Global GM Crop Area Review

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Glossary of Terms	
Term	**Description**
% GM utilisation	Proportion of the overall crop area that GM represents
Agricultural year	July 1st – June 30th to capture both northern and southern hemisphere plantings
Alfalfa	Also known as lucerne. Species *Medicago sativa*
Brinjal	Also known as aubergine/eggplant. Species *Solanum melongena*
Canola	Variety of oilseed rape. Species *Brassica napus*
Cotton	Species *Gossypium hirsutum*
Cow Pea	Also known as black-eyed pea. Species *Vigna unguiculata*
Genetic event	Identifying code name given to a specific GM trait
GM adoption	Proportion of the overall crop area that GM represents
Hectare (Ha)	Unit of area equivalent to 10,000 m² (1 Ha = 2.471 acres)
Herbicide tolerance	Tolerance to specific herbicide active ingredients
Insect resistance	Resistance to specific insect pests
Maize	Also known as corn. Species *Zea mays*
Marketing Year	Period designated for reporting of production, marketing, and disposition of a commodity
Rice	Species *Oryza sativa*
Soybean	Species *Glycine max*
Stacked gene	Combination of herbicide tolerance and insect resistance traits
Sugarcane	Species *Saccharum officinarum*
Wheat	Species *Triticum aestivum*
Sugar Beet	Species *Beta vulgaris*

Key Data

Global GM Crop Area Historical

Year	GM Area (Ha m.)	% Change
2014	179.4	5.3
2015	176.8	-1.4
2016	180.2	1.9
2017	186.9	3.7
2018	186.9	0.0
2019	186.4	-0.2
2020	189.1	1.4
2021	196.2	3.8
2022	202.9	3.4
2023	205.8	1.4
2024	209.8	1.9

Global GM Crop Area by Crop 2024

Crop	GM Area (Ha m.)	% Change	% Share
Soybean	105.1	4.7	50.0
Maize	68.4	-2.5	32.5
Cotton	24.2	2.2	11.8
Canola	10.4	1.0	5.0
Alfalfa	1.1	-5.5	0.5
Sugar beet	0.5	-1.6	0.22
Sugarcane	0.1	8.3	0.03
Wheat	0.0	10.8	0.02
Brinjal	0.0	2.7	0.00
Rice	-	-100.0	0.00
Total	**209.8**	**1.9**	**100.0**

GM Crop Area by Leading Country 2024

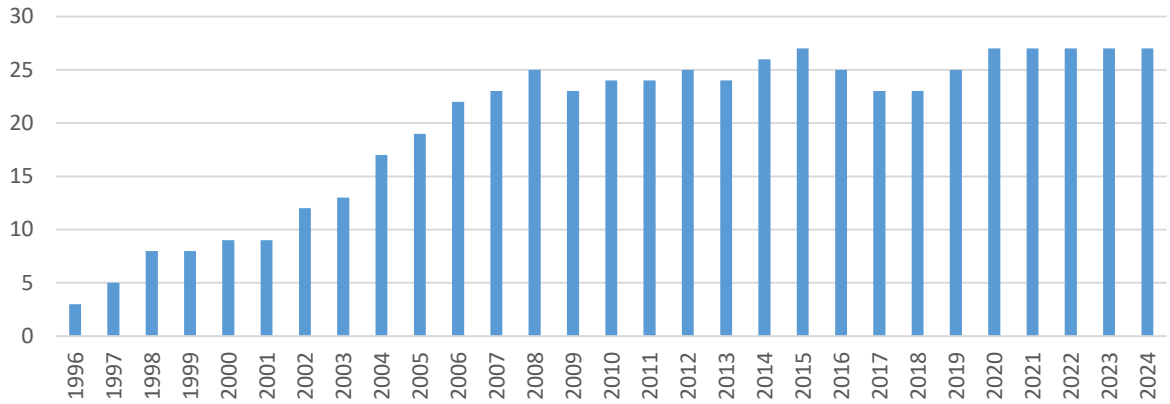
Rank	Country	GM Area (Ha m.)	% Change	% Share
1	USA	75.4	1.3	35.9
2	Brazil	67.9	1.4	32.4
3	Argentina	23.8	8.3	11.4
4	Canada	11.7	-0.4	5.6
5	India	11.2	-7.1	5.3
6	Paraguay	4.4	2.1	2.1
7	China	3.5	17.9	1.7
8	South Africa	3.5	-0.5	1.7
9	Pakistan	1.9	-16.7	0.9
10	Bolivia	1.8	1.4	0.9
Na	Others	4.8	22.5	2.3
	Total	**209.8**	**1.9**	**100.0**

GM Crop Area in 2024

In 2024, the global area under GM crops increased 1.9% over the previous year to reach 209.8 million hectares, a new record area. 28 countries cultivated a range of 10 different GM crops, with soybean the most widely planted at 105.1 million hectares. The number of GM crops being cultivated declined by one in 2024 as authorities in the Philippines revoked cultivation approval of Golden Rice. Following soybean, the most widely planted GM crops are maize at 68.4 million hectares, and cotton at 24.8 million hectares.

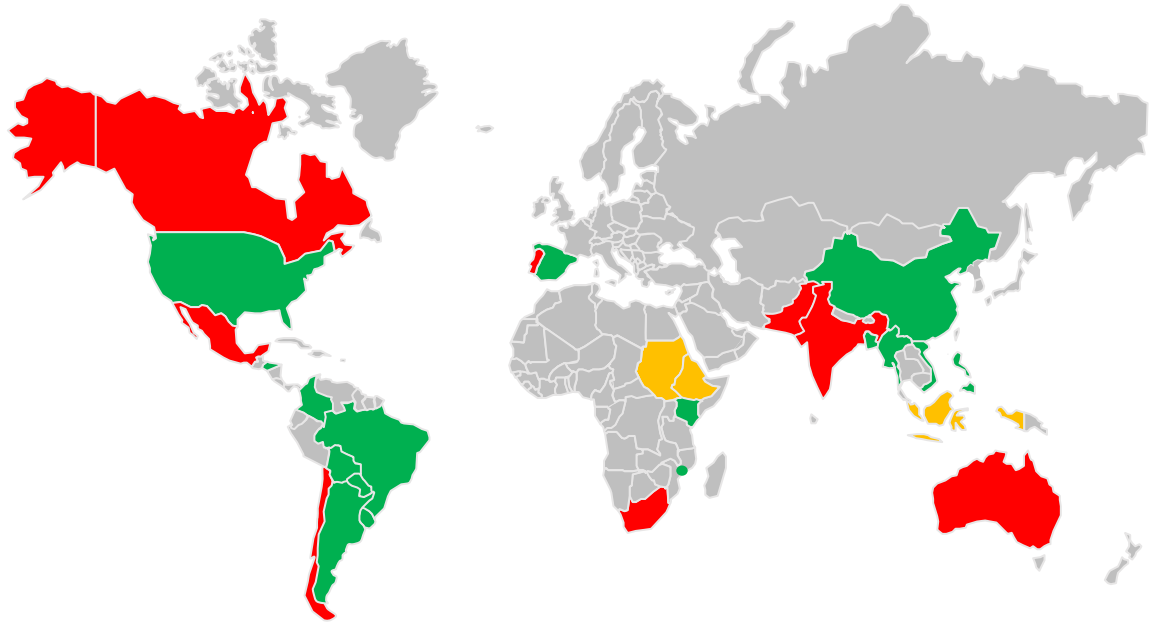
The number of countries cultivating GM crops has varied since the first introduction of GM varieties in 1996, due in part to several European countries ceasing the cultivation of GM maize, as well as the end of planting of GM cotton in Burkina Faso. 27 countries have cultivated GM crops since 2020, this number was also achieved in 2015.

Number of GM Crop Cultivating Countries by Year



The map below shows the area change in 2024, on a country level basis, compared to the previous year.

Changes in GM Crop Area 2024*



**Green = Growth, Yellow = Static, Red = Decline*

209.8 million Hectares (+1.9%)

The greatest changes in area, excluding countries cultivating less than 100,000 hectares, were seen in Vietnam (+93.2%), Uruguay (+49.8%), Spain (+40.3%), and Myanmar (+39.2), driven by a combination of greater overall planted areas and higher adoption rates. The largest declines in GM area were seen in Pakistan (-16.7%), India (-7.1%), South Africa (-0.5%), Canada (-0.4%) and Australia (-0.3%).

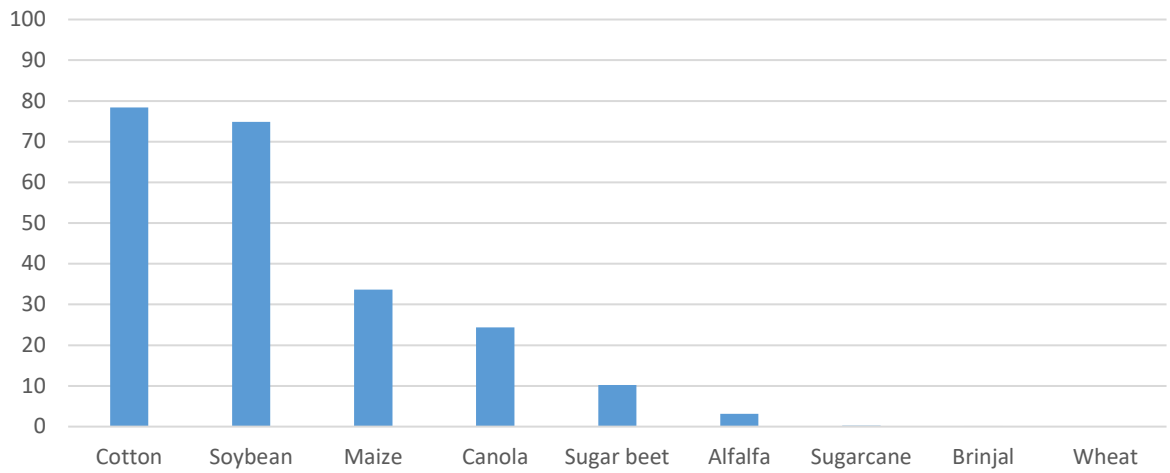
GM Adoption

The table and bar charts below show the rate of global adoption of each crop. Cotton contains the highest rate of GM % utilisation at 78.4% of the world's total cotton area, followed by soybean at 74.9%, maize at 33.7% and canola at 24.3%. Following this, the rate of global adoption falls away quickly.

Global Adoption of GM Crops

Crop	GM Area (Ha m.)	Total Area (Ha m.)	GM % Share
Cotton	24.2	30.9	78.4
Soybean	105.1	140.5	74.9
Maize	68.4	202.9	33.7
Canola	10.4	42.9	24.3
Sugar beet	0.5	4.5	10.3
Alfalfa	1.1	35.0	3.2
Sugarcane	0.06	27.0	0.23
Brinjal	0.003	1.9	0.15
Wheat	0.05	222.2	0.02
Total	**209.8**	**707.8**	**29.6**

Global Adoption of GM Crops (%)



North America

At the regional level, North America holds the 2nd largest GM crop area after Central and South America, with a total of 87.0 million hectares planted in 2024, a rise of 1.1% over 2023. Prior to 2019, North America was the leading region in terms of GM planted area, however, a combination of severe weather impacting planting in the US and Canada in 2019, and Brazil continually increasing its planted area, has resulted in North America losing its leading position. The USA is the largest GM crop area in North America, with a cultivated area 6.5 times the size of Canada's. In North America, maize is the most important GM crop, with the USA typically the world's leading exporter of harvested maize, although Brazil is now contesting that title.

North America GM Crop Area by Country 2024

Country	GM Area (Ha m.)	% Change	% Share
USA	75.4	1.3	86.6
Canada	11.7	-0.4	13.4
Total	**87.0**	**1.1**	**100.0**

USA

Area in 2024: 75.4 Ha m. (+1.3%)

GM Crops (year of introduction): Alfalfa (2011), Canola (1999), Cotton (1996), Maize (1996), Soybean (1996), Sugar beet (2005)

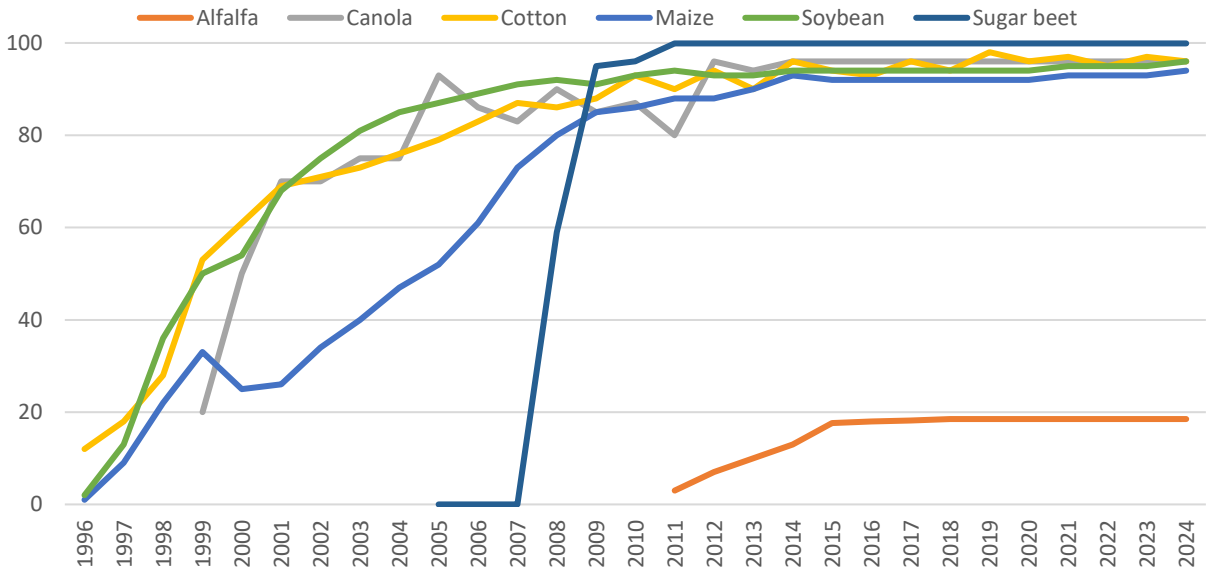
The US possesses the world's largest GM crop area, growing 1.3% in 2024, driven by strong increases in canola, cotton and soybean areas which offset smaller areas of the remaining crops.

