

BROCCOLI ANALYSIS 2022

PRODUCTION, PRICES AND EXPORTS



Index

3

Overview

6

Worldwide production

13

Global trade

20

Production in Mexico

31

Mexican exports and imports

39

The U.S. market

47

Price analysis

50

Production in Central South America

56

Articles of interest

59

Information sources



Overview



Current status broccoli cultivation

Broccoli is one of the most important vegetables commercially speaking, as evidenced by its steady increase in production, which already exceeds 25 million tons, mainly because the harvested area also continues to increase and since the yield has remained around 18 tons per hectare since 1998, there is a huge opportunity to improve yields.

China and India are the leading countries in the production of this crop since together they account for over 70% of world production, which is because they also have the largest harvested area. However, they do not have outstanding yields.

The United States and Mexico ranked third and fifth among the countries with the highest production. It is noteworthy that the United States is also the third-largest importer, which indicates that its domestic market consumes a large amount of broccoli. Of course, it also exports a significant amount, mainly to Canada and Mexico, with Canada being the second-largest importer, only behind the United Kingdom.

As for the main exporting countries, Spain leads and Mexico is in the second position, together accounting for around 50% of world broccoli exports, with the United States in the third position.

However, production in Mexico has been declining for three years due to a decrease in the harvested area and a slight decrease in yields, although the price per ton reached its historical maximum in 2020, which helped maintain the value of production for this crop.

In Mexico, the state of Guanajuato is the undisputed leader in broccoli production, followed by Puebla, Jalisco, and Sonora. However, the highest average yield was obtained in San Luis Potosi and the highest price per ton was obtained in Baja California.



Of course, it should be mentioned that there is an enormous opportunity in the technification of production at the national level since most of the production obtained is in the open air, which generates a certain level of uncertainty when climatic conditions in the main production areas are adverse. In addition, there is another great opportunity in organic production since the price per ton paid is much higher than conventional production since most of the national production is also conventional.

Broccoli production in Mexico has two peak production seasons, the largest during the spring, with April being the month with the highest historical production, and the other in late summer and early fall, with September being the month with the highest volume. However, the largest volume of exports occurs between November and March, the main destination being the United States, while between July and September there are imports, precisely from the United States.

U.S. production has decreased in recent years, mainly due to California farmers' water and labor challenges, who produce about 90% of the country's broccoli; this situation has also meant a decrease in annual export volumes, which are mostly to Canada.

In fact, the coronavirus significantly affected the national production of broccoli, as it is a vegetable in high demand by restaurants, a sector that with the closures imposed by the government was greatly affected, so that the demand for broccoli decreased, to the extent that many farmers decided not to harvest their product, especially because of the difficulty in 2019 and 2020 to market it successfully.



For Central and South America, the main producers were Guatemala, Ecuador, Peru, Colombia, and Chile, each with certain peculiarities. In the case of Guatemala and Ecuador, there has been certain stability for several years. Meanwhile, Peru seems to be declining, Colombia's production is increasing significantly, and Chile shows significant variations.

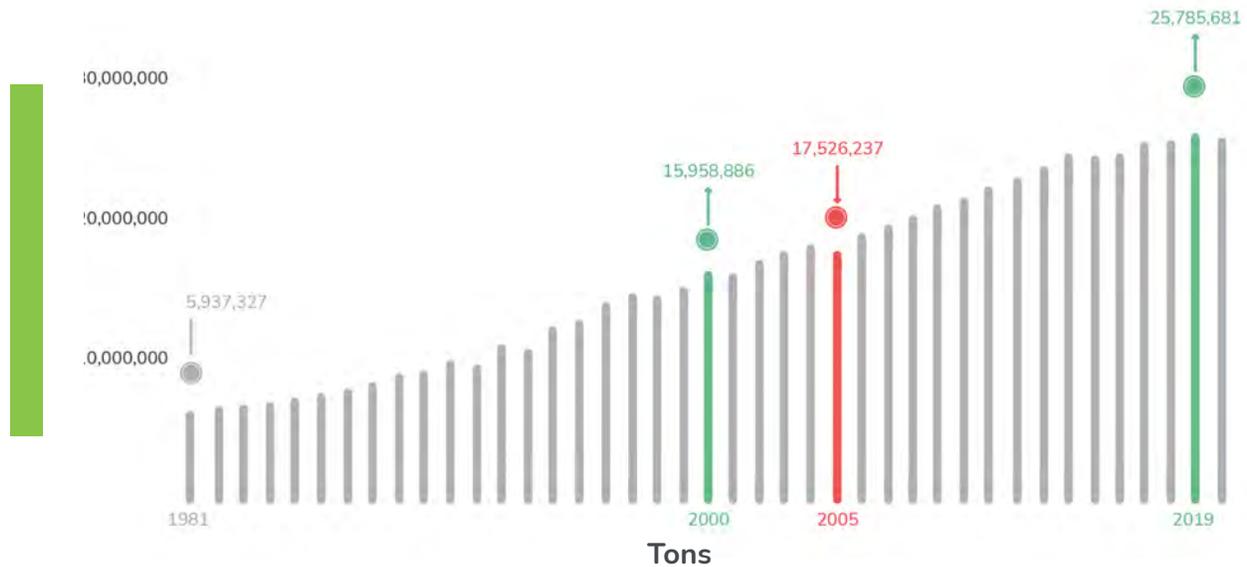




Worldwide production

Worldwide production

Source: FAOSTAT



In 2020, the world production of broccoli and cauliflower was 25,531,274 tons, which implied a decrease of 1.0% compared to 2019, when it reached 25,785,681 tons, which is the historical maximum.

Between 2011-2020 there was an average annual variation of +1.9%, while between 2001-2010 the variation was +2.9%, indicating a decrease in the rate of increase of world production over the last decade.

All indications are that world production is stabilizing, mainly due to a slight decrease in the harvested area and average yields that have not increased significantly.



Countries with the highest production

Source: FAOSTAT

	Country	Production obtained (t)	%
①	 China	9,487,465	37.2
②	 India	8,840,000	34.6
③	 United States	1,259,135	4.9
④	 Spain	746,510	2.9
⑤	 Mexico	686,788	2.7
⑥	 Italy	365,360	1.4
⑦	 Turkey	311,391	1.2
⑧	 Bangladesh	283,157	1.1
⑨	 France	257,130	1.0
⑩	 Algeria	242,990	1.0

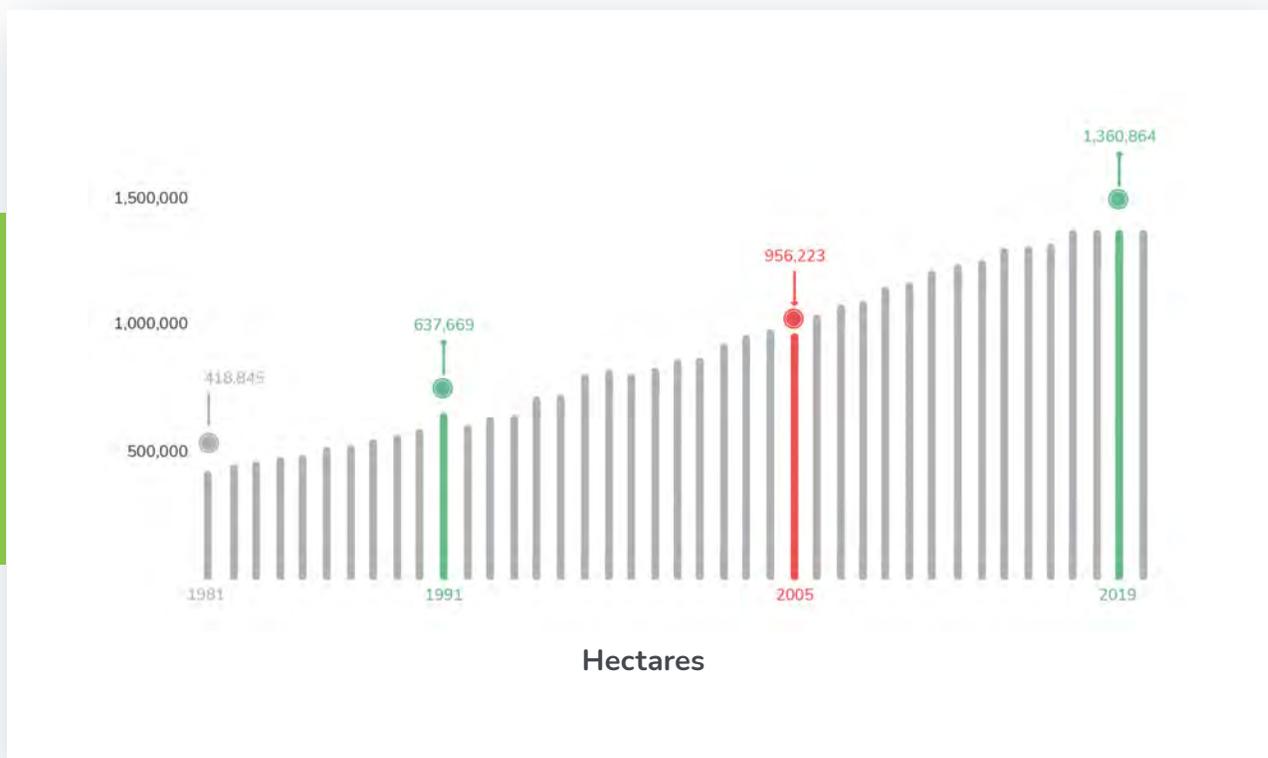
In 2020 China was the country with the largest broccoli and cauliflower production, with 9,487,465 tons, which translated into 37.2% of world production; India and the United States followed it with 8,840,000 (34.6%) and 1,259,135 (4.9%) tons, respectively.

