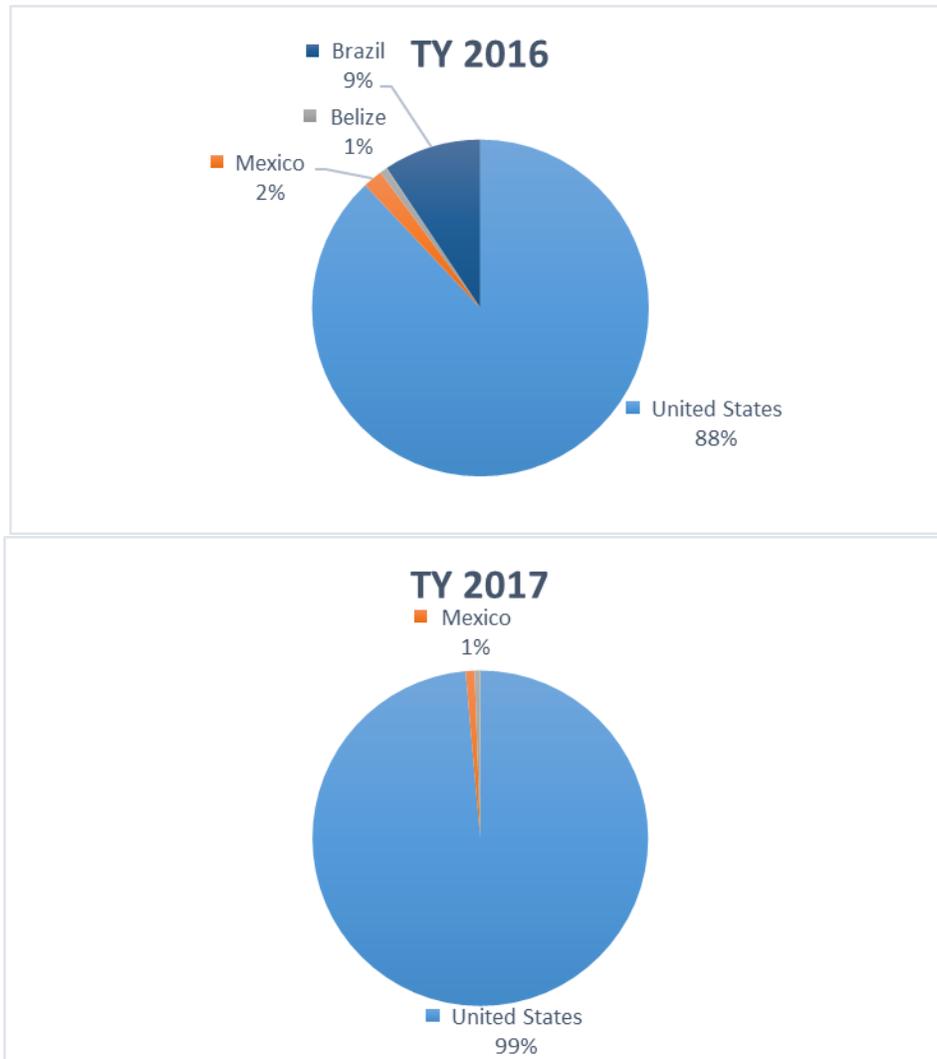
Consumption for corn is likely to be larger than post's estimate, given that significant amounts of Mexican corn enters into Guatemala year-round. Mexico's weak peso has resulted in increased contraband to Guatemala, including corn, corn flour, and other food products such as poultry meat and pork. The Government of Guatemala, in response to the private sector's constant complaints, has established the Commission against Contraband (CC). At least 30 percent of some food products consumed in Guatemala are estimated to come from contraband. White corn contraband from Mexico is distinguishable by its packaging in transparent plastic bags. Throughout the field trips in July, producers complained that contraband corn from Mexico undercuts prices for domestic corn and threatens local production.

Trade:

Imports and Exports

Guatemala imports 50 percent of its total corn consumption. Trade year (TY) data is reported on an October-September basis. As shown in the Production, Supply, and Distribution (PS&D) Table at the end of the report, imports for 2016/2017 were revised up seven percent from the previous estimate. Graph 3 shows Guatemala's corn imports for 2015/2016 and 2016/2017. Guatemala imported corn from the United States (88%), Brazil (9%), Mexico (2%), and Belize (1%) in 2015/2016. The United States increased its share up to 99 percent in 2016/2017, with the rest supplied by Mexico.