USA GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Alfalfa	1.1	-6.7
Canola	1.0	13.2
Cotton	4.5	12.9
Maize	34.8	-2.5
Soybean	33.5	4.1
Sugar beet	0.4	-2.0
Total	**75.4**	**1.3**

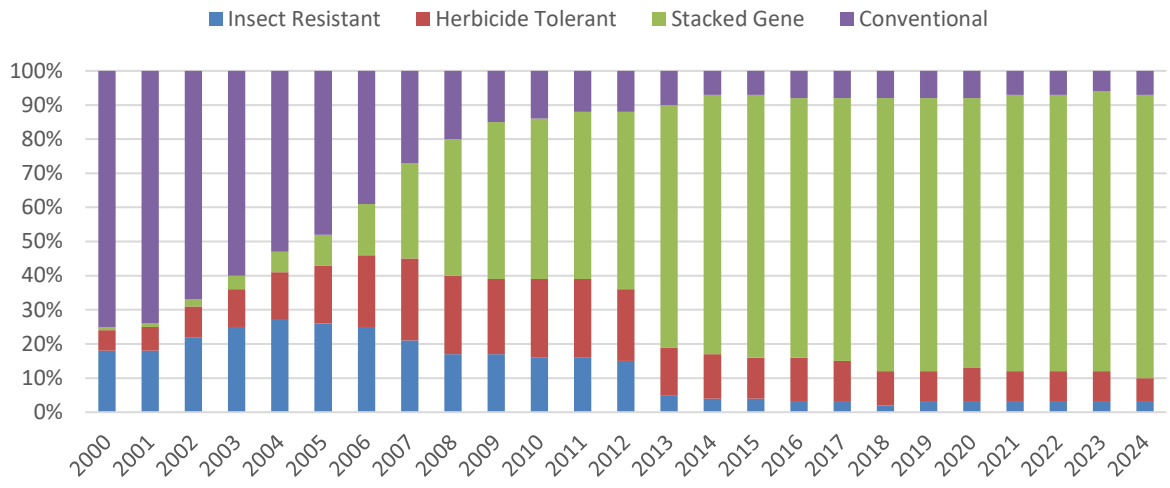
The rate of adoption of GM crop varieties is effectively mature in the USA, with all GM crops apart from alfalfa having greater than 90% adoption in 2024. As a result, US GM crop areas now generally track the changes in total planted areas (conventional + GM). The graph below shows the historical adoption rates of GM crops in the USA.

US GM Adoption by Crop (%)



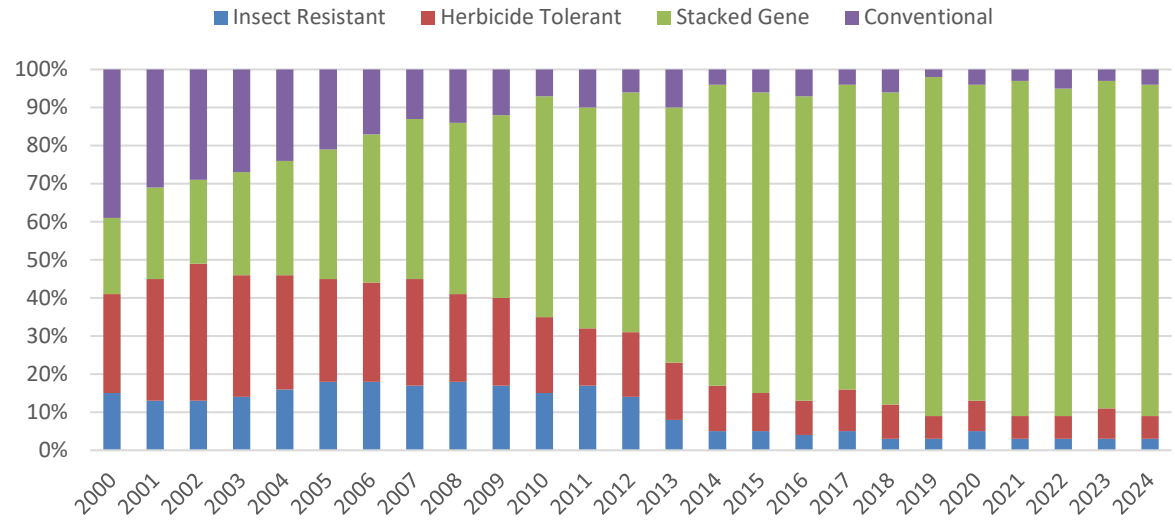
The USA possesses the largest GM maize area in the world at 34.8 million hectares in 2024, forming 50.9% of the global GM maize area. The US first planted GM maize varieties in 1996, and since that time adoption rates have quickly risen. One key trend since 2000 has been the transition away from the use of single traits (insect resistance or herbicide tolerance) towards stacked gene varieties (insect resistance and herbicide tolerance). In 2000, stacked gene varieties formed only 1% of the total US maize area, while in 2024 this has risen to 83%.

US Total Maize Area by Technology (%)



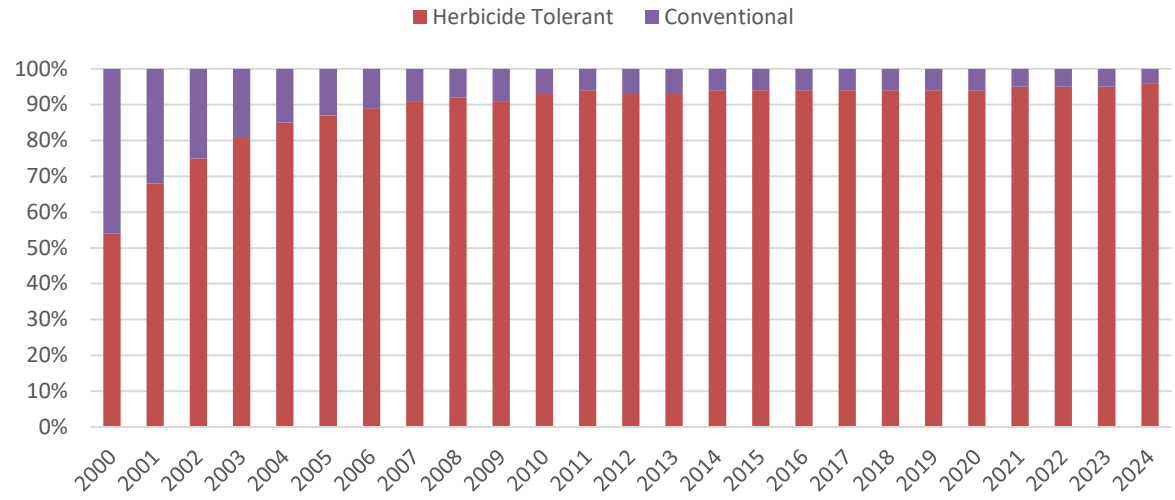
The GM cotton area in the USA amounted to 4.5 million hectares in 2024, increasing from lower levels seen the year prior. The largest US GM cotton area on record was in 2011 when the country planted 5.4 million hectares of GM cotton. The US GM cotton area grew in line with the total cotton area as result of better weather conditions and increased demand for cotton. The USA planted its first GM cotton varieties in 1996, and since 2011 more than 90% of the total US cotton area has been planted with GM varieties. As with maize, the proportion of the US cotton area planted with stacked gene varieties has been growing, forming 20% of the area in 2000 and 87% in 2024.

US Total Cotton Area by Technology (%)



The US cultivates the world's 2nd largest GM soybean area after Brazil, totalling 33.5 million hectares in 2024. At this level, the US GM soybean area forms 31.8% of the global GM soybean area. The US planted its first GM soybean varieties in 1996, with adoption rising to mature levels within the first 10 years of commercialisation. Unlike maize and cotton, GM soybean in the USA possesses only herbicide tolerance. However, GM soybean varieties utilise a wider range of herbicide tolerant technologies such as glyphosate, glufosinate, dicamba, 2,4-D and isoxaflutole tolerance traits.

US Total Soybean Area by Technology (%)



GM canola is only cultivated in the USA, Canada, and Australia, with the USA planting 1.0 million hectares in 2024. There are no commercial plantings of GM rapeseed in the world. In the USA, GM canola varieties possessing either glyphosate or glufosinate herbicide tolerance are cultivated.

The US cultivates small areas of other GM crops including sugar beet and alfalfa. GM sugar beet was launched in 2005, however, due to regulatory issues, GM sugar beet varieties were removed from the market until 2008, when adoption reached 59% of the total US sugar beet area in its first year of full deployment. GM sugar beet possesses only glyphosate herbicide tolerance. GM alfalfa was the last GM field crop to be commercialised in the US, being deployed in 2005. GM alfalfa commonly utilises glyphosate herbicide tolerance, while some varieties have been modified to contain reduced levels of lignin.

Canada

Area in 2024: 11.7 Ha m. (-0.4%)

GM Crops (year of introduction): Canola (1996), Maize (1998), Soybean (1997), Sugar beet (2010)

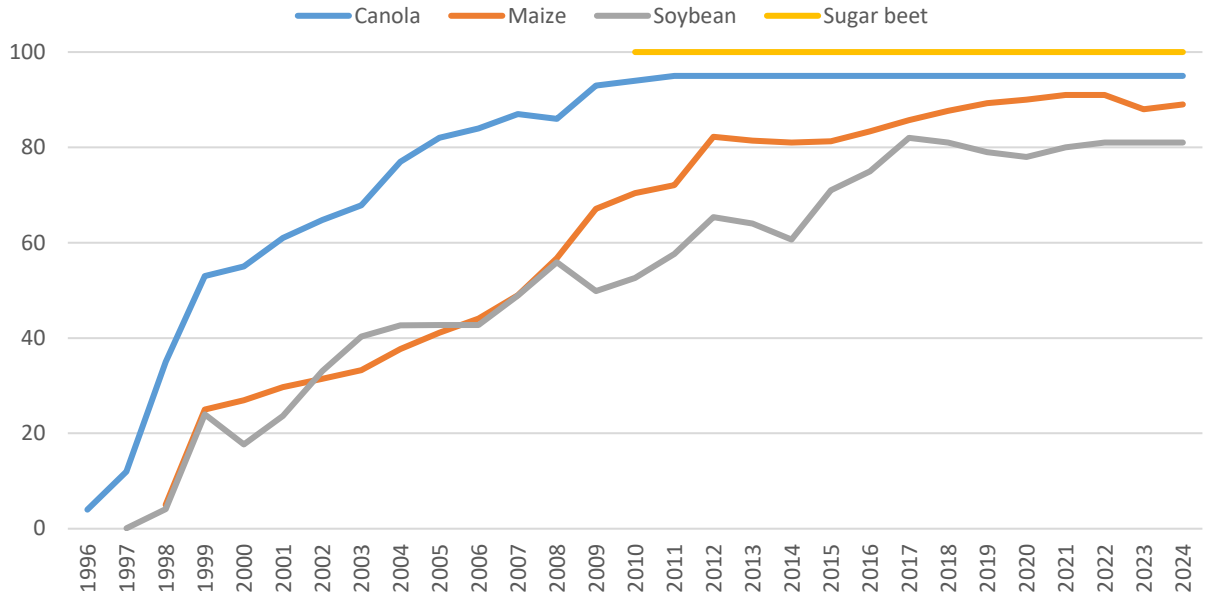
Canada has the world's 4th largest GM crop area. The GM crop area in Canada decreased by 0.4% in 2024 due to a fall in the canola and maize areas. The Canadian GM maize area declined by 3.4% despite a small increase in GM % utilisation, which rose from 88.0% to 89.0%.

Canada GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Canola	8.5	-0.3
Maize	1.3	-3.4
Soybean	1.9	1.4
Sugar beet	0	13.1
Total	**11.7**	**-0.4**

Canada holds the world largest GM canola area by a significant margin over the USA and Australia, the only other two countries cultivating GM canola. In 2024, Canada planted 8.5 million hectares of GM canola, a fall of 0.3% from the previous year.

Canada GM Adoption by Crop (%)



GM canola was first commercialised in Canada in 1996, and since 2009 the % utilisation has remained in excess of 90%. The GM canola area is exclusively herbicide tolerant, with no insect resistance traits utilised. Herbicide tolerance is achieved using either glufosinate or glyphosate tolerance.

Following canola, Canada cultivates significantly smaller areas of its remaining GM crops. In 2024, Canada planted 1.9 million hectares of soybean (+1.4%), 1.3 million hectares of maize (-3.4%), and 0.015 million hectares of sugar beet (+13.1%).

Central and South America

At the regional level, Central and South America possesses the largest GM crop area at 99.7 million hectares in 2024 (2023/24 agricultural year). Plantings increased by 3.5% over the previous year, driven by increases in seven out of the nine countries, with the most significant being an 8.3% rise in area in Argentina, translating to 1.8 million hectares in volume terms. Central and South America overtook North America as the greatest cultivator of GM crops in 2019, due in part to the evolution of the Brazilian GM crop area. Brazil has rapidly expanded its GM crop area to now form 68.1% of the region's GM crop area. Following Brazil, Argentina represents the next leading country in the region, 23.9% of the GM planted area. After Brazil and Argentina, the size of the GM crop areas in the remaining countries falls away quickly, with 3rd-placed Paraguay representing only 4.4% of the region's GM crop area. In Central and South America, soybean is the dominant crop, representing 68.9% of the region's GM crop area.