A total of 94 countries reported production in 2020, but only 22 produced more than 100,000 tons.

Mexico came in 5th position, with 686,788 tons. Other countries in the American continent that produced broccoli and cauliflower were Guatemala with 116,538 tons, Ecuador with 114,093 tons, Canada with 68,044 tons, Peru with 65,640 tons and Colombia with 56,860 tons.



World surface area



In 2020, the area harvested in the world of broccoli and cauliflower was 1,357,186 hectares, which implied a decrease of 0.3% compared to 2019, when it reached 1,360,864 hectares, the historical maximum.

Between 2011-2020 there was an average annual variation of +1.7%, while between 2001-2010 the variation was +3.1%, indicating a decrease in the rate of increase in world surface area over the last decade.

The harvested area has shown a variation of less than 1.0% for the last six years, either upward or downward, so it is somewhat stabilized, which in turn influences the fact that production has not increased in recent years.

Countries with the largest surface area

Source: FAOSTAT

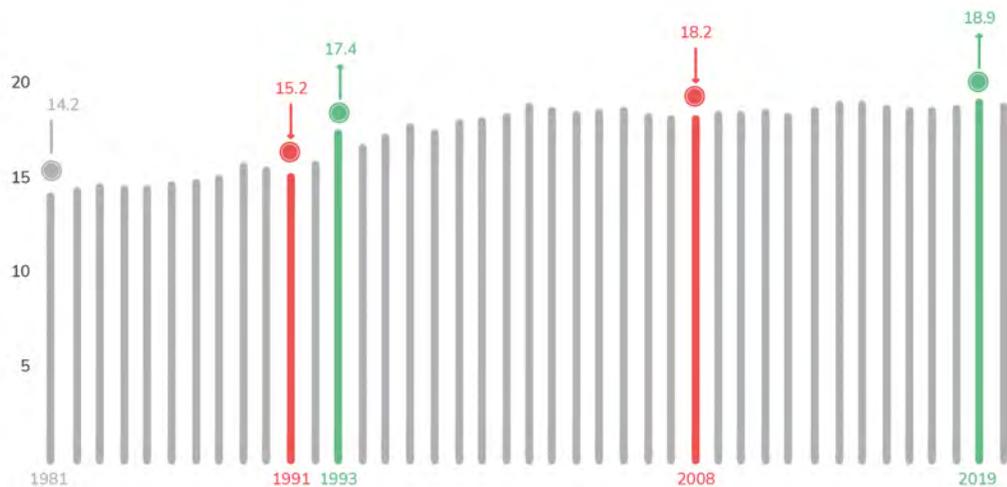
	Country	Harvested area (ha)	%
①	 China	478,343	35.2
②	 India	458,000	33.7
③	 United States	57,668	4.2
④	 Spain	41,180	3.0
⑤	 Mexico	38,339	2.8
⑥	 Bangladesh	26,001	1.9
⑦	 United Kingdom	18,251	1.3
⑧	 Japan	17,893	1.3
⑨	 France	17,820	1.3
⑩	 Indonesia	15,677	1.2

In 2020 China was the country with the largest area of broccoli and cauliflower, with 478,343 hectares, which translated into 35.2% of the world's area; it was followed by India and the United States, with 458,000 (33.7%) and 57,668 (4.2%) hectares, respectively.

A total of 94 countries reported production in 2020, but only 6 had more than 25,000 hectares.

Mexico ranked 5th with 38,339 hectares, while other countries in the Americas that harvested broccoli and cauliflower were Ecuador with 14,746 hectares, Guatemala with 6,904 hectares, Canada with 5,677 Peru with 4,987 hectares, and Colombia with 3,303 hectares.

Global yields



Tons per hectare

In 2020, the world average yield of broccoli and cauliflower was 18.8 tons per hectare, implying a decrease of 0.7% compared to 2019, when it reached 18.9 tons per hectare.

Between 2011-2020 there was an average annual variation of +0.2%, while between 2001-2010 the variation was -0.2%, which indicates that the yield has remained fairly stable over the last two decades.

This stability, coupled with the stagnation of the harvested area, has meant that world production has not increased in recent years, making it a priority to increase yields.

Countries with the highest yields

Source: FAOSTAT

	Country	Average yield (t/ha)	%
①	 Jordan	45.0	139.1
②	 Armenia	39.8	110.7
③	 Bahrain	35.3	87.8
④	 Kuwait	34.5	83.3
⑤	 Iran	32.9	74.9
⑥	 Palestine	32.3	71.9
⑦	 United Arab Emirates	28.9	53.9
⑧	 Egypt	28.1	49.5
⑨	 Algeria	27.3	45.3
⑩	 Poland	23.8	26.7

* The percentage indicated is with respect to the world average in 2020 of 18.8 t/ha

In 2020, Jordan was the country with the highest broccoli and cauliflower yield, with 45.1 tons per hectare, exceeding the world average yield of 18.8 tons per hectare by 139.1%; it was followed by Armenia and Bahrain, with 39.6 (110.7%) and 35.3 (87.8%) tons per hectare, respectively.

Twenty-nine countries exceeded the world average yield, with Egypt being the first with more than 100,000 tons produced, in 8th position.

Mexico ranked 33rd, with 17.9 t/ha, below the world average yield, and the broccoli and cauliflower yields of other countries in the Americas were as follows: Venezuela 18.0 t/ha, Colombia 17.2 t/ha, Guatemala 16.2 t/ha, Chile 16.5 t/ha and Peru 13.2 t/ha.



Global trade

World imports

Source: FAOSTAT

Year	Volume (t)	Difference (%)	Value (million dollars)	Difference (%)
2001	551,659	6.1	378	14.1
2002	559,582	1.4	398	5.5
2003	596,538	6.6	475	19.3
2004	622,438	4.3	512	7.8
2005	615,787	-1.1	603	17.8
2006	649,950	5.5	636	5.4
2007	753,139	15.9	742	16.7
2008	668,440	-11.2	698	-5.9
2009	659,646	-1.3	720	3.2
2010	745,234	13.0	823	14.3
2011	873,105	17.2	870	5.7
2012	933,100	6.9	908	4.4
2013	932,076	-0.1	1,044	15.0
2014	955,099	2.5	1,015	-2.8
2015	956,768	0.2	966	-4.8
2016	984,755	2.9	1,024	5.9
2017	1,091,168	10.8	1,163	13.6
2018	1,076,044	-1.4	1,195	2.7
2019	1,113,380	3.5	1,286	7.6
2020	1,116,463	0.3	1,379	7.3

In 2020, the world imports volume of broccoli and cauliflower amounted to 1,116,463 tons, with a value of USD 1,379 million, which implied an increase of 0.3% in terms of volume and an increase of 7.3% in terms of value, respectively, compared to 2019, when they had 1,113,380 tons and USD 1,286 million.

Over the last two decades, world imports have shown an average annual variation of +4.1% in volume and +7.6% in value, indicating that prices have remained high, despite the increase in volume.

Main importing countries

Source: FAOSTAT

	Country	Volume (t)	%	Value (million dollars)	%
①	 United Kingdom	128,654	11.5	222	16.1
②	 Canada	109,025	9.8	149	10.8
③	 United States	98,972	8.9	122	8.9
④	 Germany	79,768	7.1	100	7.3
⑤	 Malaysia	60,818	5.4	74	5.3
⑥	 France	51,754	4.6	68	4.9
⑦	 Netherlands	48,790	4.4	65	4.7
⑧	 Poland	40,923	3.7	51	3.7
⑨	 Thailand	33,739	3.0	18	1.3
⑩	 Portugal	31,585	2.8	21	1.6

The leading importer of broccoli and cauliflower in 2020 was the United Kingdom, with a volume of 128,654 tons, which accounted for 11.5% of total world imports, followed by Canada with 109,025 tons (9.8%) and the United States with 98,972 tons (8.9%).

Mexico ranked 25th, with 11,429 tons and 10 million dollars. Other countries in the American continent that imported were El Salvador with 19,762 tons (4 million dollars), Honduras with 3,961 tons (1 million dollars), and Trinidad and Tobago with 1,018 tons (1 million dollars).

