

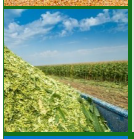


understanding agriculture worldwide

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Crop Portrait CORN

by

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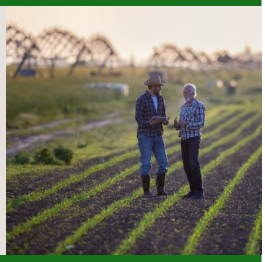


Corn Production Systems

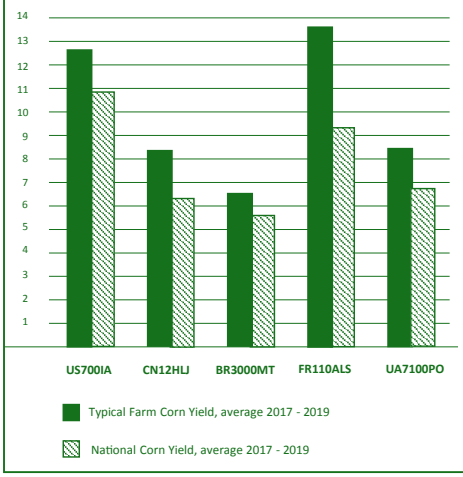
One product – many ways to produce around the world

Top 5 Countries Corn Production
(average 2018 – 2020, metric tons)

- USA 356 Million
- China 260 Million
- Brazil 104 Million
- EU 65 Million
- Argentina 50 Million

❶ US	❷ CHINA	❸ BRAZIL	❹ FRANCE	❺ UKRAINE
Typical Farm US700IA	**Typical Farm** CN12HLJ	**Typical Farm** BR3000MT	**Typical Farm** FR110ALS	**Typical Farm** UA7100PO
Specific location North Central Iowa	**Specific location** Heilongjiang Province	**Specific location** Mato Grosso	**Specific location** Alsace	**Specific location** Poltava region
Corn Acreage 364 hectares (50% of total acr.)	**Corn Acreage** 8 hectares (66% of total acr.)	**Corn Acreage** 1.620 hectares (49% of total acr.)	**Corn Acreage** 75 hectares (71% of total acr.)	**Corn Acreage** 2.034 hectares (29% of total acr.)
Tillage conservation tillage (mulch-seeding)	**Tillage** intensive tillage (plough)	**Tillage** no-tillage (direct seeding)	**Tillage** intensive tillage (plough)	**Tillage** conservation tillage (mulch seeding)

Typical Farm Corn Yield (metric ton per hectare)



Corn – Facts and Figures

Corn – physiology and agronomy

Most crops are C3 plants; the first carbon compound produced during photosynthesis contains three carbon atoms.

In environments with higher temperatures and stronger radiation, some plants developed the so-called C4 photosynthesis. Unique leaf anatomy and biochemistry enable C4 plants to produce a four-carbon compound. This feature makes them more efficient in the production of organic matter. C4 plants can't cope with low temperatures and therefore must be planted when soil temperature is above 10°C.

Corn types white vs. yellow corn

Corn is either yellow or white; the difference - besides the color - is minor (beta carotene content). White corn is prevailing in Central America (incl. Mexico) and Africa and is used as a staple food for human consumption. Yellow corn is commonly found in North and Latin America, where it is used as a feedstock for animal feeding, biofuels or isoglucose (liquid sugar).

Genetically modified corn

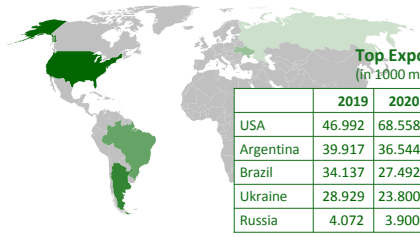
Many industrial and feedstock varieties of corn are genetically modified organisms (GMOs) engineered for resistance to the herbicide glyphosate or to produce proteins from Bacillus thuringiensis (Bt) to control insect pests.

In addition, some strains have been genetically engineered for greater drought tolerance and to increase their nutritional value. In the US, more than 90% of corn is GMO; in Brazil the share is above 80%.

In Europe, political resistance against GMO products remains high. Only four countries – Spain (130.000 ha), Portugal (7.000 ha), Slovakia (138 ha) and the Czech Republic (75 ha) grow GMO corn.

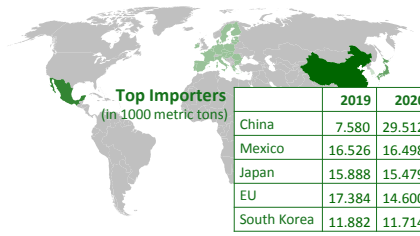
Corn as an energy crop

In 2020, more than 30% of US corn production went into ethanol. Corn also is a relevant source for ethanol in Brazil, where, in 2020, 8% of total Brazilian ethanol was derived from corn. In Germany, roughly 0.9 million ha (35% of total) corn are grown for biogas plants.