Central and South America GM Crop Area by Country 2024

Country	GM Area (Ha m.)	% Change	% Share
Brazil	67.9	1.4	68.1
Argentina	23.8	8.3	23.9
Paraguay	4.4	2.1	4.4
Bolivia	1.8	1.4	1.8
Uruguay	1.5	49.8	1.5
Colombia	0.2	1.8	0.2
Honduras	0.1	21.8	0.1
Chile	0.0	-16.2	0.0
Mexico	0.0	-7.6	0.0
Total	**99.7**	**3.5**	**100.0**

Brazil

Area in 2024: 67.9 Ha m. (+1.4%)

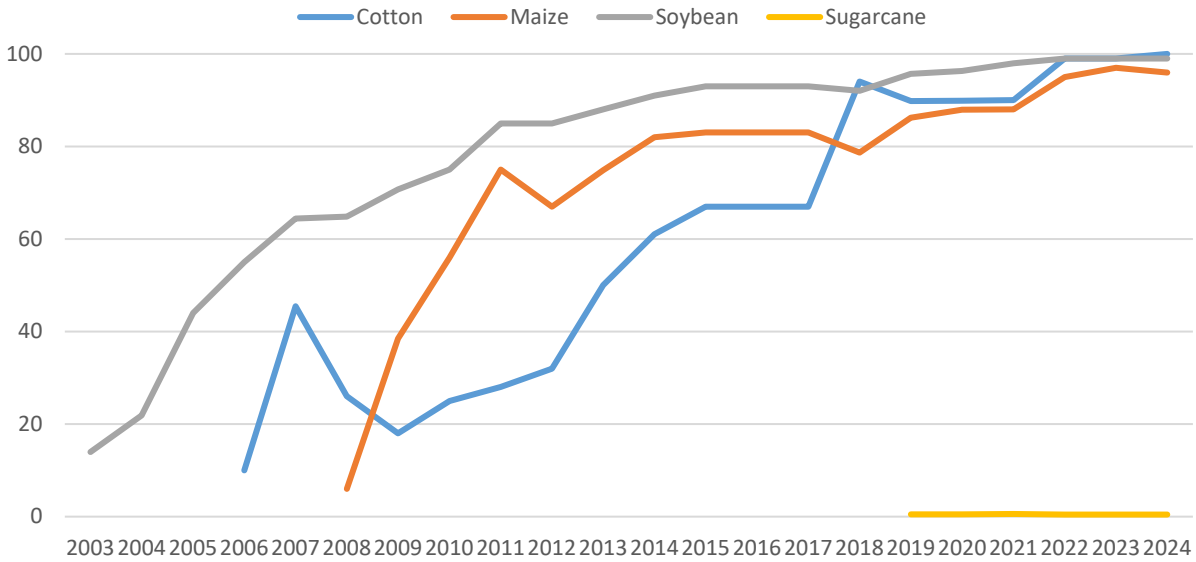
GM Crops (year of introduction): Cotton (2006), Maize (2008), Soybean (2003), Sugarcane (2019)

Brazil currently holds the world's second-largest GM crop area after the USA. The GM crop area in Brazil increased 1.4% in 2024 (2023/24 agricultural year), driven by greater areas of all GM crops. GM areas of these crops increased through a combination of greater total planted areas, offsetting a decline in the maize area and fall in GM adoption, and an increase in GM cotton % utilisation from 99.0% to 100%.

Brazil GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	1.9	18.0
Maize	20.2	-6.4
Soybean	45.7	4.7
Sugarcane	0.04	12.4
Total	**67.9**	**1.4**

Brazil GM Adoption by Crop (%)



Brazil cultivates the world's largest GM soybean area at 45.7 million hectares in 2024, a rise of 4.7% over the previous year. GM soybean was launched in the country in 2003, six years behind the USA, and adoption steadily increased to reach more than 90% of the country's total soybean area in 2014. Brazil is the greatest adopter of stacked gene soybeans, that possess both herbicide tolerance and insect resistance, which protects against specific lepidopteran insect pests. Stacked gene varieties were first commercialised in 2012 and now form the majority of the soybean area in Brazil.

GM maize was commercialised in Brazil in 2008, more than ten years after the USA. However, since that time adoption rates have increased significantly, with 96% of the total Brazilian maize area being planted with GM varieties in 2024. 2024 saw a decrease in % utilisation, falling back from 97% in 2023. Brazil cultivates three maize plantings per season, with the majority of GM plantings occurring in the second season crop. As with soybean, most of the GM maize cultivated in the country are varieties that contain stacked gene traits, possessing both herbicide tolerance and insect resistance.

GM cotton was first adopted in Brazil in 2006; however it has only been in recent years that the GM % utilisation rate reached maturity. In 2024, the GM cotton area grew 18.0% to reach 1.9 million hectares, a record area. Brazil's total cotton area has been increasing in recent years, now 226.8% greater than the level cultivated 10 years ago. As a result of strong GM % utilisation (100% in 2024), the area under GM varieties has greatly improved from the overall demand for Brazilian produced cotton. Almost all GM cotton varieties grown in Brazil possess stacked genes for both herbicide tolerance and insect resistance.

Brazil commercialised GM sugarcane in 2019, although it is cultivated on a small area, only forming around 0.5% of the country's total sugarcane area. GM sugarcane in Brazil is insect resistant, with varieties either utilising the Cry1Ab or Cry1Ac genes to control key lepidopteran insect pests.

Argentina

Area in 2024: 23.8 Ha m. (+8.3%)

GM Crops (year of introduction): Cotton (1999), Maize (1998), Soybean (1997), Wheat (2022), Alfalfa (2024)

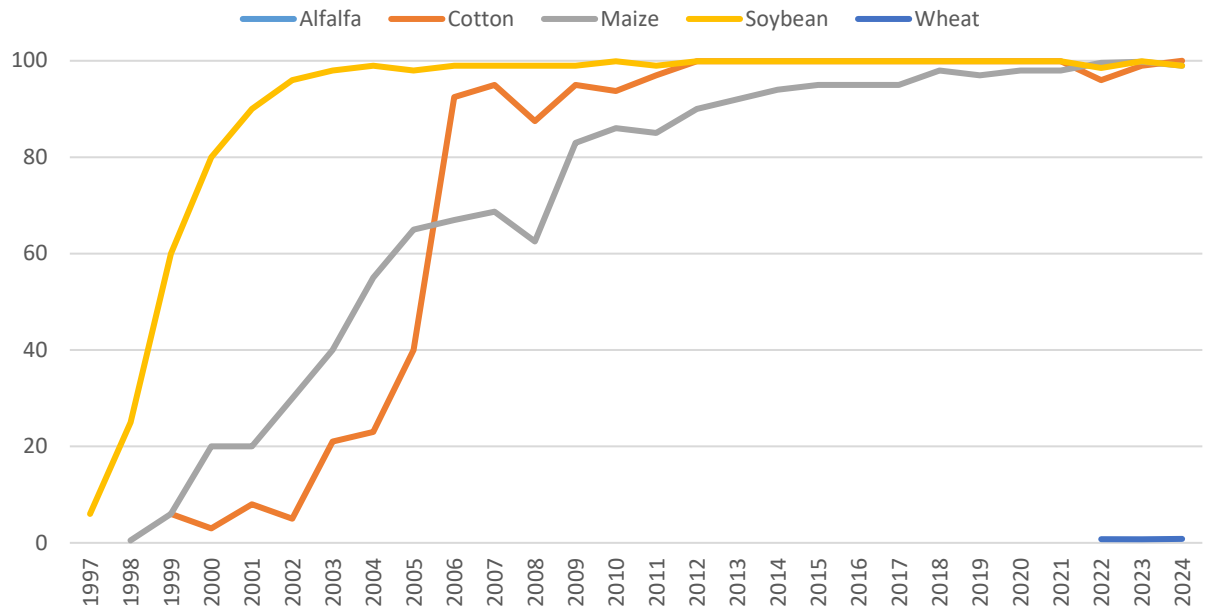
Argentina possesses the world's 3rd-largest GM crop area, and the second-largest in South America after Brazil. The Argentinean GM crop area grew 8.3% in 2024 (2023/24 agricultural year), principally as a result of an increase in the GM soybean area (+12.7%).

Argentina GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.7	56.3
Maize	6.9	-3.6
Soybean	16.2	12.7
Wheat	0.0	10.8
Total	**23.8**	**8.3**

Soybean is the main GM crop in Argentina with 16.2 million hectares planted in 2024, a rise of 12.7% over the previous year. However, not all of this crop was from a commercial source. As commercial soybean is a non-hybrid crop, growers may save the seed and replant it to generate another crop. The difficulties in controlling intellectual property in the country has led to multinational seed companies either limiting their financial exposure to the Argentinean soybean seed market or exiting it completely. GM soybean was commercialised in Argentina in 1997 and reached +90% utilisation within five years. Argentina is the second-greatest adopter of stacked gene soybean varieties after Brazil, with commercialisation occurring in 2014, two years after Brazil.

Argentina GM Adoption by Crop (%)



Despite the country planting only 6.9 million hectares of GM maize in 2024 (-3.6%), Argentina is the world's 3rd-largest GM maize area after the USA and Brazil. Adoption of GM maize varieties happened at a slower rate than in other crops as it took 14 years to reach +90% utilisation. Almost

the entire maize area in Argentina is now planted with GM varieties, typically stacked gene varieties. In 2024, % utilisation decreased 0.8% to 99.0% of the country's total maize area.

GM cotton was first planted in Argentina in 1999, although adoption rates were low in the first 5 years of commercialisation at less than 10%. It was not until 2003 when adoption increased rapidly to reach more than 90% of the total cotton area. As with soybean and maize, the majority of GM cotton cultivated in the country are stacked gene varieties.

Argentina was the first country in the world to launch GM wheat, with 53,000 hectares of HB4 planted in 2022, representing 0.8% of the country's total wheat area. However, the area planted fell 17.6% to 43,660 hectares in 2023, but recovered 10.8% in 2024 to 48,380 hectares. This GM wheat was developed by Argentinian seed company Bioceres to possess glufosinate herbicide tolerance and drought tolerance. HB4 wheat is cultivated in a closed loop system, with seed or flour not being openly offered to growers. HB4 wheat has been approved for cultivation in Brazil but has not yet been commercialised.

Paraguay

Area in 2024: 4.4 Ha m. (+2.1%)

GM Crops (year of introduction): Cotton (2011), Maize (2012), Soybean (2004)

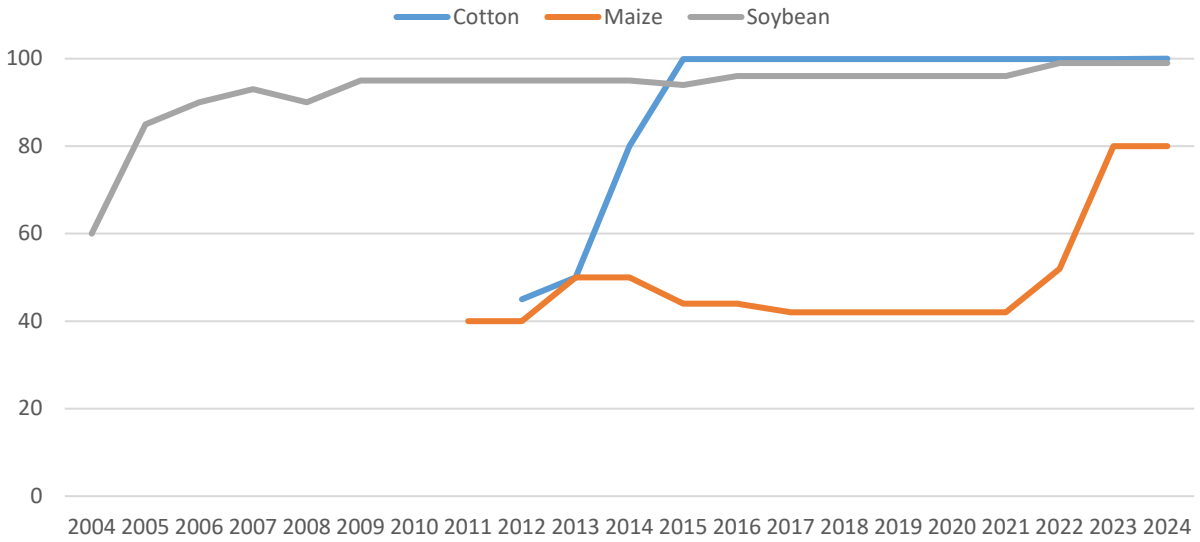
The GM crop area in Paraguay is dominated by soybean at 84.8% of the country's total GM area. As a result, changes in the country's total GM area are dictated by what is occurring in soybean.

Paraguay GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Soybean	3.7	4.2
Maize	0.6	-11.8
Cotton	0.065	44.6
Total	**4.4**	**2.1**

The GM soybean area in Paraguay grew by 4.2% in 2024, driven by a higher total soybean planted area. GM soybean was launched in the country in 2004 and saw strong adoption in its first year (60% of the total soybean area). The soybean area in Paraguay is comparatively low, resulting in lower volumes of GM seed required to facilitate high adoption levels. Soybean production is focussed in the east of the country, mainly along the border with Argentina and Brazil; as a result, the availability of GM seed from both countries was high. GM % adoption reached mature levels in 2006, only two years after first launch, and has remained above 90% since that time. As with Brazil and Argentina, the majority of the GM area is planted with stacked gene varieties.

Paraguay GM Adoption by Crop (%)



In 2024, the GM maize area fell by 11.8% to 0.6 million hectares, falling back from a record area the year before. GM maize was introduced in 2011 with an initial adoption rate of 40%; adoption was high in the first year for the same reasons as soybean. It has been reported that Paraguay sourced approximately 80.0% of its GM maize seed from Argentina. Following initial introduction, adoption rates did not rise with any significance; however, from 2021 adoption has increased. In 2023, adoption increased from 52.0% to reach 80.0% of the total Paraguayan maize area and remained at this level in 2024. Stacked gene varieties form the majority of the GM maize cultivated.

GM cotton was the last GM crop to be commercialised in Paraguay, in 2011. In 2024 65,000 hectares were planted, a rise of 44.6% over 2023 when the country planted almost 45,000 hectares. Adoption in the first year of deployment was high at 45.0%, and within four years reached 99.9% of the total cotton area and in 2024 this increased to 100% utilisation.