Main import flows

Source: FAOSTAT

Reporting country	Partner country	Imports (t)	%	Imports (million dollars)	%
United Kingdom	Spain	101,607	9.1	163	11.9
Canada	United States	89,129	8.0	123	9.0
United States	Mexico	82,671	7.4	105	7.7
Malaysia	China	59,577	5.4	71	5.2
France	Spain	40,829	3.7	58	4.2

The largest global flow of broccoli and cauliflower imports originates in Spain and is destined for the United Kingdom, a flow that in 2020 amounted to 101,607 tons, with a value of \$163 million, representing 9.1% of the total imported volume and 11.9% of the total imported value.

The next most important flows were Canadian imports from the United States (89,129 t and 123 million dollars) and U.S. imports from Mexico (82,671 t and 105 million dollars).



World exports

Source: FAOSTAT

Year	Volume (t)	Difference (%)	Value (mdd)	Difference (%)
2001	781,652	0.8	464	8.7
2002	825,301	5.6	512	10.5
2003	794,350	-3.8	568	11.0
2004	891,653	12.2	648	14.0
2005	946,377	6.1	796	22.8
2006	990,598	4.7	814	2.3
2007	988,934	-0.2	843	3.5
2008	995,231	0.6	920	9.2
2009	976,629	-1.9	970	5.4
2010	1,046,728	7.2	1,084	11.7
2011	1,148,662	9.7	1,136	4.8
2012	1,180,318	2.8	1,109	-2.3
2013	1,187,031	0.6	1,284	15.7
2014	1,240,627	4.5	1,227	-4.4
2015	1,281,071	3.3	1,187	-3.2
2016	1,341,214	4.7	1,282	8.0
2017	1,421,298	6.0	1,387	8.2
2018	1,378,823	-3.0	1,430	3.0
2019	1,392,609	1.0	1,527	6.8
2020	1,422,015	2.1	1,642	7.5



In 2020, the volume of world exports of broccoli and cauliflower amounted to 1,422,015 tons, with a value of 1,642 million dollars, which implied an increase of 2.1% in terms of volume and an increase of 7.5% in terms of value, respectively, compared to 2019, when they had 1,392,609 tons and 1,527 million dollars.

Over the last two decades, world exports have shown an average annual variation of +3.2% in volume and +7.2% in value, which indicates that prices have remained high, despite the increase in volume.

Main exporting countries

Source: FAOSTAT

	Country	Volume (t)	%	Value (million dollars)	%
①	 Spain	397,950	28.0	549	33.5
②	 Mexico	318,458	22.4	354	21.6
③	 United States	119,456	8.4	163	9.9
④	 France	108,672	7.6	110	6.7
⑤	 China	98,112	6.9	96	5.9
⑥	 Italy	76,351	5.4	103	6.3
⑦	 Netherlands	48,166	3.4	67	4.1
⑧	 Guatemala	38,375	2.7	30	1.8
⑨	 Belarus	37,481	2.6	7	0.4
⑩	 Poland	23,404	1.6	23	1.4

The leading exporter of broccoli and cauliflower in 2020 was Spain, with a volume of 397,950 tons, which accounted for 28.0% of total world exports, followed by Mexico with 318,458 tons (22.4%) and the United States with 119,456 tons (8.4%).

Other countries in the Americas that exported were Guatemala with 38,375 tons (30 million dollars, Canada with 16,492 tons (16 million dollars) and Costa Rica with 614 tons (< 1 million dollars). It is noteworthy that the United States was the 3rd largest exporter and the 3rd largest importer.

Main export flows



The largest global flow of broccoli and cauliflower exports is destined to the United States and originates in Mexico, a flow that in 2020 amounted to 312,200 tons, with a value of 349 million dollars, representing 22.2% of the total exported volume and 21.5% of the total exported value.

The next most important flows were U.S. exports to Canada (102,292 t and 1145 million dollars) and Spanish exports to the United Kingdom (99,339 t and 77.1 million dollars).

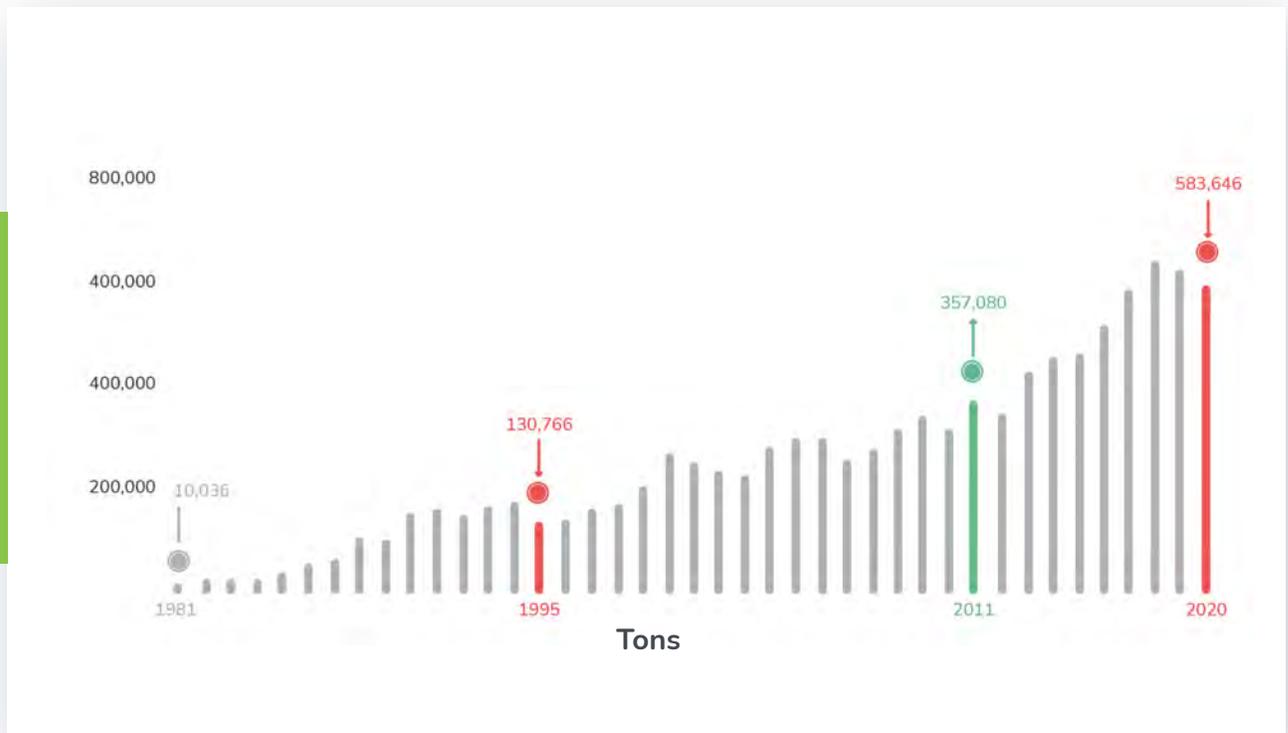
Source: FAOSTAT

Declaring country	Partner country	Exports (t)	%	Exports (million dollars)	%
Mexico	United States	312,200	22.2	349	21.5
United States	Canada	102,292	7.3	145	8.9
Spain	United Kingdom	99,339	7.1	162	9.9
Spain	Germany	67,202	4.8	87	5.3
Spain	Netherlands	53,190	3.8	74	4.5



Production in Mexico

Production obtained in Mexico



In 2020 the broccoli cultivation in Mexico had a production of 583,646 tons, a decrease of 5.0% compared to 614,437 tons in 2019.

In addition, between 2011-2020 there was an average annual variation of +7.1%. Between 2001-2010 the variation was +3.0%. In the last decade, there has been a significant increase in the production obtained.

The historical maximum was reached in 2018, with 631,512 tons, being that in 2019 and 2020 there were significant decreases, due to the decrease in area and yields.