Graph 3
Guatemala Corn Imports for TY2016 and TY2017



Source: World Trade Atlas, 2018

Looking closer at U.S. corn exports to Guatemala by type of corn, Table 1 shows how U.S. white and yellow corn exports are divided.

Table 1
U.S. Exports of White and Yellow Corn to Guatemala
2014/2015-2016/2017

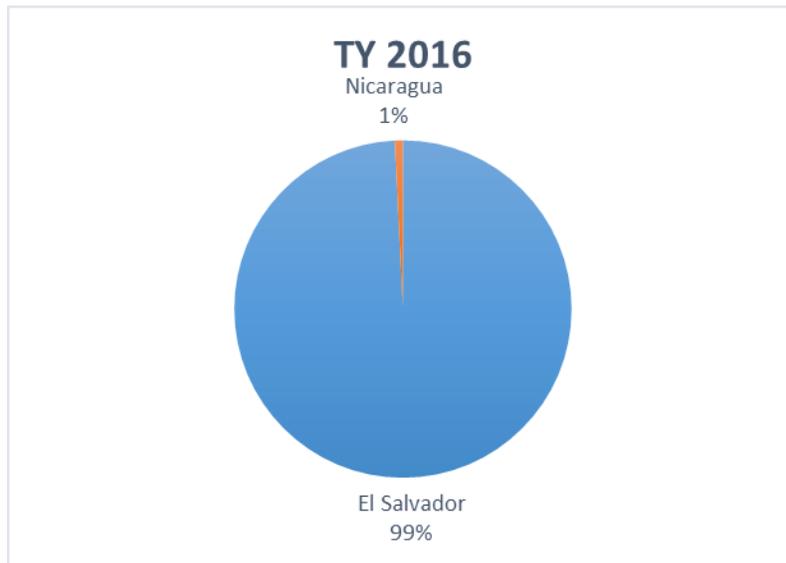
Year	TY Exports (1000's MT)					
	2014/2015	%	2015/2016	%	2016/2017	%
White Corn	45.978	5	29.586	3	37.423	4
Yellow Corn	878.830	95	938.750	97	978.024	96
Total	924.808	100	968.336	100	1,015.447	100

Source: U.S. Census Trade Data

U.S. exports of yellow corn increased on average 5 percent annually over the past three years, which is an indicator of growth in the feed industry,

Guatemala is a net corn importer, but does export approximately 3,000 MT of white corn to neighboring countries each year. Exports for 2015/2016-2016/2017 show slight changes in market share for El Salvador and Nicaragua, as shown in Graph 4. Guatemalan corn is relatively expensive, which will continue to limit Guatemala's ability to export significant quantities.

Graph 4
Guatemala Corn Exports for TY 2016-2017





Source: World Trade Atlas, 2018

Tariff Tables

The Government of Guatemala has formally protected white corn in commercial trade agreements. Table 2 shows the tariffs for white corn and yellow corn. Outside of any free trade agreement, or partial agreement, Guatemala imposes a 15 percent tariff for yellow corn and a 20 percent tariff for white corn. Countries benefiting most from increased access to Guatemala’s yellow corn import market are the United States, Mexico, other Central American countries, the Dominican Republic, and Belize. White corn can be traded duty free with the rest of the Central American countries and the Dominican Republic, while a tariff-rate-quota (TRQ) was established for the United States.

Table 2
Guatemala Import Tariffs for Corn, with and without Free Trade Agreements

HS Code	CHS (base)	CAFTA-DR (U.S.)	FTA Taiwan	FTA Mexico	FTA Central America and DR	FTA Colombia	FTA Chile	EU – Association Agreement	Panama	PA - Cuba	PA - Belize	PA - Ecuador
1005.90.20 Yellow corn	15%	0%	11.7%	0/15	0%	15%	15%	15%	18.7%*	15%	0/15	15%
1005.90.30 White corn	20%	0/20*	6.7%	20%	0%	20%	20%	20%	10.7%	20%	20%	20%

Note: CHS – Central American Harmonized System, CAFTA-DR – U.S., Dominican Republic and Central America Free Trade Agreement, FTA – Free Trade Agreement, PA – Partial Agreement, * means out-of-quota tariff

Source: Central American Import Tariffs, SAT, Guatemala

For the United States, the TRQ established for white corn increases annually by 400 MT into perpetuity, with a 25,200 MT quota for CY2018 and a 20% out-of-quota tariff, as shown in Table 3. The TRQ for yellow corn phased out completely at the end of 2014.