Bolivia

Area in 2024: 1.8 Ha m. (+1.4%)

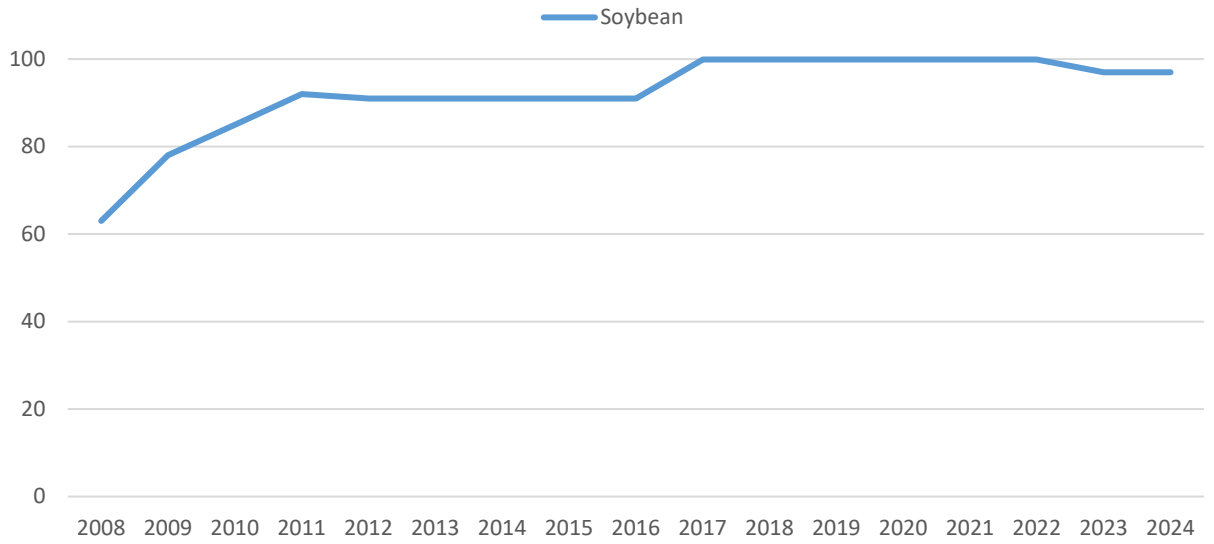
GM Crops (year of introduction): Soybean (2008)

Soybean is the only GM crop cultivated in Bolivia. In 2024, the area increased 1.4% over the previous year, with adoption rates remaining at 97.0% of the country's total soybean area. GM soybean was launched in 2008 with an initially high adoption rate of 63.0%, with this quickly growing to greater than 90.0%. Unlike Brazil, Argentina and Paraguay, Bolivia does not cultivate stacked gene varieties, instead only planting varieties possessing herbicide tolerance, although this is to change following the December 2024 regulatory authorisation of Bayer's Intacta RR2 PRO.

Bolivia GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Soybean	1.8	1.4
Total	**1.8**	**1.4**

Bolivia GM Adoption by Crop (%)



Uruguay

Area in 2024: 1.5 Ha m. (+49.8%)

GM Crops (year of introduction): Maize (2003), Soybean (2000)

The GM crop area in Uruguay increased by 49.8% in 2024, driven by a large volume increase in the soybean area combined with a large percentage increase in the GM maize area. Soybean is the dominant GM crop in the country with a planted area of 5.7 times the size of its GM maize area, and as a result, changes in the country's total GM area are dictated by what is occurring in soybean.

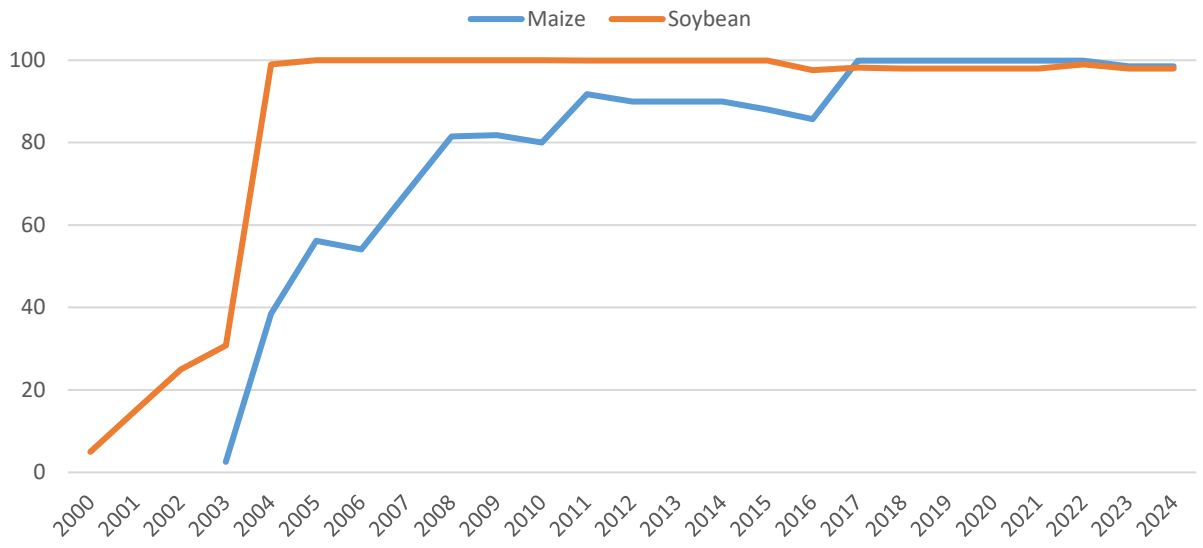
Uruguay GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Maize	0.2	130.0
Soybean	1.3	41.2
Total	**1.5**	**49.8**

The Uruguayan GM soybean area increased 41.2% in 2024 to reach 1.3 million hectares, driven by a greater total soybean area. GM % utilisation remained unchanged in 2024, at 98.0% of the country's total soybean area. GM soybean was launched in 2000 and within four years essentially covered the entire Uruguayan soybean area. While Uruguay cultivates stacked gene varieties, these represent less than half of the country's GM soybean area, a different situation to other South American countries that cultivate stacked gene varieties.

GM maize was launched three years after soybean, in 2003. Uruguay cultivates a small total maize area. As a result, despite an adoption level of 98.5%, GM maize only covered 0.2 million hectares in 2024, growing 130.0% over the previous year. Just over half of the GM maize area is planted with stacked gene varieties, with the majority of the remaining area being planted with insect resistant varieties.

Uruguay GM Adoption by Crop (%)



Colombia

Area in 2024: 0.15 Ha m. (+1.8%)

GM Crops (year of introduction): Cotton (2002), Maize (2007)

Colombia cultivated 150,150 hectares of GM crops in 2024, a rise of 1.8% over the previous year. The country's largest GM crop, maize, grew 2.6% over the previous year, driving overall GM area growth. Not all of Colombia cultivates GM crops, with adoption focussed in the north of the country at the state level.

Colombia GM Crop Area 2024

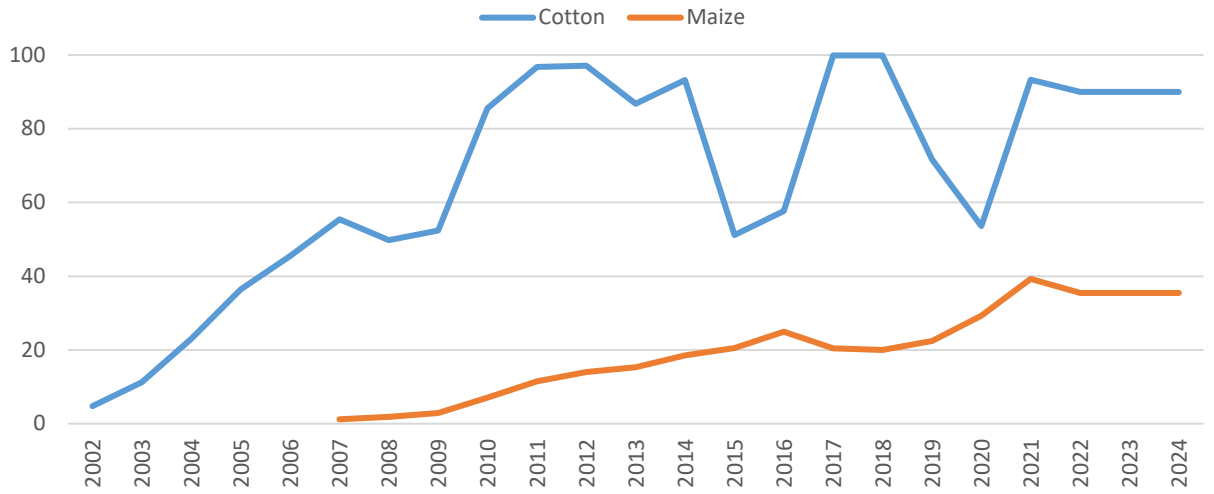
Year	GM Area (Ha m.)	% Change
Cotton	0.01	-7.1
Maize	0.14	2.6
Total	**0.15**	**1.8**

GM cotton was the first GM crop to be cultivated in the country, and while adoption rates are high, due to the low overall cotton area, GM cotton areas are small at 11,700 hectares in 2024, a fall of 7.1% from 12,600 hectares in 2023. Stacked gene varieties were first introduced in 2007 and now form the majority of the planted area, with Bollgard and Roundup Ready being the only traits approved for cultivation. Colombia imports its GM cotton seeds from the US.

GM maize was first cultivated in Colombia in 2007. Since that time, adoption rates have increased slowly, rising to reach 35.5% of the country's total maize area. Colombia reportedly sources its GM maize seeds from Brazil, as well as smaller volumes from Honduras. In 2024, the majority of the GM maize area was planted with stacked gene varieties.

In 2010, the country approved the cultivation of GM soybean, however, no commercial plantings have yet occurred.

Colombia GM Adoption by Crop (%)



Honduras

Area in 2024: 0.067 Ha m. (+21.8%)

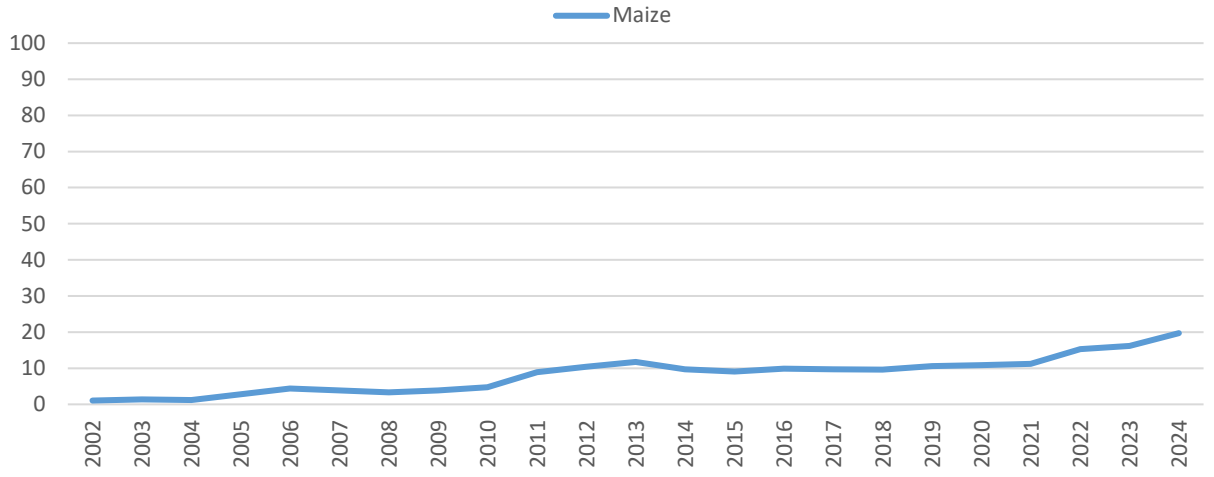
GM Crops (year of introduction): Maize (2002)

Honduras first cultivated GM maize in 2002, although utilisation remains low at 19.7% of the country's total maize area, representing 67,000 hectares in 2024. GM % utilisation increased by 3.5 percentage points to 19.7% in 2024. As with many countries, stacked gene varieties form the majority of the GM planted area.

Honduras GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Maize	0.067	21.8
Total	**0.067**	**21.8**

Honduras GM Adoption by Crop (%)



Chile

Area in 2024: 0.0106 Ha m. (-16.2%)

GM Crops (year of introduction): NA

Chile does not cultivate GM crops commercially; however, the country allows the propagation of GM seeds for export markets. Typically, GM seed stock is imported from the USA, reproduced and multiplied, and then exported to the USA and Canada.