Harvested area in Mexico



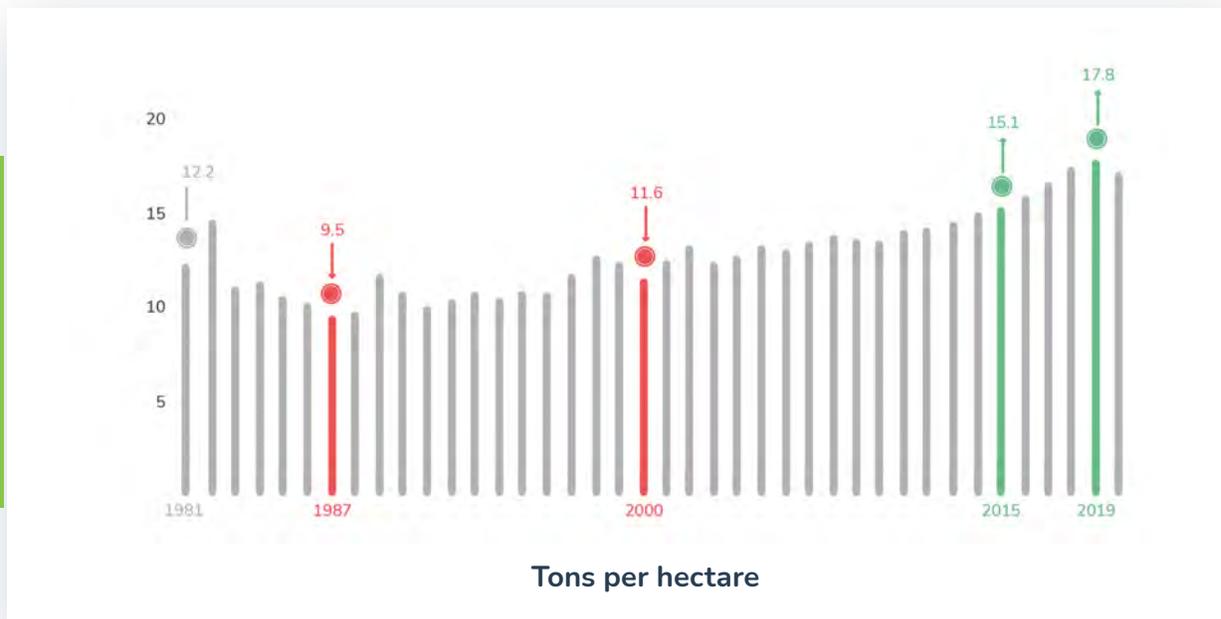
In 2020, broccoli cultivation in Mexico presented a harvested area of 33,923 hectares, a decrease of 1.6% compared to 34,472 hectares in 2019.

In addition, between 2011-2020 there was an average annual variation of +4.5%. Between 2001-2010 the variation was +1.7%. In the last decade, there has been a significant increase in the harvested area.

However, in the last three years the area has decreased by about 2,000 hectares, which, together with a decrease in yields, has led to a decrease in production.



Average yield in Mexico

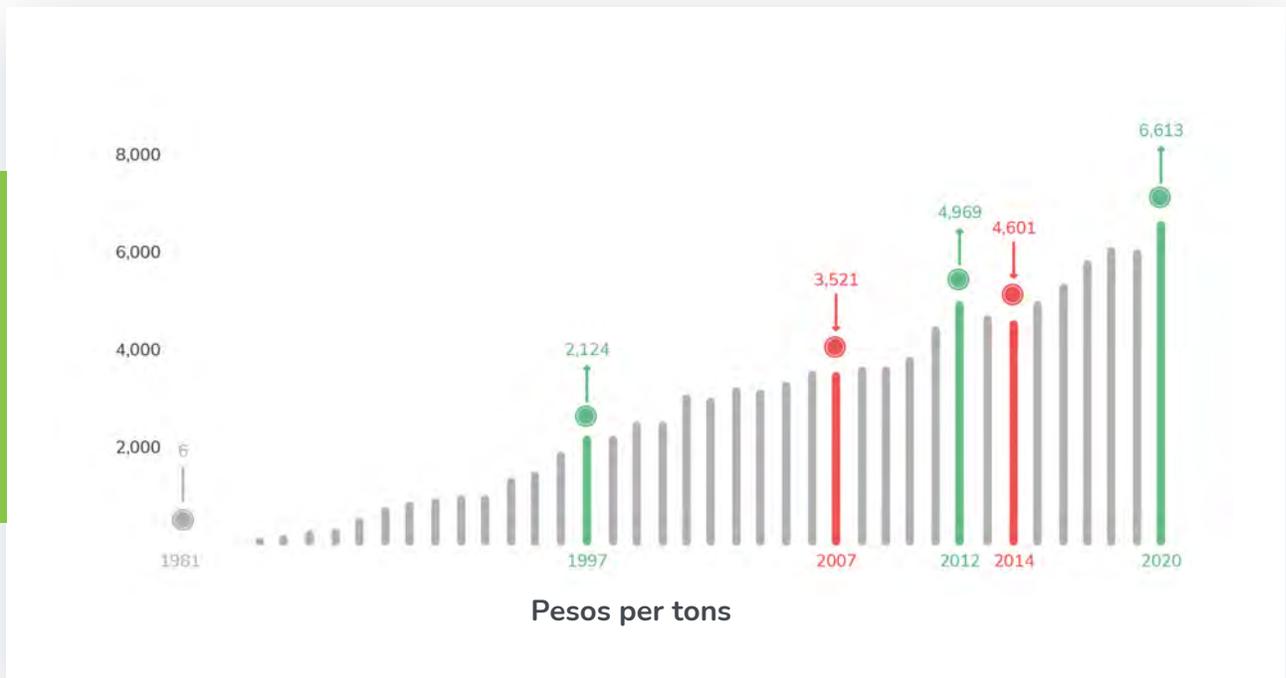


In 2020 the broccoli crop in Mexico presented an average yield of 17.2 tons per hectare, a decrease of 3.5% with respect to the 17.8 tons per hectare in 2019.

In addition, between 2011-2020 there was an average annual variation of +2.4%, while between 2001-2010 the variation was +1.7%, so in the last decade the average national yield has increased considerably.

After ten years with small increases in national yields, there was a setback in 2020, which could undoubtedly be due to the drought problems that affected several of the main producing regions in that year.

Average price in Mexico

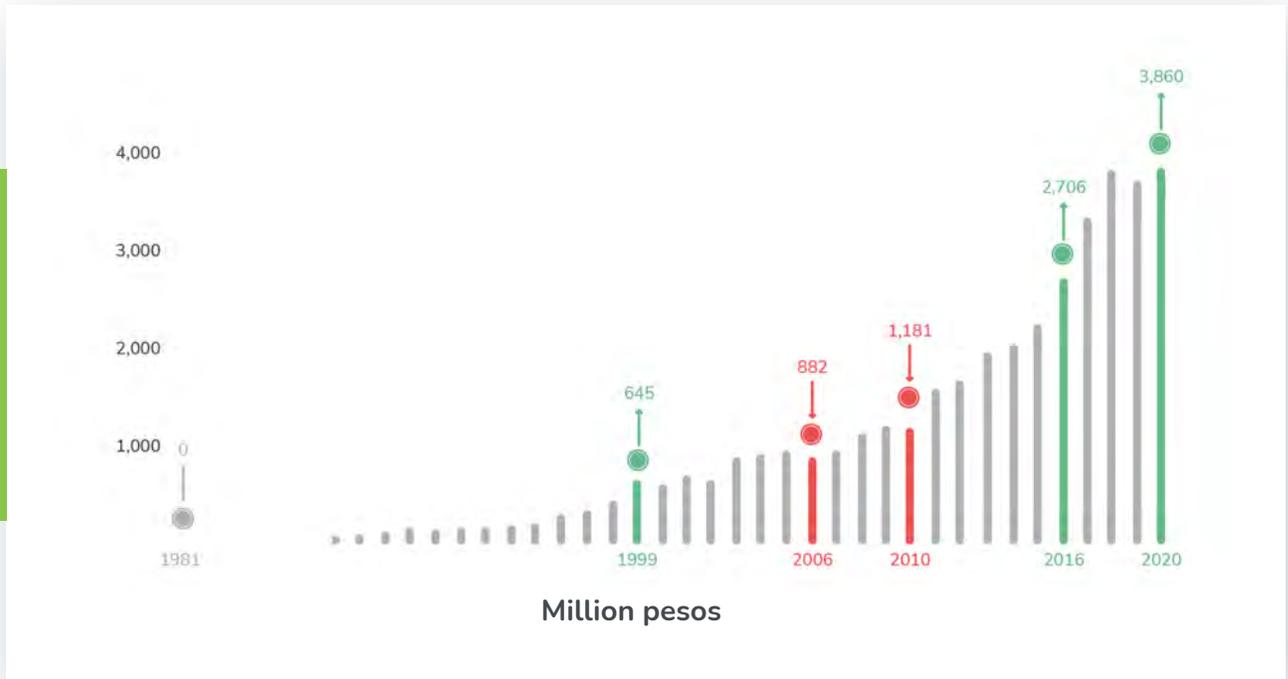


In 2020, the broccoli crop in Mexico had an average price of 6,613 pesos per ton, an increase of 9.5% over the 6,040 pesos per ton in 2019.

In addition, between 2011-2020 there was an average annual variation of +5.7%, whereas between 2001-2010 the variation was +4.7%, so that in the last two decades the price has increased significantly.

The average price rose from 2,489 pesos per ton in 2000 to 3,852 pesos in 2010 and 6,613 pesos in 2020. It remains to be seen whether the trend can continue in the following years, supported by production for export.

Production value in Mexico



In 2020, broccoli cultivation in Mexico had a production value of 3,860 million pesos, an increase of 4.0% over the 3,711 million pesos in 2019.

In addition, between 2011-2020 there was an average annual variation of +13.1%, whereas between 2001-2010 the variation was +7.5%, so that in the last decade the value of production has increased considerably.

However, after eight years with annual increases, in 2019 there was a decrease compared to 2018, although there was a recovery in 2020, so it will be necessary to see if in 2021 the upward trend continues or if there is stagnation.

