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Vegetable and Pulses Outlook

Gary Lucier and Broderick Parr

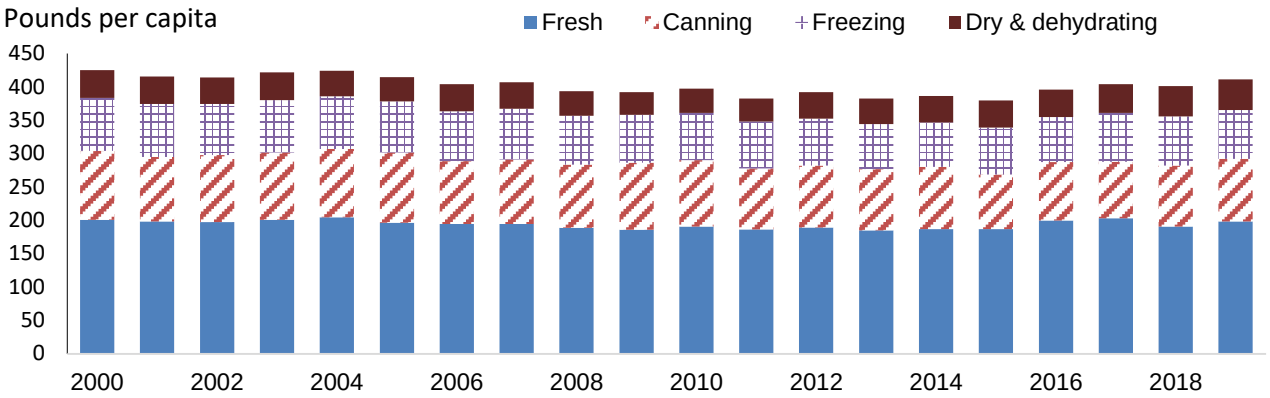
Per Capita Availability Rises in 2019

In this report:

In 2019, total U.S. per capita vegetable use (availability) increased 2 percent to 409 pounds. Except for pulse crops, all major categories exhibited increases. Availability of pulse crops dropped 23 percent as pinto and navy bean output slipped, while chickpea and lentil production declined sharply on reduced area. Recovering from a 6 percent drop in 2018, fresh-market vegetable availability (including potatoes) rose 4 percent to 198 pounds in 2019. In fact, 16 of the top 25 fresh-market vegetables posted gains in availability driven largely by increases for spinach, cauliflower, cabbage, carrots, green beans, and potatoes.

Although processing availability increased in 2019, canning uses accounted for all the gain with vegetables for freezing declining 2 percent. After declining in 2017, per capita canning availability increased for the second consecutive year. In 2019, it rose 3 percent to 94 pounds−the highest level since 2010. Increases were noted for many of the top canning vegetables, with most of the gain from processing tomatoes.

Per capita availability of all vegetables and pulses [1]



[1] Dry & dehydrating includes chipping and dehydrating potatoes, dehydrating onions, and pulse crops.

Source: USDA, Economic Research Service, *Vegetable and Pulses Yearbook* .

Approved by USDA's World Agricultural Outlook Board

Industry Overview

Vegetable Output Lower in 2019, Trade Increases

Harvested area for vegetables and pulses dropped 8 percent in 2019 to 6.2 million acres. Other than sweet potatoes, harvested acreage was reduced across the board, led by pulse crops and processing vegetables (table 1). Despite some pockets of untimely weather (e.g., early frosts, excess rain and heat) average yields across the sector managed to rise 6 percent, offsetting much of the impact of declining area. As a result, vegetable and pulse production declined 2 percent to 1.17 billion cwt. Despite a reduction in harvested area, rising yields pushed fresh utilized production up 3 percent. Although yields were generally better for canning and freezing vegetables, processing output was down 6 percent from a year earlier.

Given reduced production in the face of good demand spurred by high employment and rising incomes in 2019, aggregate vegetable prices increased 11 percent led by rising prices for fresh-market vegetables. As a result, the collective value of production for vegetable and pulse crops increased 9 percent to $19.4 billion. Virtually all of this gain came within the fresh-market and potato sectors because the value of production declined for all other major vegetable categories including processing and pulse crops (down 20 percent).

The value of U.S. vegetable and pulse crops imports and exports both registered gains in 2019. U.S. imports of all vegetables and pulse crops rose 2 percent with most of the gain coming from the fresh-market. Although fresh-market import volume declined slightly, higher average prices pushed value up 4 percent to a nominal dollar record $8 billion. As the year progressed, importers were aided by a rising U.S. dollar, which continues to gain strength in 2020 as global investors seek a safer haven during these uncertain times. Despite a stronger dollar globally, import volume was likely restrained in 2019 by strength (vis-à-vis the U.S. dollar) in both the Mexican peso and Canadian dollar—the top two nations exporting vegetables to the United States.

