



Whitepaper  
**Modernizing Maize —  
Mexico's staple grain**

# Modernizing Maize

## How technology is enhancing Mexico's staple grain

**Maize matters in Mexico. The region that first farmed the versatile grain is still the world's largest per-capita consumer. Now the country's milling industry is innovating in response to shifts in consumer tastes and market dynamics.**

Maize is an exceptionally versatile and productive cereal. It is a staple food for people and livestock around the world, and an increasingly important source of fuel for transportation and feedstock for industrial processes. It's also the basic ingredient in a long list of tasty snacks, from breakfast cereals to tortilla chips. It is perhaps no surprise, then, that annual maize production - around 1.14 billion tons - exceeds that of rice and wheat. Maize is now grown on around one in three of the world's farms, and the amount of land devoted to its production has doubled since the mid-20th century, with half of this increase occurring in the last 25 years. If these trends continue, maize will be the world's most widely grown crop by the end of this decade. Yields have also increased rapidly. At the turn of the 21st century, farmers produced an average of 3.9 tons of dry maize per hectare. By the early 2020s, average yields had reached 5.8 tons per hectare, with the crop improving in productivity at about twice the rate of rice or wheat.

### Maize in Mexico

Maize has become a globally important cereal in the last century, but it has played a central role in Mexico's diet, culture and economy for around 9,000 years. Scientists believe that modern maize is derived from teosinte, a wild grass that was first domesticated in southern Mexico. The plant became a staple food for people throughout the Americas and was exported to other continents after the arrival of European traders and colonists in the 15th and 16th centuries.



Mexicans lead the world in converting maize into food, consuming approximately 123 kg of maize per person each year.

Today, maize remains the most important staple crop in Mexico, providing about 30 per cent of the protein and 40 per cent of the calories in the national diet. It is estimated that the average Mexican consumes about 123 kg of maize products per year. The primary end use of the world's maize crop is as an input for other industries. Only 17 per cent of production is destined for human consumption, with the majority used as animal feed (61 per cent) or as a feedstock to produce fuels and materials (22 per cent). The Mexican maize market is unique due to the crop's central importance in the national diet. Around 40 per cent of the maize grown in or imported into Mexico is for human consumption. The country meets about 60 per cent of its maize needs through local production, with farmers growing a combination of traditional local varieties and modern hybrids. Maize has been the subject of considerable political controversy in the country for decades, as policymakers seek to balance the competing demands of food security, economic growth and support for the country's smallholder farmers. This debate has led to policy interventions with the potential to significantly affect market dynamics, such as the introduction of tariffs on imported white maize and a proposed ban on genetically modified varieties. In the coming years, pressure on maize availability within Mexico is likely to increase due to a combination of factors. These include the potential for further tariffs and restrictions on imports, and increased demand from food and beverage companies with operations in Mexico that export to US customers. The effects of climate change are also expected to have a negative impact on domestic yields.



Soft maize tortillas and tortilla chips are two staples in Mexican cuisine, reflecting the country's culinary traditions for maize-based products.

## Challenges for millers

For millers in Mexico, the dynamics of the maize market present ongoing challenges. They operate in a highly competitive, price-sensitive market. They are exposed to significant fluctuations in the price, quality and availability of inputs. And they produce for customers who are perhaps the most demanding consumers of maize products in the world. As a leading global supplier of plant and process technologies, Bühler offers a comprehensive range of solutions for maize processing. Our offerings cover the entire value chain for all types of maize products, including cleaning, degermination, dry milling, flaking and steaming. We are constantly improving and upgrading these solutions, applying innovations developed throughout the Group to meet the needs of the modern maize sector.

## Maize innovation

Bühler Sortex optical sorters, for example, use advanced vision technology to detect and remove a wide range of defects, including discolored, broken, split grains and foreign material. We offer integrated process solutions for effective mycotoxin reduction, SORTEX A LumoVision can identify and separate grains with Aspergillus mold signatures faster and more accurately than ever, using a specially designed lighting and camera system. These moulds, which produce dangerous aflatoxins, have traditionally been extremely difficult to detect in maize processing because they closely resemble the color of the uncontaminated grain. Once a contaminated kernel has been identified, air nozzles blow it out of the product stream. LumoVision reduces yield loss to less than 5 percent and was described by Forbes as a 'remarkable new technology'.



Our SORTEX LumoVision is an advanced optical sorting machine to detect and reduce mycotoxin-infected grains, ensuring food safety and product quality.

Degermination is another key challenge for maize millers, especially when working with modern high-yielding hybrid varieties. These plants have soft kernels, making efficient separation of germ and endosperm more challenging in conventional processes. Originally developed for the efficient processing of beans, peas, lentils and chickpeas, Bühler's Pulsroll huller is now being adopted in maize processes as a gentler and more precisely controllable alternative to conventional degermination equipment. With easy adjustment of the grinding gap, adjustable machine inclination, and pressure control within the hulling chamber, Pulsroll offers high hulling efficiency and less breakage, resulting in optimal operation and higher in-process yields. And Pulsroll isn't just gentle on grains, it's easy on power consumption too. Tests have shown that the system uses around 40 percent less energy per ton of grain processed than conventional degermination machines. The process can additionally be equipped with inline near-infrared (NIR) sensors that enable real time measurement for further yield improvements and optimum product quality.



The Pulsroll offers high degermination efficiency and less breakage for increased yield.

Resource efficiency is a key theme for Bühler's innovative solutions, used to produce pre-cooked maize flours for tortillas and nacho chips. Our patented Prime Masa Nixtamal process replaces traditional grain cooking with an advanced steam process that increases the nutritional value of the product, allows millers to produce tortilla flour with up to 84 percent less water, and virtually eliminates wastewater (Nejayote) production. The production process also cuts energy use by half and provides a useful yield increase, while maintaining the flavor, texture and mouthfeel of the conventional product. With the sale of our fourth Prime Masa plant, we are excited to mark this significant milestone in our ongoing growth and dedication to innovation.

## Arepa

Arepa flour is another pre-cooked maize product that is growing rapidly in popularity around the world. Used to make the flatbreads that are a staple food in Venezuela and Colombia, arepa flour requires a special process to achieve the required degree of gelatinization in the finished product. Bühler has developed a complete arepa production solution designed to offer high levels of productivity, quality and consistency.

Mexico gave maize to the globe, and it has since become one of the world's most important agricultural products. For millers, working with the golden grain has always required a balance: respecting thousands of years of culinary tradition while responding to the changing needs of customers and global food markets. Bühler's maize processing solutions are designed to help them achieve that balance, offering consistent, high quality product while continually improving operational efficiency, productivity and flexibility.

Find out more about our complete-process-solutions and customer testimonials by scanning this QR-code.



Filled Arepas, a traditional staple originated from Venezuela and Colombia, are a daily favorite among locals and are growing in popularity worldwide.

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