Top Exporters
(in 1000 metric tons)

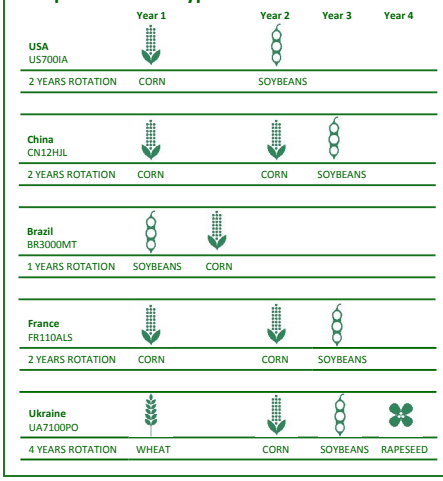
	2019	2020	2021
USA	46.992	68.558	63.000
Argentina	39.917	36.544	40.500
Brazil	34.137	27.492	29.000
Ukraine	28.929	23.800	31.500
Russia	4.072	3.900	4.500



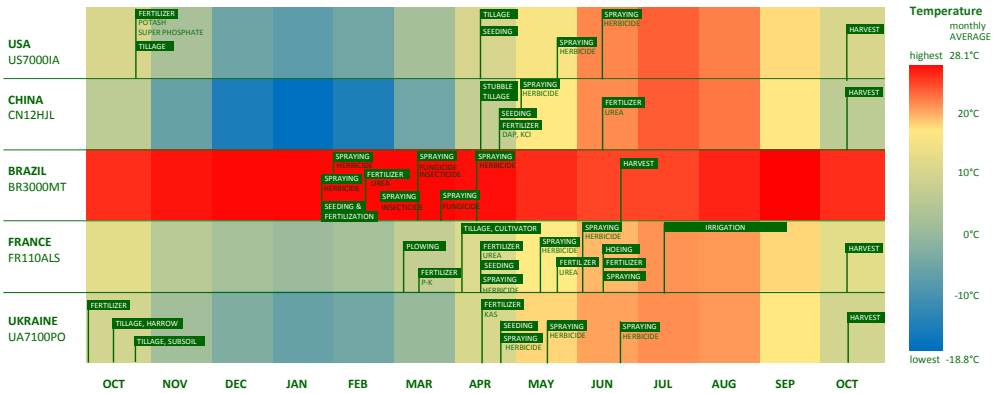
Top Importers
(in 1000 metric tons)

	2019	2020	2021
China	7.580	29.512	26.000
Mexico	16.526	16.498	17.000
Japan	15.888	15.479	15.600
EU	17.384	14.600	15.000
South Korea	11.882	11.714	11.500

Crop Rotation of Typical Farms

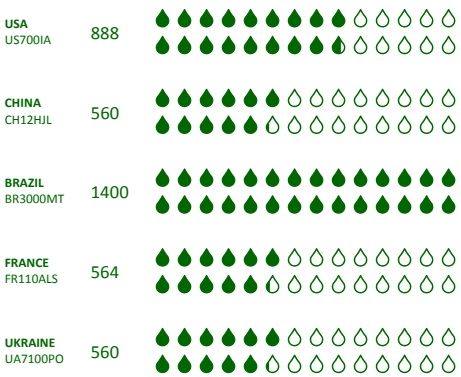


Crop Calendar

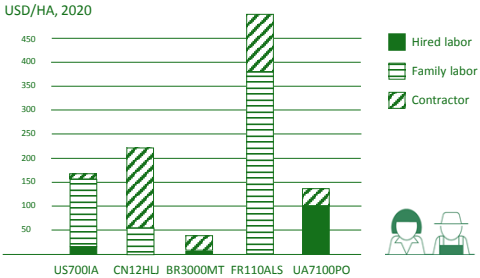


Annual Precipitation mm/year

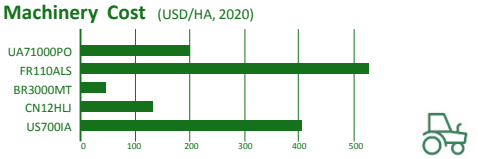
= 50 mm



Labor Cost
USD/HA, 2020



Machinery Cost (USD/HA, 2020)



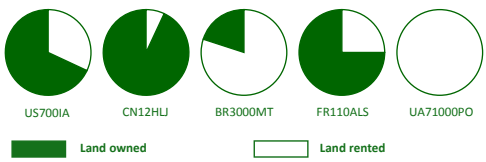
Land Prices and Rental Rates
USD/HA, 2020

	Purchase price	Rental rate
USA US700IA	23.440	617
China CN12HLJ	no land market	681
Brazil BR3000MT	9.765	84
France FR110ALS	12.575	198
Ukraine UA7100PO	1.350	205

Exchange Rates
2020

1 USD =	1 USD
1 USD =	6,9 CNY
1 USD =	5,2 BRL
1 USD =	0,9 EUR
1 USD =	27 UAH

Ownership Structure



Direct Costs USD/ha, 2020

USA US700IA	553
CHINA CN12HLJ	473
BRAZIL BR3000MT	297
FRANCE FR120ALS	595
UKRAINE UA7100PO	214