Table 3
Guatemala TRQs for white corn in CAFTA-DR (for the United States)

Product Description	2018 (MT)	2019 (MT)	2020 (MT)	2021 (MT)	2022 (MT)	2023 (MT)	2024 (MT)	2025 (MT)
White corn	25,200	25,600	26,000	26,400	26,800	27,200	27,600	28,000
	20%	20%	20%	20%	20%	20%	20%	20%

Source: Ministry of Agriculture, CAFTA-DR Phasing Out

Guatemala, in addition to the TRQ system for white corn established under CAFTA-DR, has opened a WTO quota for grains since 2012. Table 4 shows CAFTA-DR and World Trade Organization (WTO) quotas for 2012-2018, in terms of availability and use. The CAFTA-DR quota volume and use-rate during TY2012-2016 is shown in Graphs 5 and 6.

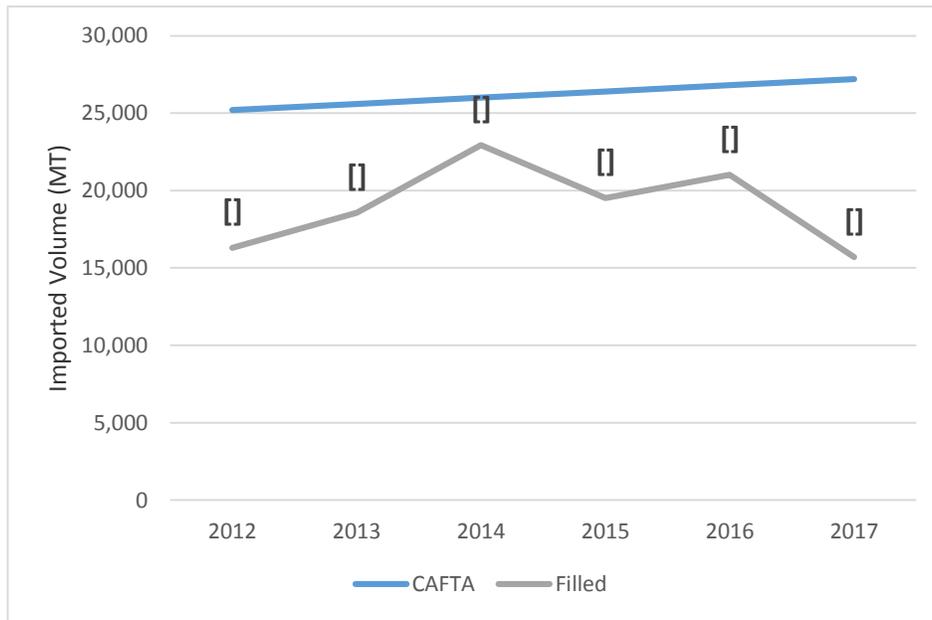
Table 4
Guatemala Quotas for white corn: CAFTA-DR and WTO

Year	2012 (MT)	2013 (MT)	2014 (MT)	2015 (MT)	2016 (MT)	2017 (MT)	2018 (MT)
CAFTA	25,200	25,600	26,000	26,400	26,800	27,200	27,600
Allowed for Imports	22,800	23,200	23,600	24,400	24,400	24,800	
Filled	16,300	18,560	22,943	19,520	21,020	15,696	
WTO	82,000	70,000	50,000	50,000	50,000	50,000	50,000
Filled	20,225	4,400	33,255	44,630	49,926	40,734	