Broccoli producing states in Mexico

In 2020, 18 states reported broccoli production, with Guanajuato being the undisputed leader with 409,837 tons, or 70.2% of the national total, followed by Puebla, Jalisco, Sonora, and Tlaxcala, with 7.8%, 4.0%, 3.5% and 3.0%, respectively, so that these five states produced 85.5% of broccoli in the country, mainly because these states accumulate 88.5% of the national harvested area.

San Luis Potosí is the entity with the highest average yield, with 29.4 tons per hectare, while Baja California obtained the highest average price per ton, \$18,429, followed by Baja California Sur and Sonora, with \$14,150 and \$10,851, respectively. Finally, Guanajuato generated 2,708 million pesos (70.2%) in terms of production value.

	State	Production obtained (t)	Harvested area (ha)	Average yield (t/ha)	Average price (\$/t)	Production value (million pesos)
①	 Guanajuato	409,837	24,234	16.9	6,608	2,708
②	 Puebla	45,343	2,595	17.5	4,236	192
③	 Jalisco	23,293	1,243	18.7	5,640	131
④	 Sonora	29,623	923	22.3	10,851	224
⑤	 Tlaxcala	17,499	776	22.5	6,211	109
⑥	 Aguascalientes	16,346	914	17.9	4,028	66
⑦	 Baja California	13,573	890	15.2	18,429	250
⑧	 Michoacan	11,737	598	19.6	5,041	59
⑨	 Queretaro	9,160	666	13.8	3,786	35
⑩	 Zacatecas	5,191	335	15.5	4,137	21



Broccoli producing municipalities in Mexico

In 2020, 141 municipalities reported broccoli production, with Dolores Hidalgo being the leader with 50,806 tons, meaning 8.7% of the national total, followed by Valle de Santiago, San Luis de la Paz, San Miguel de Allende, and Doctor Mora, with 8.3%, 5.9%, 5.5% and 4.9%, respectively, so that these five municipalities produced 33.4% of the broccoli in the country, mainly because these municipalities accumulate 34.9% of the national harvested area.

Venado, San Luis Potosí was the municipality with the highest average yield, with 46.5 tons per hectare, while Mexicali, Baja California had the highest average price per ton, \$18,631, followed by Los Cabos, Baja California Sur and San Luis Río Colorado, Sonora, with \$14,150 and \$10,937, respectively. Finally, Dolores Hidalgo generated 351 million pesos (9.1%) in terms of production value.

Source: SIAP

Municipality	Production obtained (t)	Harvested area (ha)	Average yield (t/ha)	Average price (\$/t)	Production value (million pesos)
Dolores Hidalgo, Gto.	50,806	3,178	16.0	6,914	351
Valle de Santiago, Gto.	48,405	2,843	17.0	6,087	295
San Luis de La Paz, Gto.	34,510	2,009	17.2	6,849	236
San Miguel de Allende, Gto.	31,712	1,980	16.0	7,287	231
Doctor Mora, Gto.	28,446	1,759	16.2	6,806	194
San José Iturbide, Gto.	25,759	1,554	16.6	7,088	183
Juventino Rosas, Gto.	25,148	1,053	23.9	6,497	163
Jaral del Progreso, Gto.	22,412	1,319	17.0	6,238	140
San Luis Río Colorado, Son.	19,753	883	22.4	10,937	216
Abasolo, Gto.	19,686	1,277	15.4	5,888	116

Domestic production breakdown

Broccoli production technologies in Mexico in 2020

Source: SIAP

99.9% of the national broccoli production in 2020 was in the open air, indicating a huge opportunity for technification, especially considering that yields can be higher if a protective structure is used.

Technology	Production obtained (t)	Harvested area (ha)	Average yield (t/ha)	Average price (\$/t)	Production value (million pesos)
Open air	582,693	33,908	17.2	6,614	3,856
Protected agriculture	683	15	45.5	6,090	4
Total	583,646	33,930	17.2	6,613	3,860

Types of broccoli production in Mexico during 2020

Source: SIAP

98.4% of national broccoli production in 2020 was conventional, so there is a huge opportunity for organic production, especially considering that the average price per ton far exceeds its conventional counterpart.

Technology	Production obtained (t)	Harvested area (ha)	Average yield (t/ha)	Average price (\$/t)	Production value (million pesos)
Conventional	574,147	33,304	17.2	6,466	3,712
Organic	9,499	620	15.3	15,537	148
Total	583,646	33,930	17.2	6,613	3,860

Monthly domestic production



The broccoli production peak occurs between March and May, which concentrated 26.4% of the annual volume in 2020. Subsequently, there was an abrupt drop between June and July, to have a second production peak between August and November.

January was the month with the lowest production, 2.6%, followed by July, December, and June, with 4.6%, 5.1% and 5.6%, respectively. In addition, in the last three years with available data, the behavior of the national production curve has been quite similar, with only very slight variations in some months.



Monthly broccoli production in Mexico

Source: SIAP Panorama Agroalimentario

Month	2018	2019	2020	Average
January	2.6	2.6	2.9	2.7
February	5.8	6.2	7.0	6.3
March	13.3	12.6	11.9	12.6
April	15.8	15.3	14.5	15.2
May	7.1	9.0	9.3	8.5
June	6.5	5.9	5.6	6.0
July	4.4	4.4	4.6	4.5
August	10.5	10.4	10.2	10.4
September	11.1	11.1	11.4	11.2
October	9.2	9.3	9.7	9.4
November	9.5	8.3	7.8	8.5
December	4.2	4.9	5.1	4.7



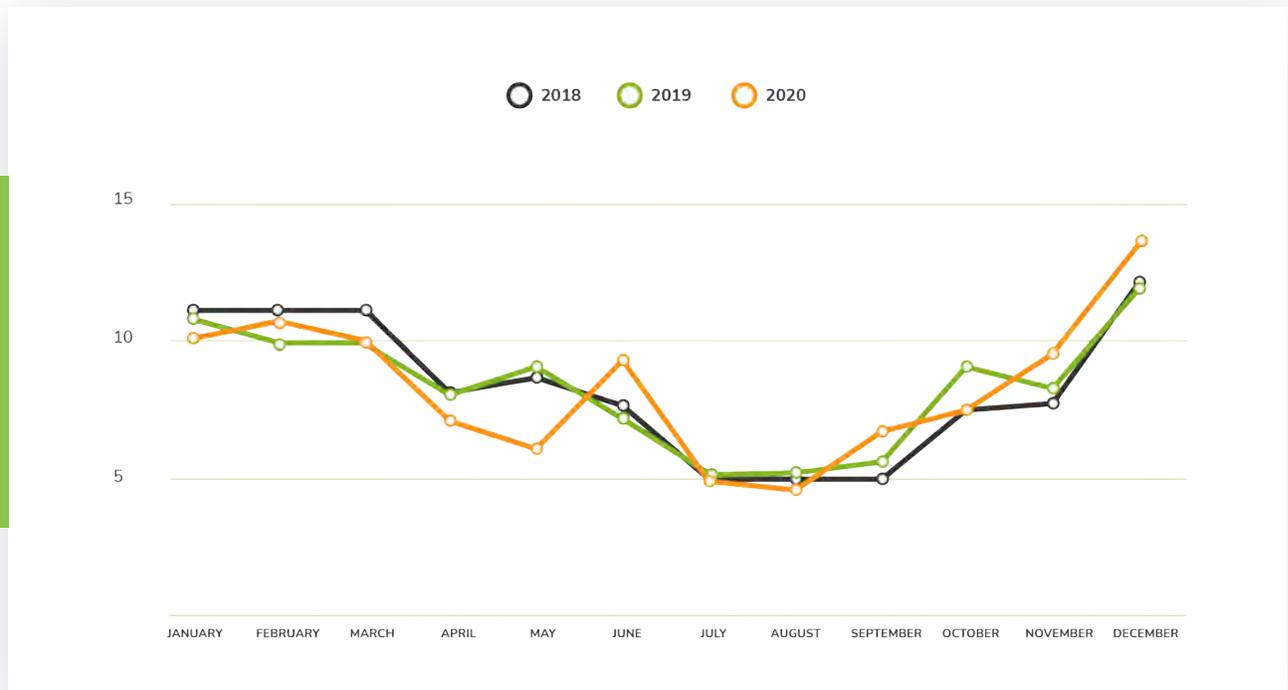


Mexican exports and imports



Monthly domestic exports

Source: SIAP Panorama Agroalimentario



Most broccoli exports occurred between November and March, when 54.0% of the total volume exported in 2020 was shipped. However, there was an important rebound in June, while the months with the lowest exports were July and August, with 4.9% and 4.6%, respectively.

It is important to note that in 2020, the volume of exports increased in November and December, accounting for 23.2% of total shipments in those months, while April and May decreased their volume to 7.1% and 6.0%, respectively.