Chile GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Canola	0.0048	-34.7
Maize	0.0049	18.9
Soybean	0.0009	-23.4
Total	**0.0106**	**-16.2**

Mexico

Area in 2024: 0.00924 Ha m. (-7.6%)

GM Crops (year of introduction): Cotton (1998)

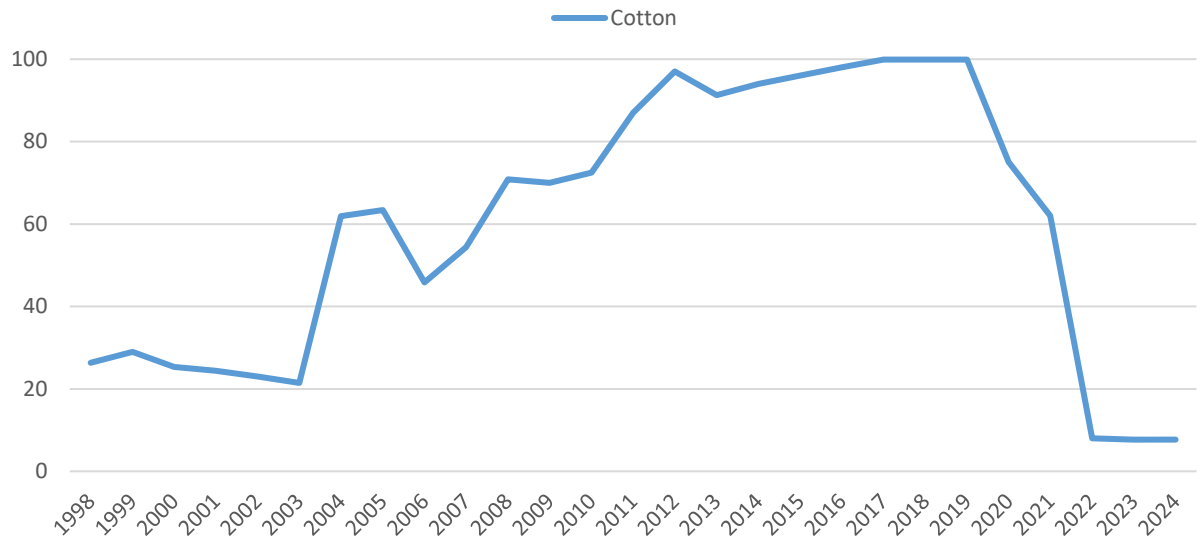
Mexico was one of the first countries to commercialise GM cotton, as far back as 1998. While the country saw peak GM cotton areas of 171,000 hectares in 2014, from 2019 the area has significantly declined.

Mexico GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.009	-7.6
Total	**0.009**	**-7.6**

The Mexican government has taken an anti-GM and glyphosate stance, intending on phasing out the use of the herbicide glyphosate by 2024. As part of this anti-GM standpoint, Mexico has also not approved any permit applications for cultivation of cotton since 2019, resulting in the reduced availability of GM cotton seeds and a significant decline in adoption rates.

Mexico GM Adoption by Crop (%)



Asia Pacific

The total GM crop area in Asia Pacific is significantly smaller than those in the Americas, amounting to 19.4 million hectares in 2024. At present, India forms the majority (57.9%) of the region's GM planted area. At the crop level, cotton is the dominant GM crop accounting for 85.5% of the region's total GM area.

Asia Pacific GM Crop Area by Country 2024

Country	GM Area (Ha m.)	% Change	% Share
India	11.2	-7.1	57.9
China	3.5	17.9	18.1
Pakistan	1.9	-16.7	9.8
Australia	1.4	-0.3	7.3
Philippines	0.7	13.8	3.7
Vietnam	0.4	93.2	2.2
Myanmar	0.2	39.2	1.0
Indonesia	0.02	0.0	0.1
Bangladesh	0.003	2.7	0.0
Total	**19.4**	**-1.8**	**100.0**

India

Area in 2024: 11.2 Ha m. (-7.1%)

GM Crops (year of introduction): Cotton (2002)

India possesses the world's 5th-largest GM crop area, and the largest in Asia. Despite being the ranked 5th in world in terms of GM crop area, the country only cultivates one GM crop, cotton. The country cultivated the world's largest GM cotton area in 2024, at 11.2 million hectares, a fall of 7.1% from the previous year. The first GM cotton varieties were commercialised in 2002, and were mainly Bollgard-based varieties; however, since 2015 the country has almost exclusively cultivated varieties containing the Bollgard II trait. India does not commercially cultivate any herbicide tolerant or stacked gene varieties, instead focusing solely on insect resistance.

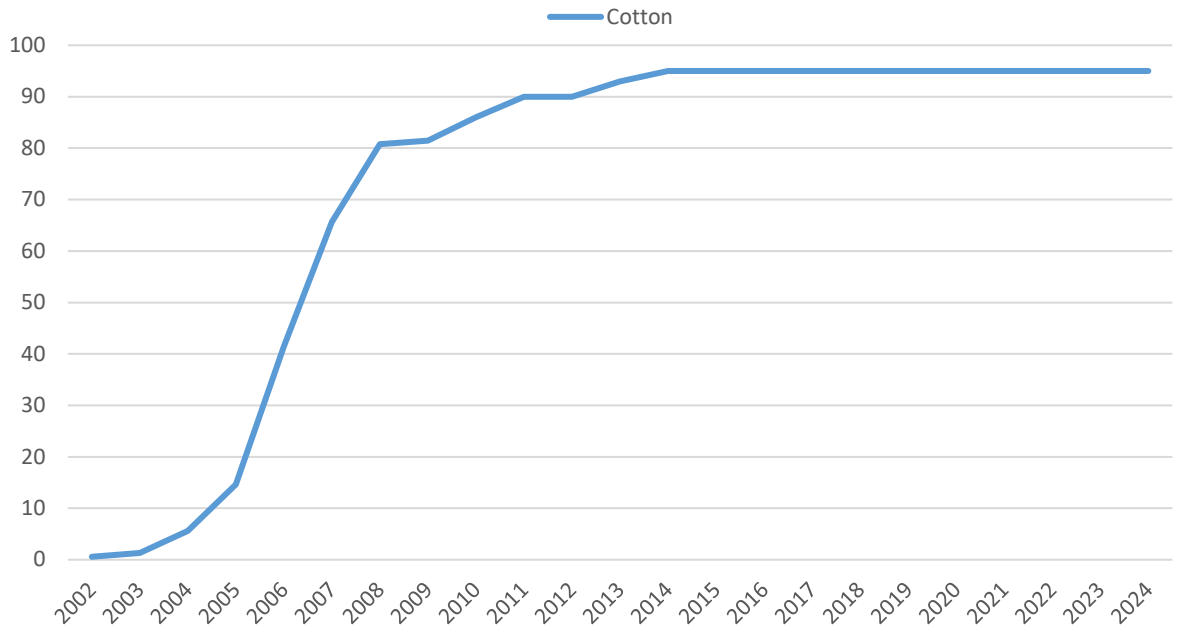
While only GM cotton has been approved for cultivation there are reports of other GM crops being cultivated illegally. Bt brinjal (aubergine/eggplant) seed reportedly arrives from Bangladesh, while herbicide tolerant soybean cultivation may be occurring in several states.

India GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	11.2	-7.1
Total	**11.2**	**-7.1**

GM adoption rates reached +90% in the first ten years of commercialisation and have remained at 95% of the total cotton area since 2014.

India GM Adoption by Crop (%)



China

Area in 2024: 3.5 Ha m. (+17.9%)

GM Crops (year of introduction): Cotton (1998)

China possesses Asia's second-largest GM cotton area after India. The first GM varieties were commercialised in 1998, and since 2013 adoption levels have exceeded 90% of the country's total cotton area. The total cotton area in China has gradually fallen in recent years as the Chinese government has moved to focus cotton cultivation in the west of the country. It is estimated that more than 77% of the country's GM cotton is planted with Bt varieties developed by the Chinese Academy of Agricultural Sciences (CAAS).

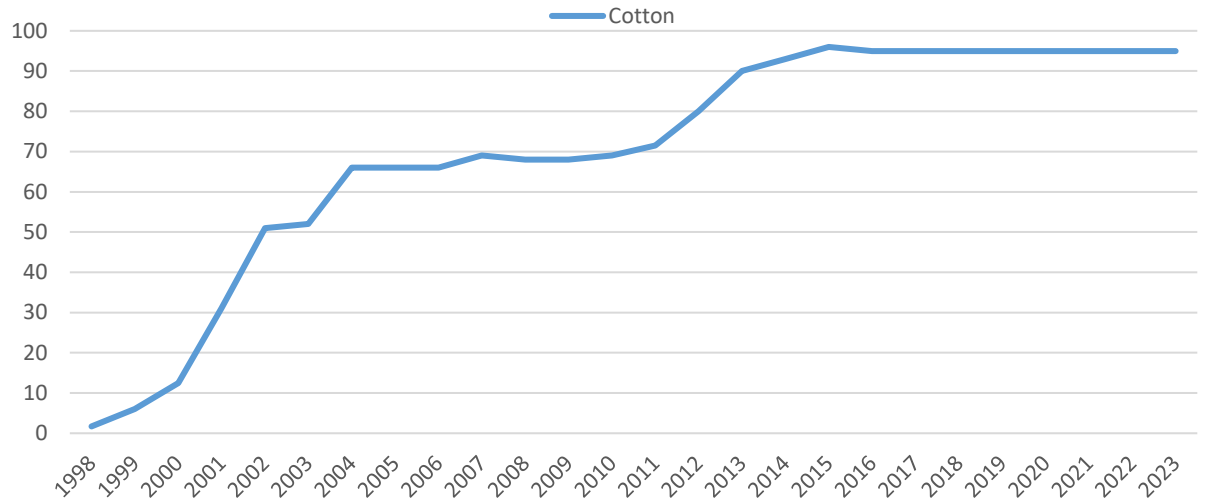
China GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	2.8	3.4
Maize*	0.7	150.0
Soybean*	0.04	-
Total	**3.5**	**17.9**

**Pre-commercial trials*

Rates of adoption increased rapidly following commercialisation in 1998; however, GM % utilisation stagnated between 2004 and 2011, before rising again and reaching a plateau of 95% of the total cotton area. In 2024 GM adoption further increased to 98.3% of the country's total cotton area.

China GM Adoption by Crop (%)



In recent years China has approved the cultivation of GM maize and soybean, although at present the technology is in late-stage commercial trials. It was estimated that China planted 666,000 hectares of GM maize as part of commercial trials in 2024. Once fully commercialised, it is expected that GM maize will grow to cover the majority of the country's ~43 million hectares of maize. Once peak adoption has been realised, it is likely that China will cultivate the world's largest GM maize area.

Pakistan

Area in 2024: 1.9 Ha m. (-16.7%)

GM Crops (year of introduction): Cotton (2010)

Pakistan planted 1.9 million hectares of GM cotton in 2024, a fall of 16.7% from the previous year as a result of areas in the key production zones of Punjab and Sindh declining.

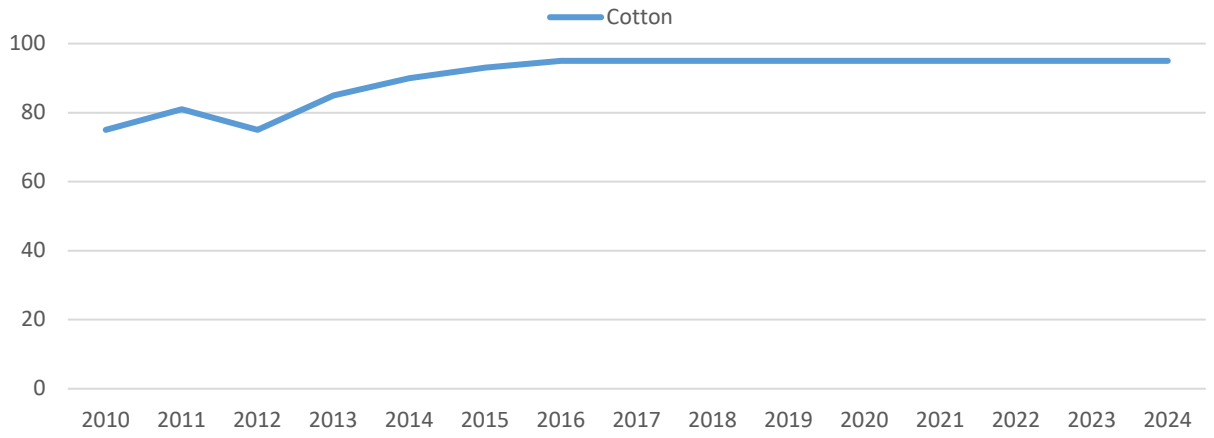
Pakistan GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	1.9	-16.7
Total	**1.9**	**-16.7**

Pakistan does not cultivate any varieties possessing herbicide tolerance, instead planting those with only insect resistance. The majority of the GM area is planted Bollgard varieties with a single insect resistance gene, although some dual gene varieties have been developed by the Centre of Excellence in Molecular Biology, University of the Punjab (CEMB). Seed companies are reportedly reluctant to commercialise new GM technology in the country due to lack of IP protection and regulatory uncertainty, leading to technology stagnation.

GM cotton was first launched in 2010, instantly attaining high adoption rates. Since 2016, GM adoption has remained approximately 95% of the country's total cotton area.

Pakistan GM Adoption by Crop (%)



Australia

Area in 2024: 1.4 Ha m. (-0.3%)

GM Crops (year of introduction): Canola (2008), Cotton (1996)

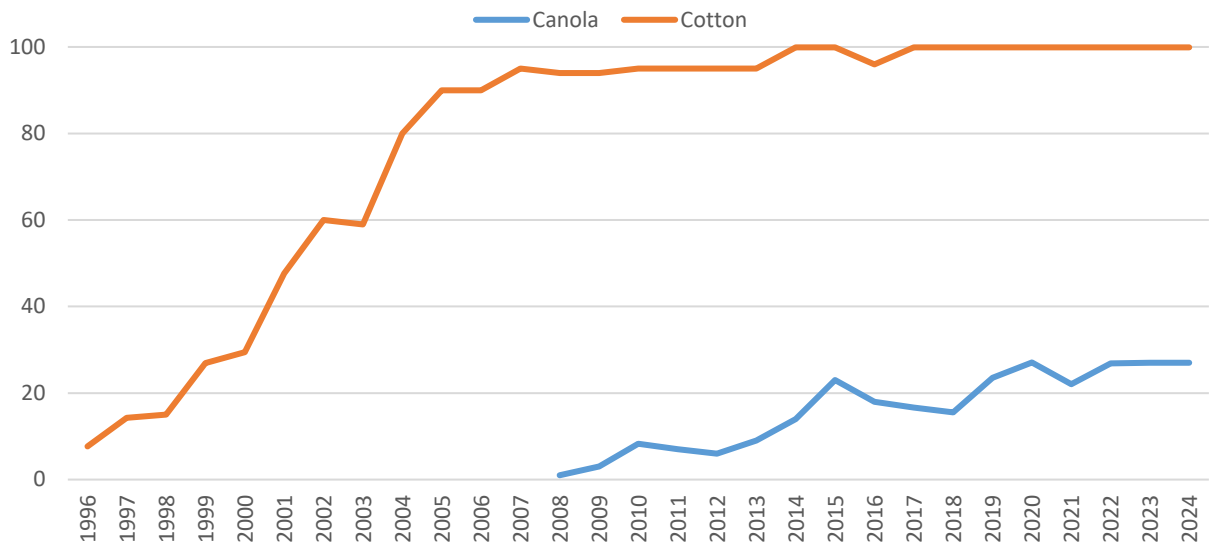
Australia planted 1.4 million hectares of GM crops in 2024, with 66.5% planted with canola.