Source: White Corn Situational Report, Ministry of Agriculture, 2017

Graph 5

Guatemala White Corn Imports (CY) under CAFTA-DR TRQ

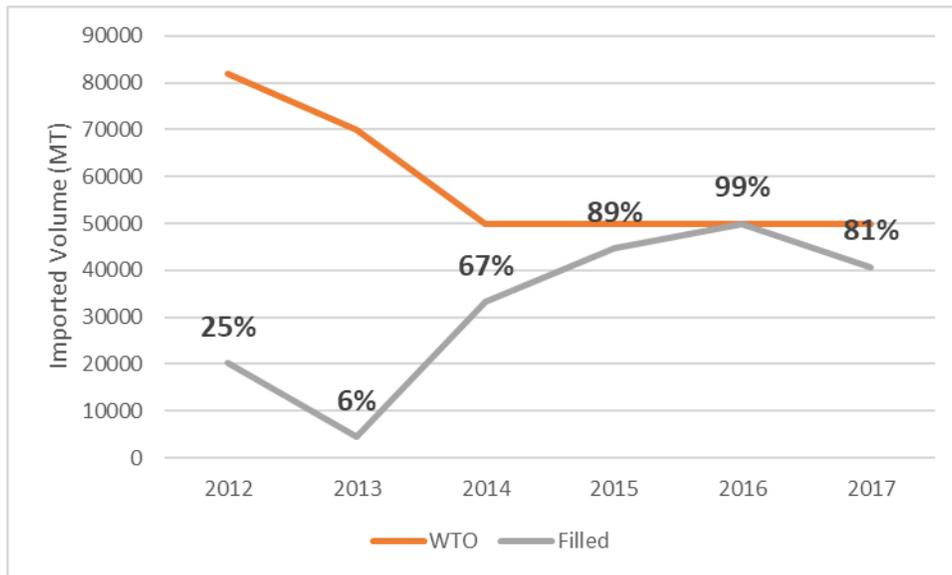


Source: Data from the Ministry of Economy, 2018

Parallel to the CAFTA-DR quota for white corn, there is also a WTO quota for white corn, which is twice as large. WTO quotas are opened as a safeguard for the food industry, to access white corn at the most convenient price. The United States is the main source for white corn imports in Guatemala, but it is occasionally sourced from Brazil or Argentina. The fill rate last year fell significantly representing 63 percent for the CAFTA-DR quota compared to 81 percent fill for the WTO quota, heavily sourced from Mexico.

Graph 6

Guatemala White Corn Imports (CY) under WTO



Source: Data from the Ministry of Economy, 2018

Stocks:

For MY2018/2019, stocks are forecast at 384,000 MT, slightly above the current official USDA forecast. While stocks may represent some food security inventory held by the government, this inventory is not significant. After INDECA sold 129,000 MT of storage, present capacity is approximately 70,000 MT. This storage is underutilized, as the government does not currently have a formal policy to purchase corn and hold it in strategic reserves for emergency use and/or to support prices. On-farm storage is significant, but difficult to measure. Farmers store the corn for their own personal consumption throughout the year. At least 250,000 MT of the stocks correspond to silos operated by the food and feed industry.

Policy:

The Guatemalan Ministry of Agriculture has no integrated policy to support corn production. ICTA invests around \$5 million annually in corn breeding mostly for the lowlands. MAGA also reports corn prices in the principal markets on a weekly basis. In addition, MAGA has an incipient agricultural extension service, which aims to provide technical assistance to farmers. MAGA implements the Peasant Economic Family Agricultural Program (PAFEC in Spanish), which intends to increase production capacity in the rural areas, but has no specific corn technology transfer program in place. There is a quasi-subsidy program in place, for vulnerable farmers, who may receive some agricultural tools and 100 Kg of fertilizer. MAGA has no program in place to support credits or insurance, nor storage or commercialization.

MAGA will actively participate in the 2017 approved School Feeding Law. The law mandates purchases of local production for the public schools, which will definitely support overall domestic agriculture, and corn as part of the daily diet.

Guatemala is in the process of adopting a new biotechnology regulation that will be harmonized with Honduras under the Customs Union Agreement. The agreement requires the standardization of sanitary and phytosanitary protocols, and to unify trade practices and regulations among the three Northern Triangle countries of Central America.