Monthly export of broccoli in Mexico

Source: SIAP Panorama Agroalimentario

Month	2018	2019	2020	Average
January	11.1	10.8	10.1	10.7
February	11.1	9.9	10.7	10.6
March	11.1	9.9	10.0	10.3
April	8.1	8.0	7.1	7.7
May	8.7	9.1	6.0	7.9
June	7.6	7.2	9.3	8.0
July	4.9	5.1	4.9	5.0
August	5.0	5.2	4.6	4.9
September	5.0	5.6	6.7	5.8
October	7.5	9.0	7.4	8.0
November	7.7	8.3	9.6	8.5
December	12.2	11.9	13.6	12.6

In 2019, 439,686 tons of broccoli were exported, while in 2020 there were 459,400 tons, an increase of 4.5%. As for the value of exports went from 506 to 554 million dollars, so the increase was 9.5%.



Countries to which exports are made

Source: SIAVI (January-September 2021)

	Country	Volume (t)	%	Value (million dollars)	%
①	 United States of America	240,530	97.0	236.1	99.5
②	 Japan	779	0.3	0.9	0.4
③	 Belize	345	0.1	0.2	0.1
④	Other countries	6,192	2.5	0.0	0.0
	Total	247,844	100	237.2	100

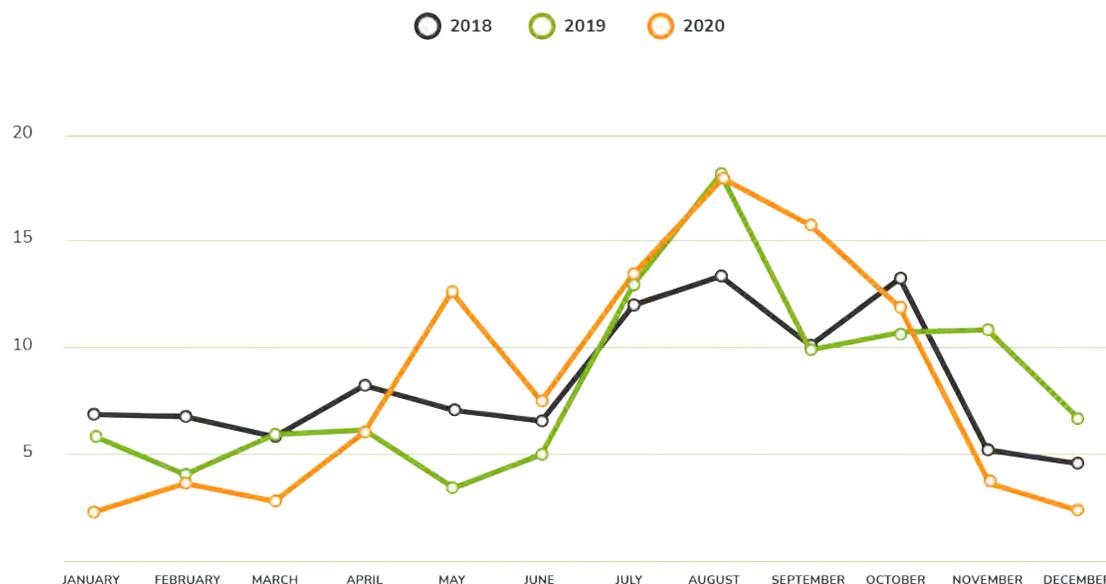
Tariff Fraction 07.04.10.03

According to the information presented in the Tariff Information Service Via Internet (SIAVI by its acronym in Spanish), between January and September 2021, 97.0% of Mexican exports of broccoli and cauliflower, fresh or refrigerated, were destined for the United States, which translated into 240,530 tons, which in turn represented 236.1 million dollars.

The other four countries to which broccoli and cauliflower were shipped during this period totaled only 7,315 tons, so there is no alternative market for this product.



Monthly domestic imports



In general, the largest volume of broccoli imported by Mexico enters the country between July and October, something noteworthy, given that these months are the second-highest production months of the year, although of course, we are not talking about a considerable volume of broccoli.

In 2020, 53.3% of the annual volume of imports was concentrated from July to October, while between November and March, the minimum was 2.3% and the maximum was 3.7%. However, the volume of imports in relation to the volume of exports is minimal.

Monthly broccoli imports in Mexico

Source: SIAP Panorama Agroalimentario

Month	2018	2019	2020	Average
January	6.9	5.9	2.3	5.0
February	6.8	4.0	3.6	4.8
March	5.9	6.0	2.7	4.9
April	8.3	6.1	6.1	6.8
May	7.1	3.4	12.7	7.7
June	6.6	5.0	7.4	6.3
July	12.0	13.0	13.5	12.8
August	13.4	18.3	18.1	16.6
September	10.0	9.9	15.7	11.9
October	13.3	10.8	11.9	12.0
November	5.1	10.9	3.7	6.6
December	4.6	6.7	2.3	4.5



In 2019, 3,971 tons of broccoli were imported, while in 2020 it was 3,238 tons, i.e., a decrease of 18.5%. However, in 2020, imports accounted for only 0.7% of realized exports, so their relevance is minimal.

Countries from which imports are made

Source: SIAVI (January-September 2021)

	Country	Volume (t)	%	Value (million dollars)	%
①	 United States	17,974	100	13.8	100
	Total	17,974	100.0	13.8	100.0

Tariff Fraction 07.04.10.03

As explained above, Mexico's volume of fresh or refrigerated broccoli and cauliflower imports is minimal. Between January and September 2021 only 17,974 tons were imported, of which 100% came from the United States.

This volume resulted in a value of 13.8 million dollars, which is minimal compared to the value of exports, and it is expected to remain so in the following years.



Curious facts about broccoli in Mexico

In 2020, broccoli was the 37th most produced agricultural product in Mexico, with 583,646 tons, being also the 37th in terms of production value, with 3,860 million pesos.

In 2020, broccoli, cabbage, and cauliflower were the 13th agri-food product exported that generated the most revenue for Mexico, with 710 million dollars and representing 3.6% of the national production of vegetables.

Annual per capita consumption of broccoli was 2.1 kg in 2018, 1.4 kg in 2019 and 1.0 kg in 2020, so consumption in Mexico has declined considerably in recent years.





The U.S. market

Domestic production

In 2020, 40,590 hectares of broccoli were harvested in the United States, a decrease of 4.5% compared to 42,492 hectares in 2019, and 11.9% compared to 46,094 hectares in 2018. California was the largest acreage state in 2020, with 36,216 hectares, followed by Arizona, with 4,371 hectares, with these two states being the only producers.

In terms of yields, these have remained constant in recent years, with 17.0, 17.7 and 17.7 tons per hectare in 2018, 2019 and 2020, respectively. In 2020 California led with 17.9 tons per hectare, and Arizona remaining at 15.7 tons per hectare.

Production was 718,773 tons in 2020, while in 2019 and 2018 it was 753,368 and 784,194 tons. The state with the highest production was California, with 650,128 tons, followed by Arizona with 68,645 tons.

Of the volume produced domestically, 692,768 tons were marketed fresh, while 25,060 tons were destined for processing.

The decrease in production in recent years is because the coronavirus caused a notable decrease in the demand for broccoli in California. After all, it is a product in great demand by restaurants and other food services, which suffered closures that caused demand to fall rapidly, and even several Arizona farmers preferred not to harvest their product due to the difficulty of placing it in the market.



Import and export

Source: USDA-ERS

Year	Volume (t)	Difference (%)	Value (million pesos)	Difference (%)
2017	220,314	-	254	-
2018	191,984	-12.9	204	-19.7
2019	223,731	+16.5	220	+7.9
2020	245,836	9.9	261	+18.2

The United States is the main importing country of fresh or chilled broccoli, and although in 2018 its import volume decreased considerably, in 2019 and 2020 imports increased again, mainly due to the decrease in domestic production, which found it difficult to position its product on the market.

In the last four years (2017-2020), the annual import volume of broccoli went from 220,314 to 245,836 tons, which meant an increase of 11.6%, although in 2018, the volume dropped and in 2019 there was a recovery.

The value of imports shows a fairly similar behavior, with \$254 million in 2017 and \$261 million in 2020, although in 2018 and 2019 the value was much lower.

Exports of fresh or refrigerated broccoli by the United States

Source: USDA-ERS

Year	Volume (t)	Difference (%)	Value (million pesos)	Difference (%)
2017	73,464	-	98	-
2018	71,956	-2.1	105	+6.5
2019	60,878	-15.4%	96	-8.6
2020	59,921	-1.6%	96	+0.1

Exports of fresh or refrigerated broccoli from the United States are minimal and have declined in recent years, a consequence of the lower volume produced, as U.S. growers must compete with production in Mexico, where better conditions are available.

In addition, in 2020, a volume equivalent to 24.4% of imports in the same year was exported. And between 2017 and 2020, there was a decrease in exports of 18.4%, although the value of such exports has remained relatively stable.



Main countries from which the United States imports fresh and refrigerated broccoli

Source: USD - ERS

	Country	2017	2018	2019	2020
①	 Mexico	214,562	187,741	217,912	237,213
②	 Canada	5,433	4,108	3,814	3,823
③	 Guatemala	313	132	1,984	4,800
④	 Costa Rica	5	0	20	0
⑤	 Turkey	0	0	0	0
⑥	Other countries	0	3	0	0

The main supplier of broccoli for the US market is Mexico, which contributed 96.5% in 2020; with minimum volumes from Guatemala and Canada of 2.0% and 1.6%, respectively.