Australia GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Canola	0.9	1.3
Cotton	0.5	-3.3
Total	**1.4**	**-0.3**

Australia planted its first GM canola products in 2008 following the lifting of cultivation restrictions in New South Wales and Victoria. This was followed in 2010 by Western Australia and 2020 by South Australia. Western Australia now represents the state with the largest GM canola area, with over 70% of the country's total GM canola area. In the 15 years since first commercialisation, national adoption has remained below 30%, primarily due to the competition from the high utilisation of non-GM herbicide tolerant technologies such as Clearfield (imidazolinone tolerance).

Australia GM Adoption by Crop (%)



Almost the entire Australian cotton area is planted with GM varieties, with 99.9% adoption effectively since 2014. Bayer's Bollgard 3 XtendFlex forms the majority of the GM planted area, with the remainder planted with Roundup Ready and Liberty Link varieties.

Philippines

Area in 2024: 0.7 Ha m. (+13.8%)

GM Crops (year of introduction): Maize (2004), Rice (2022, but removed from market in 2024)

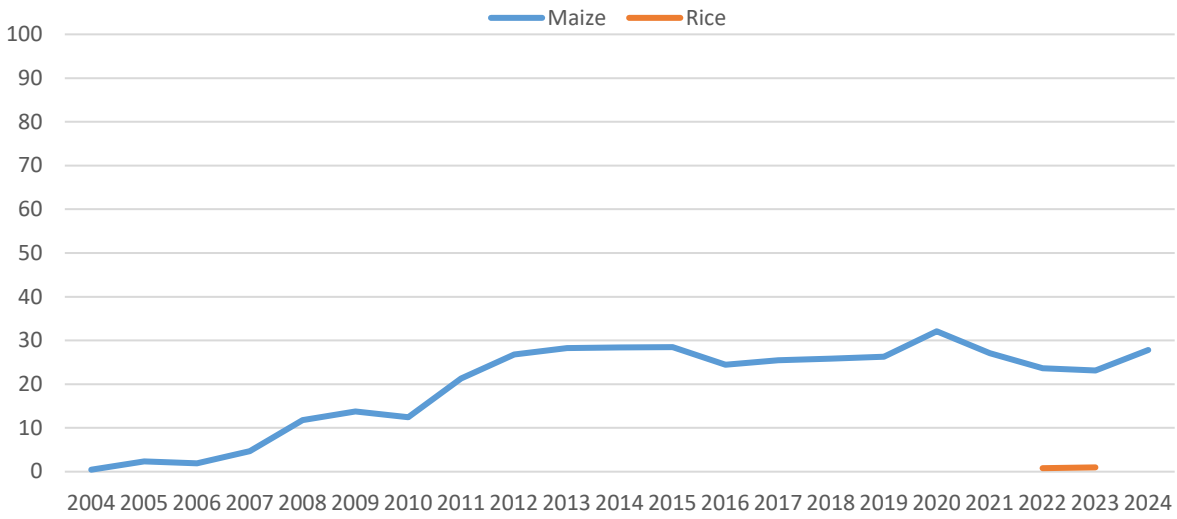
The planted area of GM crops in the Philippines increased by 0.7% in 2024, despite GM Golden Rice's cultivation approval being revoked by Philippine authorities, and a fall in GM maize adoption. The GM maize area increased through a rise in the country's total maize area. In 2022, GM insect resistant brinjal (aubergine/eggplant) was approved for cultivation, however, no commercial planting has yet occurred.

Philippines GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Maize	0.71	23.1
Rice	-	-100.0
Total	**0.71**	**13.8**

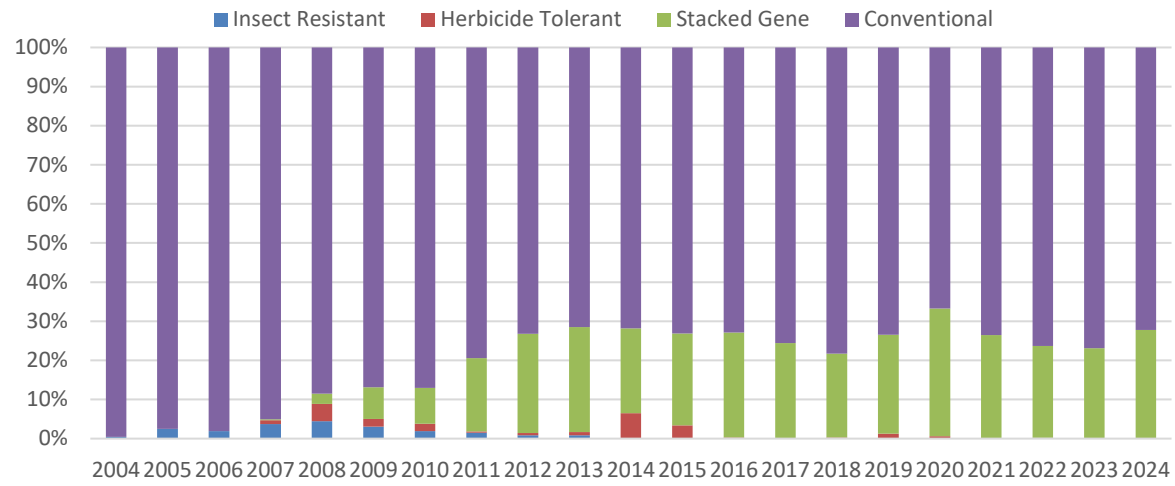
The first GM rice variety in the world to be commercialised was Golden Rice in the Philippines in 2022. Golden Rice possesses elevated levels of beta-carotene, a precursor of vitamin A, through the expression of crt1 and psy1 genes. Golden rice was developed by the International Rice Research Institute (IRRI) and deployed on 38,000 hectares (seed production and commercial harvest) in its first year of cultivation. At that level, Golden Rice was planted on only 0.8% of the country's total rice area. However, as previously stated, Golden Rice was removed from the market in 2024.

Philippines GM Adoption by Crop (%)



The first commercial plantings of GM maize occurred in 2004 on an initial area of 10,000 hectares. Prior to 2007, only insect resistant varieties were cultivated; however, in that year the first herbicide tolerant and stacked gene varieties were planted. Since 2007, stacked gene varieties have become the dominant GM technology, accounting for 100% of the GM area in 2024. To date, GM maize adoption rates typically remain below 30%, with 2020 being the only year where adoption was above this level.

Philippines Total Maize Area by Technology (%)



Vietnam

Area in 2024: 0.43 Ha m. (+93.2%)

GM Crops (year of introduction): Maize (2015)

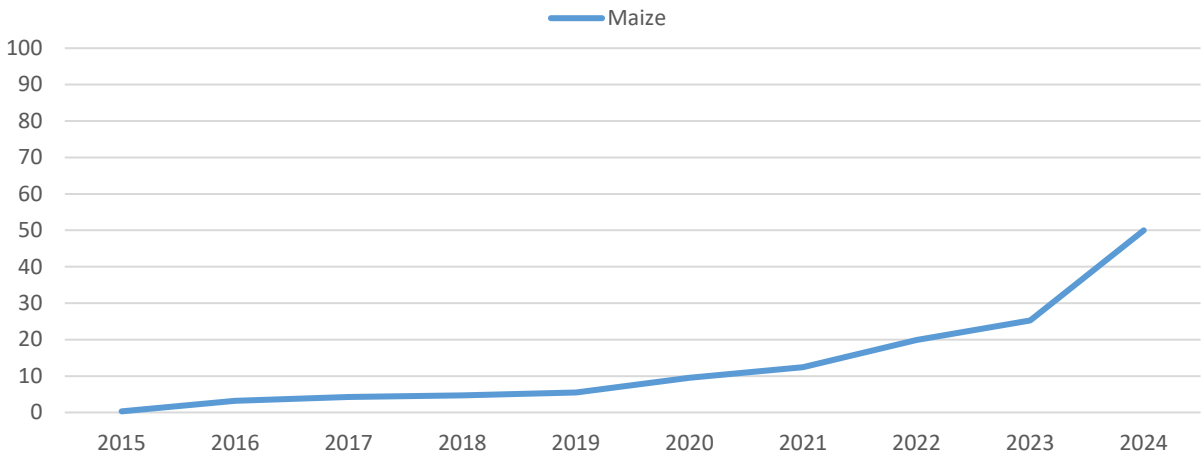
Vietnam planted a record GM maize area in 2024, at 425,000 hectares, representing 50.0% of the country's total maize area. The majority of the GM maize area is planted with stacked gene varieties.

Vietnam GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Maize	0.43	93.2
Total	**0.43**	**93.2**

Since its first introduction in 2015, the adoption of GM maize varieties has steadily increased to reach half of the country's overall maize area. The rate of adoption increase has been exacerbated by a reduction in the overall maize planted area, falling from 1.18 million hectares in 2015 to 0.85 million hectares in 2025.

Vietnam GM Adoption by Crop (%)



Myanmar

Area in 2024: 0.2 Ha m. (+39.2%)

GM Crops (year of introduction): Cotton (2006)

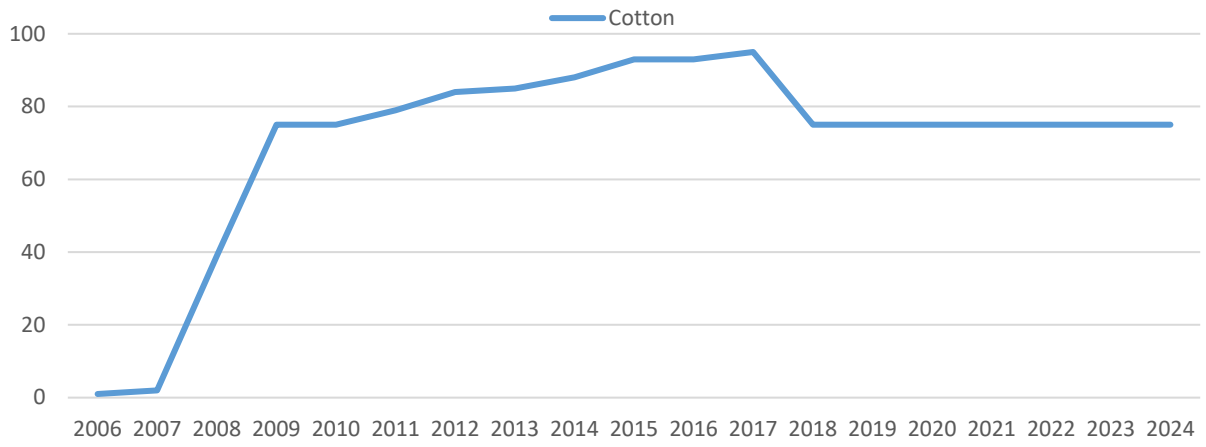
Myanmar cultivated GM cotton, its only approved GM crop, on 190,000 hectares in 2024. The country only cultivates insect resistant varieties, typically those developed locally, with the remainder of the area planted with varieties sourced from India.

Myanmar GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.19	39.2
Total	**0.19**	**39.2**

Adoption rates of GM cotton peaked in 2017 when the crop represented 95% of the country's total cotton area. However, since that time % utilisation has fallen to a new plateau of 75%.

Myanmar GM Adoption by Crop (%)



Indonesia

Area in 2024: 0.02 Ha m. (0.0%)

GM Crops (year of introduction): Maize (2022), Sugarcane (2019)

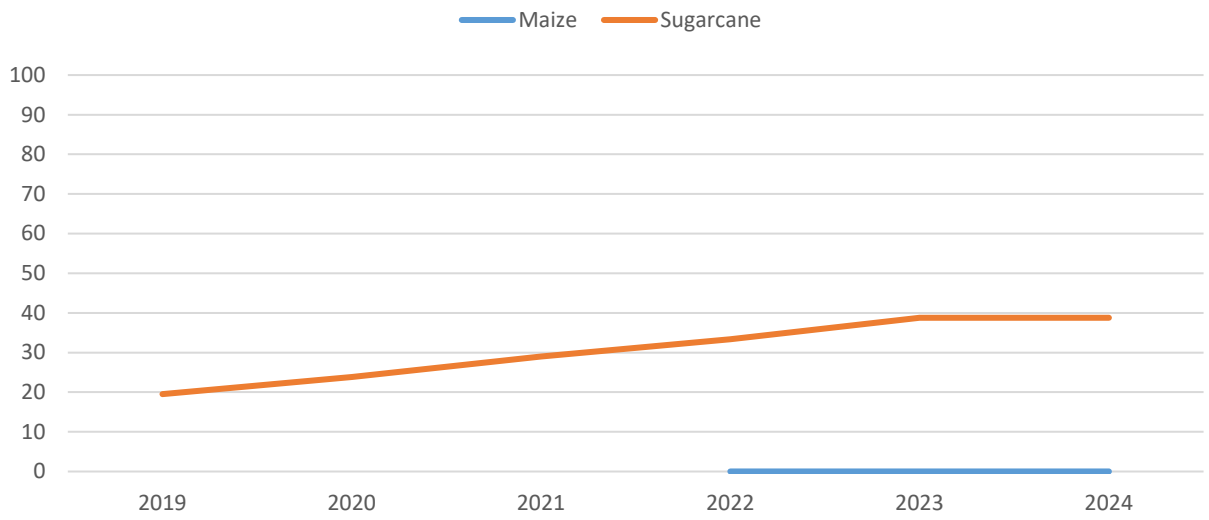
Indonesia is a recent adopter of GM crop technology, having commercialised its first GM sugarcane variety in 2019 and GM maize in 2022. GM potato was authorised for cultivation in 2018, however, to date no commercial plantings have taken place. The country's GM crop area remained flat in 2024 with no changes to areas of any of its GM crops.