Marketing:

Guatemala lacks a sound agricultural market information system. The Institute of Statistics (INE) generates agricultural statistics by extrapolating outdated census and survey data and adjusting based on current conditions. The last agricultural census was conducted in 2003 and last agricultural survey was conducted in 2008. Agricultural statistics are monitored on a yearly basis by the Bank of Guatemala, which calculates the GDP based on surveys from agricultural associations and farmers. The Ministry of Agriculture and Livestock (MAGA) analyzes the information generated by INE and the Bank of Guatemala, but does not generate its own agricultural statistics.

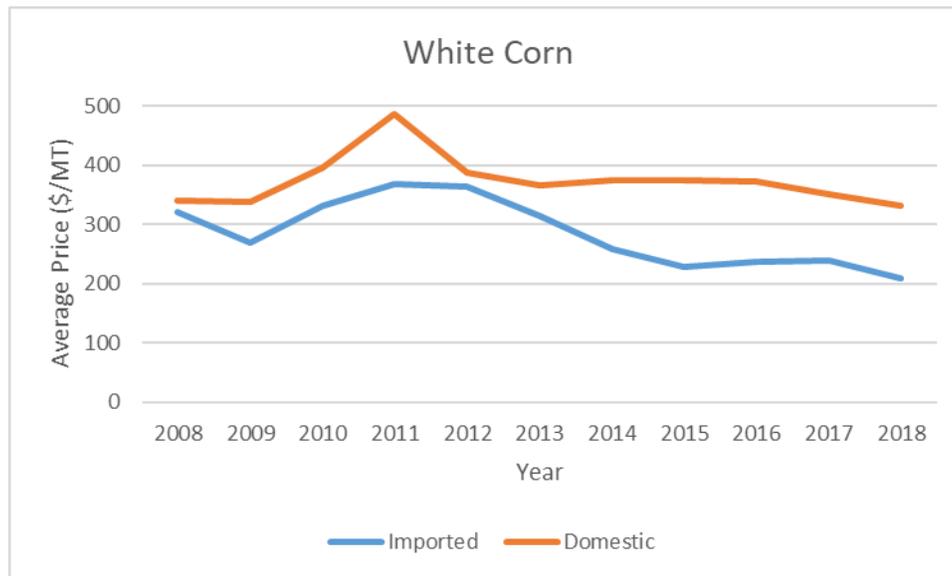
MAGA publishes market prices for the main markets in the country. USDA has supported MAGA and INE to standardize market information for price monitoring and publication. Although MAGA publishes weekly prices for agricultural products in the markets that are monitored, <http://web.maga.gob.gt/diplan/precios-agropecuarios/>, those prices are not readily available to farmers, who lack access to the internet. As a result, farmers rely exclusively on the intermediary, who sets prices at the farm, and there is no room for negotiation.

Guatemala has poor credit options for agricultural activities. The formal banking system has no reasonable options for agricultural credits, lacking a model for agricultural investments. Banrural, a public-private owned bank, has an Agricultural Credit line, but demands collateral that small farmers do not have. Agricultural trust funds exist, such as GuateInvierte and IFAD that provide credit lines, but access to those credits are cumbersome and bureaucratic. Agricultural insurance is available, but at a prohibitive cost for small corn producers.

Prices

Graph 7 compares white corn prices from 2008 to 2018, between imported and domestic product, at wholesale. The price gap between imported and national corn prices was narrower prior to 2012. As of 2014, the price gap has been widening with Guatemalan prices at least 30 percent above imported prices, see Table 5.