In the case of Mexico, from 2017 to 2020, it went from 214,562 to 237,213 tons, increasing by 10.6%. While Guatemala went from 313 to 4,800 tons, so its increase was 1,433.6%, managing to surpass Canada only in 2020; however, it is far from being possible for these countries to surpass Mexico as the main supplier.



Main countries to which the United States exports fresh and refrigerated broccoli

Source: USD - ERS

	Country	2017	2018	2019	2020
①	 Canada	52,115	50,085	47,268	47,514
②	 Mexico	1,209	1,238	1,305	4,350
③	 Taiwan	4,403	2,076	1,310	1,139
④	 Japan	15,150	17,599	10,165	5,782
⑤	 Barbados	325	361	203	192
⑥	Other countries	255	592	618	937

U.S. exports of fresh or refrigerated broccoli are mainly destined for Canada, which in 2020 accounted for 79.3% of total exports, followed by Japan (9.7%), Mexico (7.3%), Taiwan (1.9%) and Barbados (0.3%).

Although shipments to Canada decreased slightly, shipments to Japan decreased considerably in 2020, compared to the previous two years, while the volume to Mexico increased without being significant.



Main broccoli supplying companies to the United States

Source: UN Comtrade y US Census Bureau
HS Code: 070410

Supplier	Shipping (#)	Volume (kg)
Taylor Farms Baja California S de RL de CV	537	101,821,399
Comercializadora Gab SA de CV	5,962	91,010,995
Christian Alberto Gomez Zazueta	46	55,770,061
Agro Horticultores SA de CV	91	50,286,048
Empaque Río Colorado Spr de RL de CV	96	50,261,592
Cm Irish SA de CV	108	38,515,677
Fernando de Jesús Rodríguez Mendoza	39	34,573,363
Agrícola de Las Montañas S de RL de CV	69	34,399,516
Gn Productores Agrícolas de RL de CV	54	34,116,789
Fgasgro Mex S de RL de CV	136	29,625,811

* The information presented corresponds to the period from 12-28-2018 to 12-16-2021

* Only shipments from Mexico to the United States are shown



Main broccoli buyers in the United States

Source: UN Comtrade y US Census Bureau
HS Code: 070410

Buyer	Shipping (#)	Volume (kg)
Ftf Sonora S de RL de CV	43	21,233,827
Taylor Farms Baja California S de RL de CV	846	11,991,016
Frutas y Verduras San Miguel SA de CV	446	9,783,520
Importadora y Exportadora de Frutas y Legumbres de México SA de CV	529	9,400,304
Frutería Los Cuates SA de CV	173	4,251,978
Operadora de Ciudad Juárez SA de CV	471	3,850,812
Fernández / González / Rubén	136	3,125,250
Comestibles Maldonado SA de CV	95	2,194,058
Balmaceda / Guzmán / Sonia Candelaria	69	1,465,736
Fruvemex Mexicali SA de CV	76	1,374,567

* The information presented corresponds to the period from 12-28-2018 to 12-16-2021

* Only shipments from Mexico to the United States are shown



Broccoli price analysis

Source: USDA ERS

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
2017	0.94	1.07	1.12	1.50	1.19	1.13	1.13	1.01	1.31	1.22	1.14	1.14	1.16
2018	1.08	1.04	0.97	1.03	1.05	1.05	0.97	1.02	1.04	1.08	1.16	1.16	1.05
2019	0.99	0.95	1.08	0.95	0.97	0.97	1.07	0.94	1.01	1.02	1.03	0.87	0.99
2020	1.10	0.99	0.95	0.89	0.93	1.21	1.06	1.08	1.31	1.01	1.09	1.04	1.05
Monthly	1.03	1.01	1.03	1.09	1.03	1.09	1.06	1.01	1.17	1.08	1.11	1.05	1.06

Prices of fresh or refrigerated broccoli imported by the U.S. (usd/kg)

The average annual price paid for fresh or chilled broccoli imported by the United States went from 1.14 usd/kg in 2017 to 1.04 usd/kg in 2020, a decrease of 8.8% in that period, while the average for the last four years was 1.06 usd/kg.

The months with the lowest prices in 2020 were April and May, with 0.89 and 0.93 usd/kg, respectively, when there is the largest supply of broccoli, mainly due to the peak spring production in Mexico, which occurs in March and April. The highest price was in September, with 1.31 usd/kg.



Broccoli price analysis

Source: USDA ERS

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
2017	1.36	1.36	1.47	1.53	1.44	1.29	1.36	1.34	1.25	1.37	1.25	1.12	1.35
2018	1.29	1.18	1.30	1.38	1.44	1.47	1.45	1.62	1.55	1.65	1.61	1.81	1.48
2019	1.66	1.45	1.63	1.35	1.69	1.43	1.58	1.68	1.75	1.87	1.58	1.47	1.60
2020	2.00	1.42	1.59	1.44	1.33	1.78	1.66	1.62	1.86	1.59	1.72	1.61	1.63
Monthly	1.58	1.35	1.50	1.43	1.47	1.49	1.51	1.57	1.60	1.62	1.54	1.50	1.51

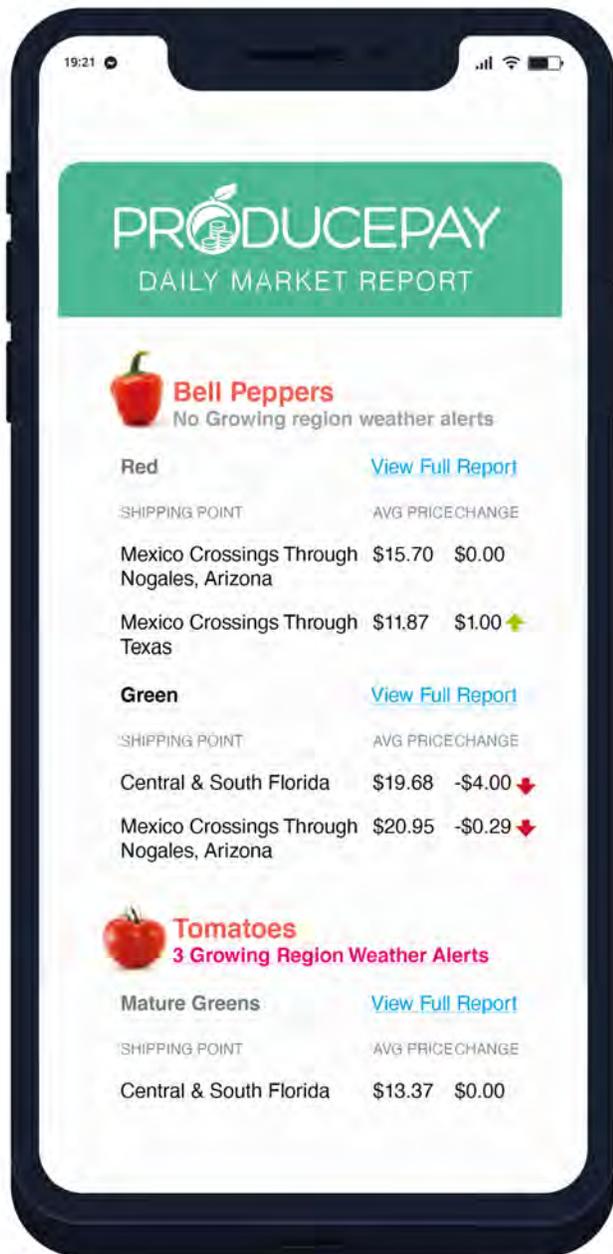
Prices of fresh or refrigerated broccoli exported by the U.S. (usd/kg)

Regarding export prices, the average of the last four years was 1.51 usd/kg, 42.5% higher than the average import price. In addition, the average annual export price increased from 1.35 to 1.51 usd/kg between 2017 and 2020, respectively.

In 2020, the highest price was in January with 2.00 usd/kg, while the lowest price was in May with 1.33 usd/kg. Historically, the highest prices were between September and November, while the lowest prices were between February and March.

Finally, it is important to mention that in the United States, fresh or refrigerated broccoli is marketed mainly in 2 presentations: 11-pound carton or grouped box and 28-pound pyramid box/grouped box.





Daily Market Report

If you want to be updated with fresh produce prices in the U.S. market, subscribe for free to **ProducePay's** Daily Market Report where you will also find information on many other agricultural products.

[Click here](#)



Production in Central and South America

Guatemala

The five Central and South American countries that produced the most broccoli and cauliflower in 2020 were: Guatemala, Ecuador, Peru, Colombia, and Chile, for which the most relevant information is presented below.