Indonesia GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Maize	0.0003	0.0
Sugarcane	0.02	0.0
Total	**0.02**	**0.0**

GM sugarcane in Indonesia was developed by the state-owned sugar plantation company PT Perkebunan Nusantara. The crop utilises either the EcBetA or RmBetA gene to promote drought tolerance. A driver of area development since 2022 was the certification of GM sugarcane for general commercialisation.

Indonesia GM Adoption by Crop (%)



Utilisation of GM maize is low at 0.01% of the country's total maize area in 2024, its third year of cultivation. It was reported that Bayer supplied enough seeds for planting 200-300 hectares in South Sulawesi, West Nusatenggara, and East Nusatenggara under the company's Better Life Farming (BLF) program. Syngenta has also reportedly launched stacked gene varieties for cultivation. Both are preparing to locally produce F1 hybrids for cultivation beyond 2023 as the Ministry of Agriculture prohibits the importation of F1 seeds.

Bangladesh

Area in 2024: 0.003 Ha m. (+2.7%)

GM Crops (year of introduction): Brinjal (2014)

Bangladesh first planted GM varieties of brinjal in 2014. The crop possesses insect resistance to protect against crop damage by pests such as the Brinjal Fruit and Shoot Borer (*Leucinodes orbonalis*) through the production of the Cry1Ac delta endotoxin. There are currently two commercial varieties, BARI Begun-10 and BARI Begun-11, that both utilise the Cry1Ac gene. It was reported the country planted GM brinjal on an area of 2,910 hectares in 2024, a rise of 2.7% over the previous year.

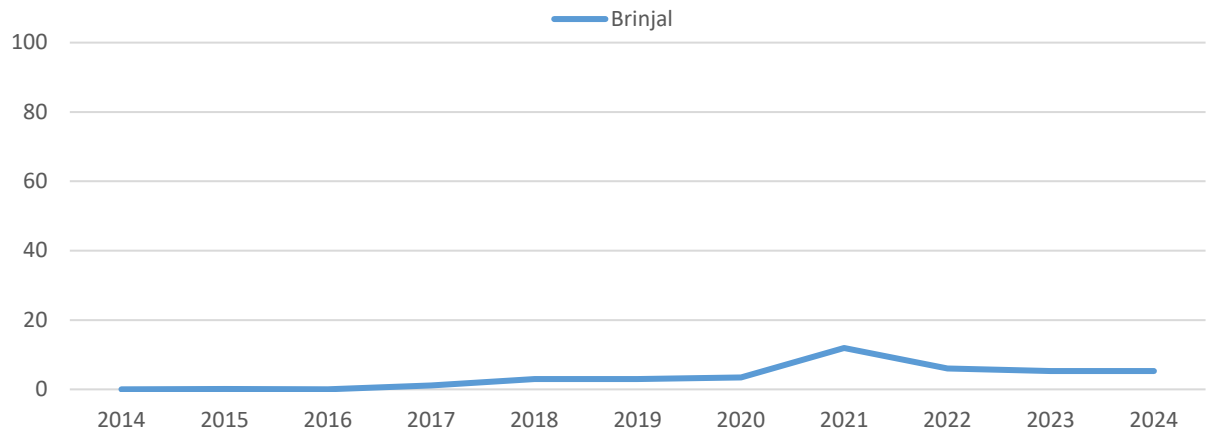
Two GM cotton genetic events have been approved for cultivation, JKCH 1947 and JKCH 1947, both developed by JK Agrigenetics. To date no commercial planting has occurred, although the country reported planted 15.3 hectares of demonstration plots in 2023.

Bangladesh GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Brinjal	0.003	2.7
Total	**0.003**	**2.7**

GM Brinjal was first commercialised in 2014, however utilisation remains low. While adoption saw a peak of 11.9% in 2021, it has fallen year on year to 5.3% of the country's total brinjal area in 2024.

Bangladesh GM Adoption by Crop (%)



Europe

At the regional level, Europe holds the world's smallest GM area at only 65,963 hectares in 2024. The majority of this area is in Spain, where 98.5% of the region's GM maize is cultivated. Historically, a number of European countries cultivated GM maize; however, only Spain and Portugal remain.

Historical European Cultivators of GM Maize

Country	First Planting	Final Planting
Czech Republic	2005	2016
France	2004	2008
Germany	2004	2008
Poland	2006	2012
Romania	3007	2015
Slovakia	2006	2016

Europe GM Crop Area by Country 2024

Country	GM Area (Ha m.)	% Change	% Share
Spain	0.065	40.3	98.5
Portugal	0.001	-44.6	1.5
Total	**0.066**	**37.2**	**100**

Spain

Area in 2024: 0.065 Ha m. (+40.3%)

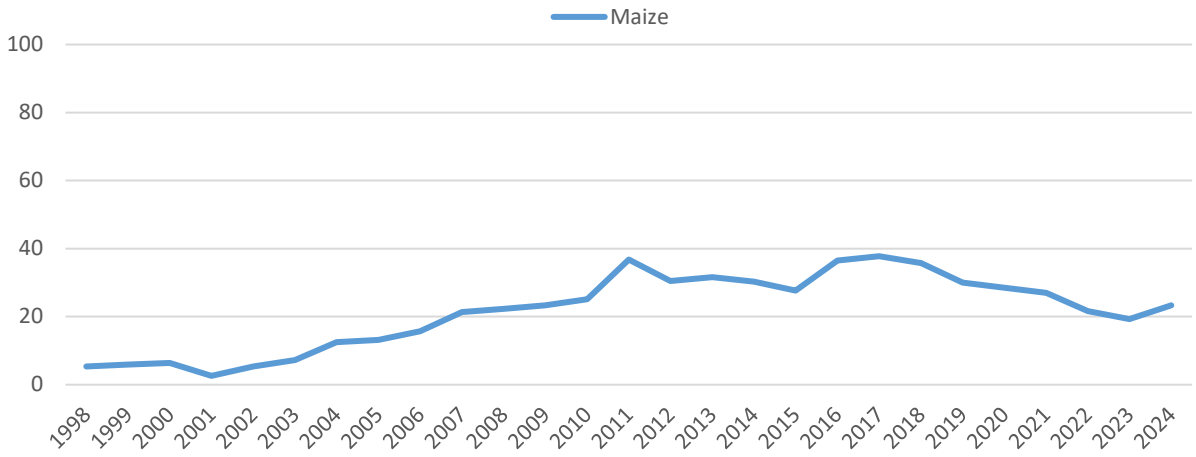
GM Crops (year of introduction): Maize (1998)

Spain first planted GM maize in 1998, predominantly in the Ebro River basin (autonomous regions of Aragon, Catalonia, and Navarra), where European Corn Borer pressure is elevated. Spain cultivates only insect resistant varieties that possess the MON 810 genetic event. Spain's GM maize area recovered in 2024, growing by 40.3% partially as a result of an increase in the country's overall maize area and a rise in GM % utilisation to 23.4%.

Spain GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Maize	0.065	40.3
Total	**0.065**	**40.3**

Spain GM Adoption by Crop (%)



Portugal

Area in 2024: 0.000963 Ha m. (-44.6%)

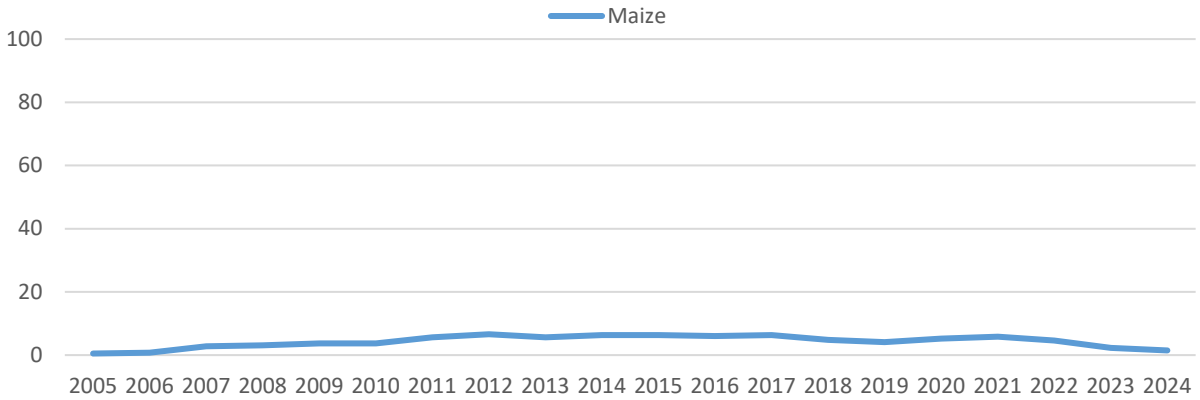
GM Crops (year of introduction): Maize (2005)

In a similar situation to Spain, Portugal only cultivates varieties of GM maize that contain the MON 810 insect resistance genetic event. GM maize cultivation is focussed in the region of Alentejo in the county's centre-south, where approximately 60% of the GM area occurs. First plantings of GM maize in Portugal took place in 2005, and since that time adoption rates have not significantly increased. In 2024, Portugal's GM maize area fell 44.6% through a decline in GM % utilisation, with only 1.5% of the country's total maize area planted with GM varieties in 2024.

Portugal GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Maize	0.000963	-44.6
Total	**0.000963**	**-44.6**

Portugal GM Adoption by Crop (%)



Rest of World

The rest of world region planted 3.7 million hectares of GM crops in 2024, a fall of 0.4% from the previous year. South Africa is the driver of the region's GM cultivation as it represents almost 95% of the GM planted area. From 2008 to 2015, Burkina Faso cultivated GM cotton; however, plantings ended as it was reported that the varieties containing GM traits were not yielding enough. Since 2012 other countries in the region have begun GM crop cultivation.

Rest of World GM Crop Area by Country 2024

Country	GM Area (Ha m.)	% Change	% Share
South Africa	3.473	-0.5	94.3
Sudan	0.196	0.0	5.3
Ethiopia	0.008	0.0	0.2
Kenya	0.007	53.3	0.2
Eswatini	0.000	84.9	0.0
Total	**3.684**	**-0.4**	**100.0**

South Africa

Area in 2024: 3.5 Ha m. (-0.5%)

GM Crops (year of introduction): Cotton (1997), Maize (1999), Soybean (2001)

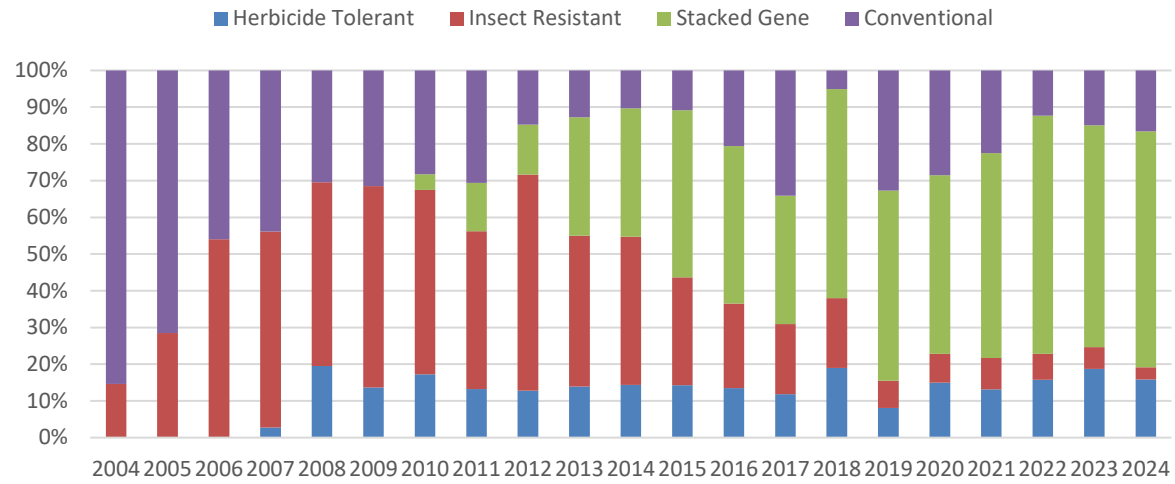
South Africa possesses the world's 8th-largest GM crop area at 3.5 million hectares in 2024. Within this, maize forms the bulk of the country's GM area, 63.4% of South Africa's total.

South Africa GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.18	-9.1
Maize	2.2	0.0
Soybean	1.1	0.2
Total	**3.5**	**-0.5**

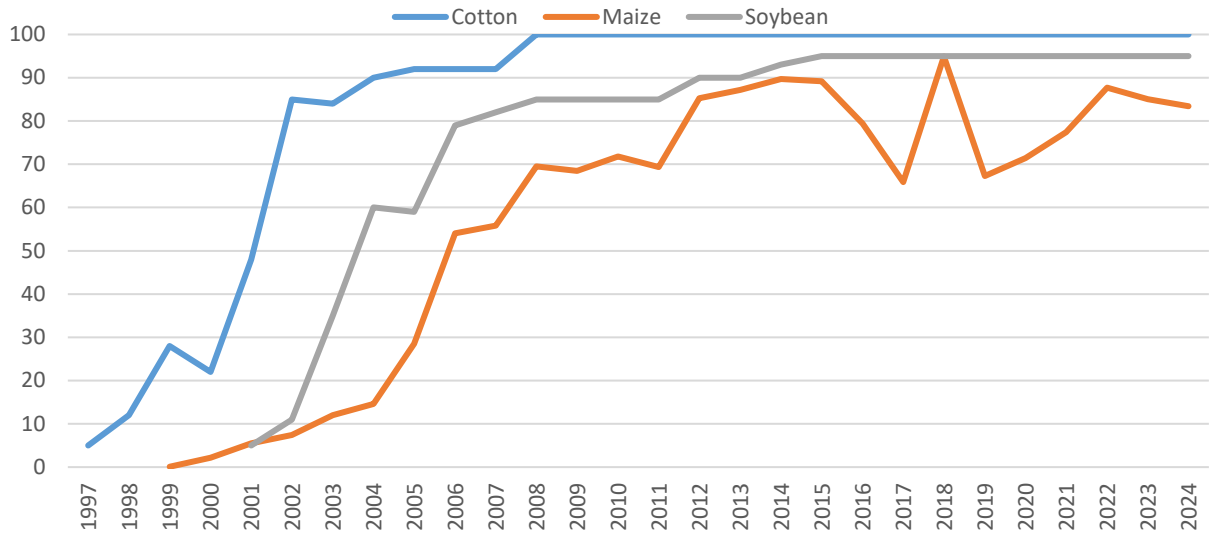
GM maize was first planted in 1999 on an initial 0.1% of the country's total maize area. It was not until 2018 that adoption rates exceeded 90%, but since that time % utilisation has declined to 83.5% in 2024. 64.3% of the country's total maize area is planted with stacked gene varieties, with solely herbicide tolerant varieties forming the next largest group with 15.9% of the total area. Conventional varieties that do not possess any GM traits represent approximately 16.6% of the total area, while solely insect resistant varieties are planted on 3.3% of the country's total maize area.