Graph 7
White Corn Wholesale Average Prices in Guatemala 2010-2018



Source: DIPLAN, MAGA, Historical Data, 2018

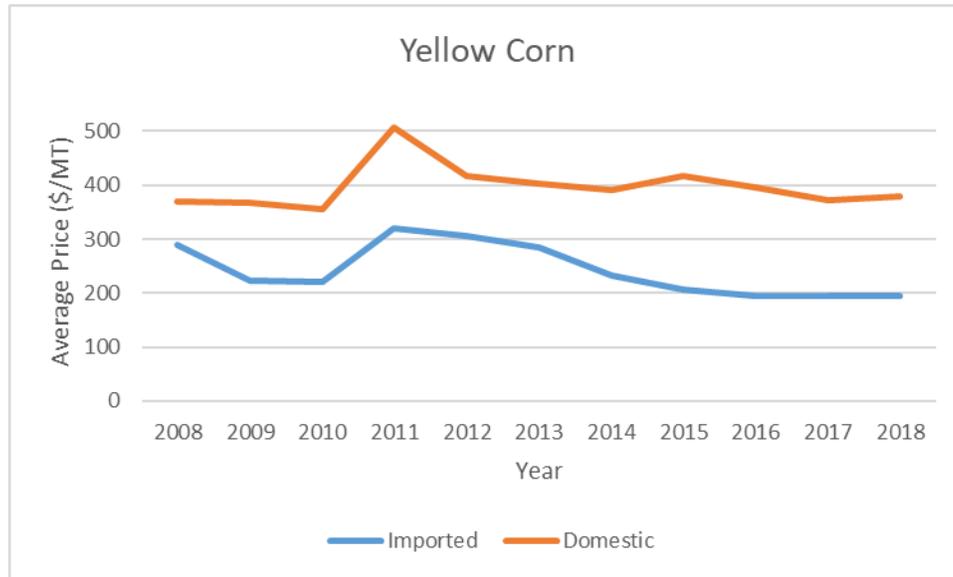
Table 5
Guatemala Historical Prices for White Corn
\$/MT

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Imported	321	270	332	369	363	315	258	228	237	239	210
Domestic	341	337	396	486	387	366	375	375	373	351	331
Difference	6%	20%	16%	24%	6%	14%	31%	39%	36%	32%	37%

Source: DIPLAN, MAGA, Historical Data, 2018

Graph 8 shows average prices for yellow corn in Guatemala since 2008. Yellow corn prices, mostly imported from the United States, have fallen annually since 2013, but at a slower rate than white corn. The gap between imported and national corn prices has been more consistent throughout the past 10 years, with a 50 percent price differential over the past four years, see Table 6. Guatemalan yellow corn production is minimal and yields are poor.

Graph 8
Yellow Corn Average Prices in Guatemala 2008-2018



Source: DIPLAN, MAGA, Historical Data, 2018

Table 6
Guatemala Historical Prices for Wholesale Yellow Corn

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Imported	290	223	222	319	306	285	233	206	196	195	195
Domestic	370	368	355	507	417	402	391	418	395	372	379
Difference	22%	39%	38%	37%	27%	29%	40%	51%	51%	48%	49%

Source: DIPLAN, MAGA, Historical Data, 2018

Overall, higher prices for locally produced corn in Guatemala is a result of low productivity and rising production costs. While increased contraband has contributed to lower corn prices, it is not the only factor hurting small corn producers. No access to the latest agricultural production technologies, the lack of affordable credit, and rising input costs have placed Guatemalan corn producers at a comparative disadvantage. MAGA is looking to make some fundamental changes in its policy to support increasing commercial productivity in agriculture, including corn. However, the changes have been slow to materialize and the government is running out of time. New Presidential elections are scheduled for June 2019.

Production, Supply and Demand Data Statistics:

Corn Market Begin Year Guatemala	2016/2017		2017/2018		2018/2019	
	Sep 2016		Sep 2017		Sep 2018	
	USDA Official	New Post	USDA Official	New Post	USDA Official	New Post
Area Harvested	882	880	880	876	880	872
Beginning Stocks	451	451	472	361	467	374
Production	1899	1804	1900	1796	1900	1683
MY Imports	996	1077	1000	1200	1000	1325
TY Imports	951	1029	1000	1150	1000	1250
TY Imp. from U.S.	927	1008	0	1050	0	1075
Total Supply	3346	3332	3372	3357	3367	3382
MY Exports	4	4	5	3	5	3
TY Exports	3	3	5	3	5	3
Feed and Residual	1420	939	1450	945	1500	955
FSI Consumption	1450	2028	1450	2035	1500	2040
Total Consumption	2870	2967	2900	2980	3000	2995
Ending Stocks	472	361	467	374	362	384
Total Distribution	3346	3332	3372	3357	3367	3382
Yield	2.1531	2.05	2.1591	2.0502	2.1591	1.93

(1000 HA) ,(1000 MT) ,(MT/HA)