Broccoli and cauliflower production in Guatemala

Source: FAOSTAT

Year	Production (t)	Area (ha)	Yield (t/ha)
2016	118,078	6,865	17.2
2017	115,978	6,906	16.8
2018	116,713	6,911	16.9
2019	116,923	6,894	17.0
2020	116,538	6,904	16.9

Broccoli and cauliflower production in 2020 was 116,538 tons, obtained from a harvested area of 6,904 hectares, with an average yield of 16.9 tons per hectare.

In the last five years, production went from 118,078 to 116,538 tons, a decrease of 1.3%, despite a slight increase in surface area and due to a decrease in yields.

It is worth noting that the maximum historical production was reached in 2016, with 118,078 tons, although since 2012 production has remained above 100,000 tons.

Ecuador

Source: FAOSTAT

Year	Production (t)	Area (ha)	Yield (t/ha)
2016	111,549	14,424	7.7
2017	114,223	14,762	7.7
2018	114,599	14,810	7.7
2019	113,457	14,665	7.7
2020	114,093	14,746	7.7

Broccoli and cauliflower production in 2020 was 114,093 tons, obtained from a harvested area of 14,746 hectares, with an average yield of 7.7 tons per hectare.

In the last five years, production increased from 111,549 to 114,093 tons, an increase of 2.3%, due to the growth in surface area since yields have remained constant.

In 2004, it exceeded 10,000 tons produced and in 2013 it exceeded 100,000 tons produced, with the all-time high occurring in 2015, with 118,026 tons.



Perú

Source: FAOSTAT

Year	Production (t)	Area (ha)	Yield (t/ha)
2016	74,401	5,756	12.9
2017	70,237	5,239	13.4
2018	72,464	5,298	13.7
2019	75,012	5,557	13.5
2020	65,640	4,987	13.2

Broccoli and cauliflower production in 2020 was 65,640 tons, obtained from a harvested area of 4,987 hectares, with an average yield of 13.2 tons per hectare.

In the last five years, production went from 74,401 to 65,640 tons, a decrease of 11.8%, due to a considerable reduction in surface area and despite the increase in yields.

The case of Peru is interesting, as it went from 19,517 tons in 2015 to 74,401 tons in 2016, a significant increase in production, with its all-time high in 2019, with 75,012 tons.



Colombia

Source: FAOSTAT

Year	Production (t)	Area (ha)	Yield (t/ha)
2016	7,357	702	10.5
2017	33,560	1,617	20.8
2018	53,834	3,436	15.7
2019	59,291	3,444	17.2
2020	56,860	3,303	17.2

Broccoli and cauliflower production in 2020 was 56,860 tons, obtained from a harvested area of 3,303 hectares, with an average yield of 17.2 tons per hectare.

In the last five years, production went from 7,357 to 56,860 tons, an increase of 672.9% due to an increase in surface area and yield.

Since 2002, production has exceeded 10,000 tons, but there have been significant variations in production since then, reaching the historical maximum in 2019 with 59,291 tons.



Chile

Source: FAOSTAT

Year	Production (t)	Area (ha)	Yield (t/ha)
2016	22,773	1,252	18.2
2017	27,307	1,540	17.7
2018	31,668	1,832	17.3
2019	31,618	1,869	16.9
2020	30,020	1,814	16.5

Broccoli and cauliflower production in 2020 was 30,020 tons, obtained from a harvested area of 1,814 hectares, with an average yield of 16.5 tons per hectare.

In the last five years, production increased from 22,773 to 30,020 tons, an increase of 31.8%, due to the growth surface area and spite of the decrease in yields.

The historical maximum of production was in 2006 with 37,000 tons, with significant variations since then, which indicates a certain instability in the production of this crop.





Articles of interest

Science unveils why many children hate broccoli

Source: La Vanguardia

Broccoli, cauliflower, or cabbage share that they are vegetables of the Brassica genus, all of them very healthy, and that they arouse the frontal rejection of many children's palates. Now, new research has revealed that there is a reason why so many children hate these vegetables, and it has to do with the bacteria in their mouths, and more specifically, with the enzymes they leave in their saliva, which, combined with those in broccoli or cauliflower, emit volatile, foul-smelling, sulfur-flavored gases as they chew them.

Scientists explain that brassicas have a compound called S-methyl-L-cysteine sulfoxide (SMCSO), which produces sulfurous odors when mixed with another enzyme in these vegetables. And it turns out that bacteria in the mouth also produce this enzyme, and as the oral microbiome changes from one person to another, some have more or less concentration of this particular oral bacteria. So, based on this information, a group of Australian researchers decided to study whether subjective preferences for broccoli, cauliflower or other Brassica vegetables had to do with the greater or lesser presence of these bacteria and the gases and odors they can produce in the saliva, both in adults and children.

To do this they recruited 98 parent-child pairs, mixed saliva samples from each of them with cauliflower powder and analyzed the volatile gases produced. And they found significant variations in the levels of sulfur gases produced from sample to sample. However, the children generally had similar levels to their parents, suggesting they shared similar oral microbiomes.

And, as they explain in the study published in the Journal of Agricultural and Food Chemistry, they found a clear correlation between a strong aversion to Brassica vegetables in children and high levels of volatile sulfur produced by their saliva.

In contrast, they did not observe such an association in parents with similar volatile sulfur profiles, indicating, researchers say, that tolerance to bitter or pungent tastes increases with age.

Damien Frank, lead author of the study, assures that it is reasonable for children to resist eating these vegetables "if when they do so, high levels of volatile gases are produced in their mouths that smell like farts or decomposing animals and a strange sulfur taste." However, the researchers also point out that their study demonstrates that people can learn, with age, to tolerate these odors and to appreciate or even enjoy these vegetables regardless of the composition of their oral microbiome, the bacteria that inhabit their mouths, or the bacteria that live in their mouths.



Leoneses develop biodegradable

Source: Periódico Correo

With broccoli waste and other components, two young people from León were able to develop a polymer similar to plastic, but it is a bioplastic that degrades in one year.

At the age of 32, Alfredo López, a biotechnology engineer with a doctorate in science, together with his colleague Iván Loera, managed to find in broccoli the key to develop the raw material used to make everything from a kitchen cutlery to a bottle, or any product that is usually made with plastic, but the difference is that, with their technology and innovation, they offer sustainability.

"Broccoli is high in cellulose, and it can act as a kind of glue or amalgam that helps us to join the polymers together to obtain the bioplastic in the end. The initial tests lasted six months just to see if it was feasible to work with broccoli as a raw material," he explained.

It should be noted that a plastic cutlery alone takes about 400 years to biodegrade, a bottle of the same material 500 years, with this polymer (which is the raw material) developed with broccoli and other additives, it can biodegrade on land in a maximum of one year.

Alfredo said that they started excited to develop a product that helps the environment and allows them to enter into new processes with waste.

The road was not easy, perhaps that is why not everyone takes the risk, he said, but based on the results obtained, he assured that it is worth it.

And despite any adversity, especially the economic one, they did not give up, and for months they investigated, made tests, set up a small workshop in the garage of Ivan's house, with machinery that they acquired with their savings and after some time the result came out.

Now, the path for both researchers is to continue developing new processes to mitigate the impact on the environment, to leave behind the harmful processes and to obtain the resources to continue working, although they reveal that there is already an interested businessman.

He emphasized that, from one ton of broccoli, 10% of the raw material is available once dehydrated, "with the necessary resources we can market four tons per month as a pilot test, and then evolve to market better products that do not harm the environment," he said.





Sources

SIAP. **Datos abiertos de la estadística de producción agrícola.** http://infosiap.siap.gob.mx/gobmx/datosAbiertos_a.php

SIAVI. **Fracción arancelaria brócoli y coliflor 07.04.10.03**
<http://www.economia-snci.gob.mx/>

FAOSTAT. **Cultivos y productos de agricultura y ganadería - Producción**
<http://www.fao.org/faostat/es/#data/QCL>

FAOSTAT. **Cultivos y productos de agricultura y ganadería - Comercio**
<http://www.fao.org/faostat/es/#data/QCL>

FAOSTAT. **Matriz detallada del comercio.**
<http://www.fao.org/faostat/es/#data/TM>

USDA ESMIS. **Vegetables Annual Summary (Broccoli).**
<https://usda.library.cornell.edu/concern/publications/02870v86p?locale=en>

USDA ERS. **Data by Commodity - Imports and Exports (Broccoli).**
<https://www.ers.usda.gov/data-products/vegetables-and-pulses-data/by-commodity/>

Agricultural Marketing Resource Center (AgMRC).
Broccoli.
<https://www.agmrc.org/commodities-products/vegetables/broccoli>

La Vanguardia. **La ciencia desvela por qué muchos niños odian el brócoli.**
<https://www.lavanguardia.com/vida/20210924/7743881/ciencia-desvela-ninos-odian-brocoli.html>

Periódico Correo. **Leoneses desarrollan plástico biodegradable a base de brócoli.**
<https://periodicocorreo.com.mx/leoneses-desarrollan-plastico-degradable-a-base-del-brocoli/>

DOCUMENT BY

PRODUCEPAY

M.C. Olmo Axayacatl
Sr. Content Analyst