South Africa Total Maize Area by Technology (%)



GM soybean was first cultivated in South Africa in 2001. In the 20 years since commercialisation, GM plantings now represent 95.0% of the country's total soybean area. In 2024, 1.1 million hectares of GM soybean were cultivated, a rise of 0.2% over the previous year. The GM area is exclusively planted with Roundup Ready (glyphosate tolerant) varieties. A driver of the country's GM soybean area has been its rotation with maize crops and increased oilseed processing operations in the country.

South Africa GM Adoption by Crop (%)



GM cotton was planted on a small area in South Africa at 0.18 million hectares in 2024, a fall of 9.1% from the previous year. GM Cotton was introduced in 1997 when solely insect resistant varieties were utilised; however in 2024 stacked gene varieties formed the majority of the total cotton area at approximately 90%.

Sudan

Area in 2024: 0.196 Ha m. (0.0%)

GM Crops (year of introduction): Cotton (2012)

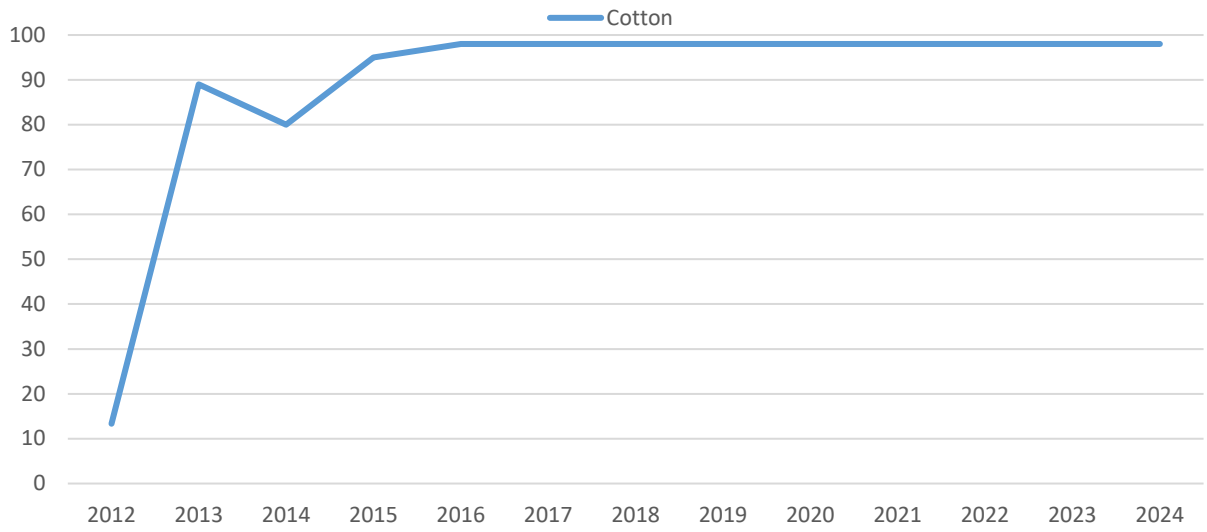
Sudan has only cultivated GM cotton for the past 10 years. During this time adoption rates have increased to reach 98.0% of the country's total cotton area. During the first year of commercialisation, % utilisation was 13.3%, however, this quickly jumped to 98% within four years.

Sudan GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.196	0.0
Total	**0.196**	**0.0**

The Sudan GM cotton area is planted with solely insect resistant varieties, typically containing Bayer's Bollgard trait.

Sudan GM Adoption by Crop (%)



Ethiopia

Area in 2024: 0.0077 Ha m. (0.0%)

GM Crops (year of introduction): Cotton (2019)

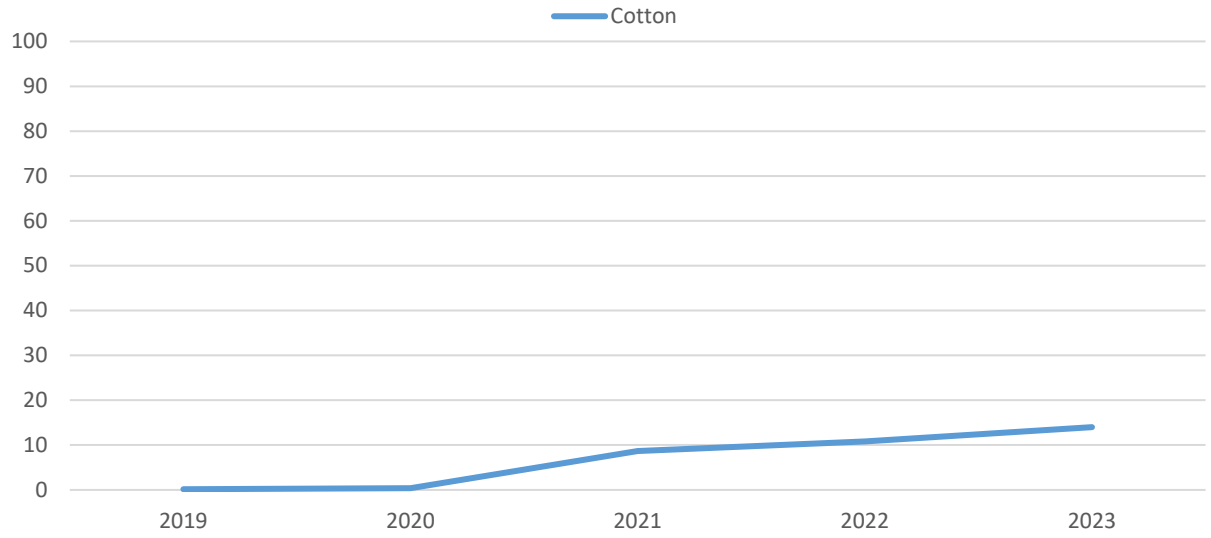
Ethiopia has only recently begun the cultivation of GM cotton, with first plantings occurring in 2019. In 2024, GM plantings remained flat at 7,700 hectares. The Ethiopian government authorised the use of seeds sourced from India, typically from JK Agri Genetics. However, since that time there has reportedly been greater use of seeds purchased from uncertified sources on the Ethiopian border. Ethiopia's National Variety Release Committee (NVRC) has recently approved the commercial release of GM insect resistant and drought tolerant maize which were developed as part of the TELA Maize Project.

Ethiopia GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.0077	0.0
Total	**0.0077**	**0.0**

In a similar situation to Sudan, Ethiopia's GM cotton area is planted with solely insect resistant varieties.

Ethiopia GM Adoption by Crop (%)



Kenya

Area in 2024: 0.0069 Ha m. (+53.3%)

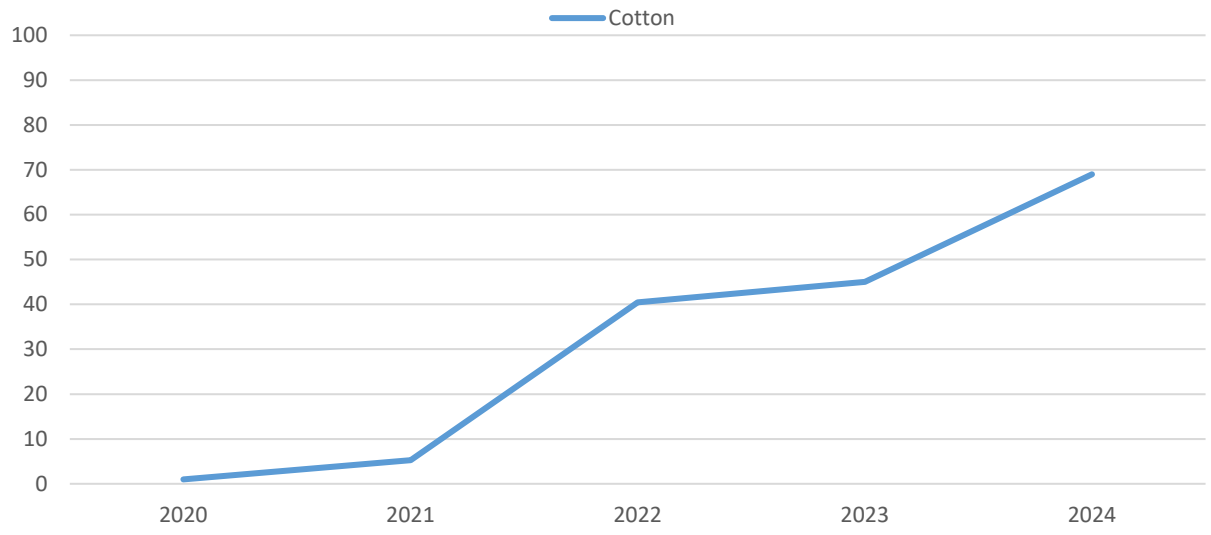
GM Crops (year of introduction): Cotton (2020)

Kenya planted its first commercial varieties of GM cotton in 2020, with the government citing the need to provide the agricultural sector with pest and drought resistant crops and help adapt to climate change. In the years since, plantings have increased to 6,900 hectares, representing 69.0% of Kenya's total cotton area in 2024.

Kenya GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.0069	53.3
Total	**0.0069**	**53.3**

Kenya GM Adoption by Crop (%)



Malawi

Area in 2024: 0.002

GM Crops (year of introduction): Cotton (2020)

Malawi first planted GM cotton varieties in 2020, with adoption growing to 75% of the country's total cotton area in 2024. Adoption of GM cotton varieties has been driven by reportedly greater yield in comparison with conventional non-GM varieties.

Malawi GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.002	-
Total	**0.002**	**-**

Eswatini

Area in 2024: 0.0002 Ha m. (+84.9%)

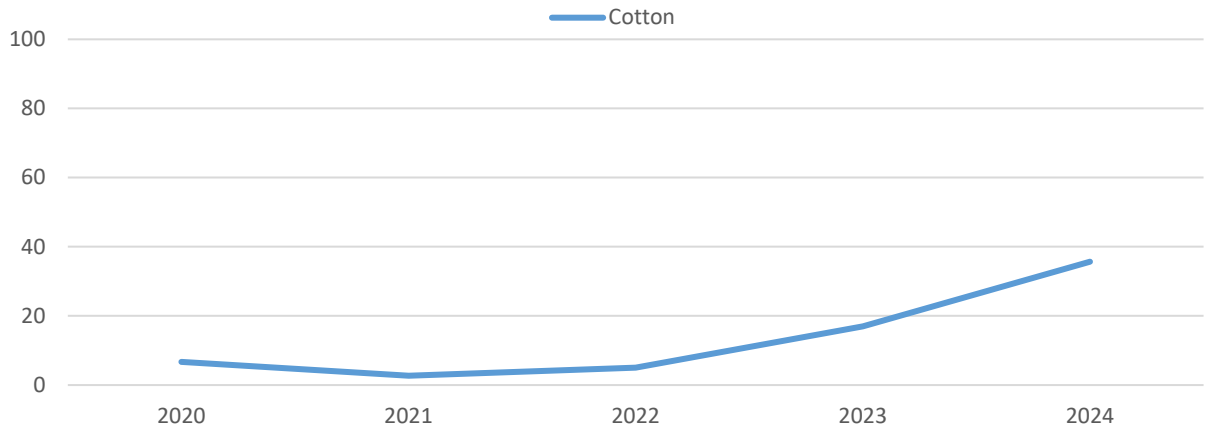
GM Crops (year of introduction): Cotton (2020)

Eswatini planted its first commercial varieties of GM cotton in 2020 at an initial adoption rate of 6.7% of the country's total cotton area. In the last two years adoption rates have increased to form 35.7% of the total cotton area. GM cotton was introduced with the aim of returning the country to growing cotton production, aiding feeding the country's cotton gins that have reportedly gone underutilised.

Eswatini GM Crop Area 2024

Year	GM Area (Ha m.)	% Change
Cotton	0.0002	84.9
Total	**0.0002**	**84.9**

Eswatini GM Adoption by Crop (%)



Nigeria

Nigeria has begun the cultivation of GM cotton and cowpea. However, GM cotton is still reportedly in its trial phase, while GM cowpea began commercial plantings in 2022. The country approved the maize genetic event MON 87460 x MON 89034 in 2021, with regulators approving the use of this genetic event in four TELA maize varieties in early 2024. Data from Nigeria is presently difficult to attain and AgbioInvestor is progressing with gathering this data.

Nigeria cultivates two GM cotton varieties: Mahyco C 567 BGII & Mahyco C 571 BGII, both of which utilise the MON 15985 genetic event that produces the Cry1Ac and Cry2Ab delta endotoxins. Bt cowpea varieties contain the AAT709A genetic event that confers resistance to pest pod borer (*Maruca vitrata*) through the production of the Cry1Ab delta endotoxin.

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