On the export side of the market, although U.S. exporters continued to battle against the strong dollar and higher U.S. domestic prices, they managed to reverse the decline in exports in 2018 and posting a 4 percent gain in 2019. Exports to two of the top three destinations increased in 2019, with exports to Canada—the top destination—accounting for 45 percent of value. Given the strength of the dollar, it is not surprising that 2020 exports started off slowly with values down 5 percent from a year earlier over the first two months. U.S. trade will likely slow further over the next few months due to the pandemic-inspired global economic pause.

Table 1. U.S. vegetable and pulse industry at a glance, 2016-19[1]

Item	Unit	2016	2017	2018	2019	Percent change 2018-19 [6]
Area harvested						
Vegetables, fresh & processing[4]	1,000 acres	2,897	2,390	2,300	2,070	-1.5
Potatoes	1,000 acres	1,038	1,045	1,015	942	-0.9
Dry beans, peas and lentils	1,000 acres	3,794	4,096	3,554	3,064	-13.5
Other[2]	1,000 acres	167	163	148	155	15.9
Total	1,000 acres	**7,896**	**7,694**	**7,017**	**6,230**	**-7.7**
Production						
Vegetables, fresh	Million cwt	400	336	314	304	3.4
Vegetables, processing[4]	Million cwt	372	333	357	346	-5.5
Potatoes	Million cwt	450	451	450	423	-2.1
Dry beans, peas and lentils	Million cwt	69	58	62	55	-12.0
Other[2]	Million cwt	41	45	37	40	24.5
Total	Million cwt	**1,332**	**1,223**	**1,220**	**1,173**	**-2.5**
Crop value						
Vegetables, fresh	$ millions	10,809	11,422	9,656	10,678	19.6
Vegetables, processing[4]	$ millions	1,903	2,145	2,096	1,854	-3.2
Potatoes	$ millions	4,089	4,135	4,005	4,138	9.2
Dry beans, peas and lentils	$ millions	1,508	1,343	1,313	1,017	-20.4
Other[2]	$ millions	1,843	1,883	1,868	1,720	-2.3
Total	$ millions	**20,152**	**20,928**	**18,938**	**19,407**	**8.6**
Unit value[3]						
Vegetables, fresh	$/cwt	27.02	34.01	30.74	35.09	16.7
Vegetables, processing	$/cwt	5.12	6.44	5.87	5.36	6.0
Potatoes	$/cwt	9.09	9.17	8.90	9.79	11.5
Dry beans, peas and lentils	$/cwt	21.86	23.16	21.18	18.57	-9.6
Other[2]	$/cwt	44.95	41.84	50.48	42.53	-26.0
Total	$/cwt	**15.13**	**17.11**	**15.52**	**16.55**	**11.3**
Imports						
Vegetables, fresh	$ millions	7,486	7,354	7,682	8,008	4.2
Vegetables, processing[4]	$ millions	2,515	2,618	2,805	2,806	0.0
Potatoes	$ millions	1,241	1,365	1,510	1,529	1.3
Dry beans, peas and lentils	$ millions	117	216	214	177	-17.3
Other[5]	$ millions	1,588	1,606	1,731	1,680	-2.9
Total	$ millions	**12,947**	**13,158**	**13,941**	**14,200**	**1.9**
Exports						
Vegetables, fresh	$ millions	2,114	2,159	2,200	2,274	3.4
Vegetables, processing[4]	$ millions	1,586	1,513	1,435	1,374	-4.3
Potatoes	$ millions	1,737	1,814	1,786	1,923	7.7
Dry beans, peas and lentils	$ millions	681	841	536	622	16.1
Other[5]	$ millions	729	819	757	787	4.0
Total	$ millions	**6,846**	**7,147**	**6,713**	**6,980**	**4.0**
Per capita availability						
Vegetables, fresh	Pounds	155.9	157.1	149.2	153.4	2.8
Vegetables, processing[4]	Pounds	106.2	104.7	112.2	114.3	1.9
Potatoes	Pounds	110.2	117.8	116.0	118.8	2.4
Dry beans, peas and lentils	Pounds	10.7	11.1	13.7	11.1	-19.2
Other[2]	Pounds	11.2	12.0	9.5	11.7	23.2
Total	Pounds	**394.1**	**402.7**	**400.6**	**409.2**	**2.1**

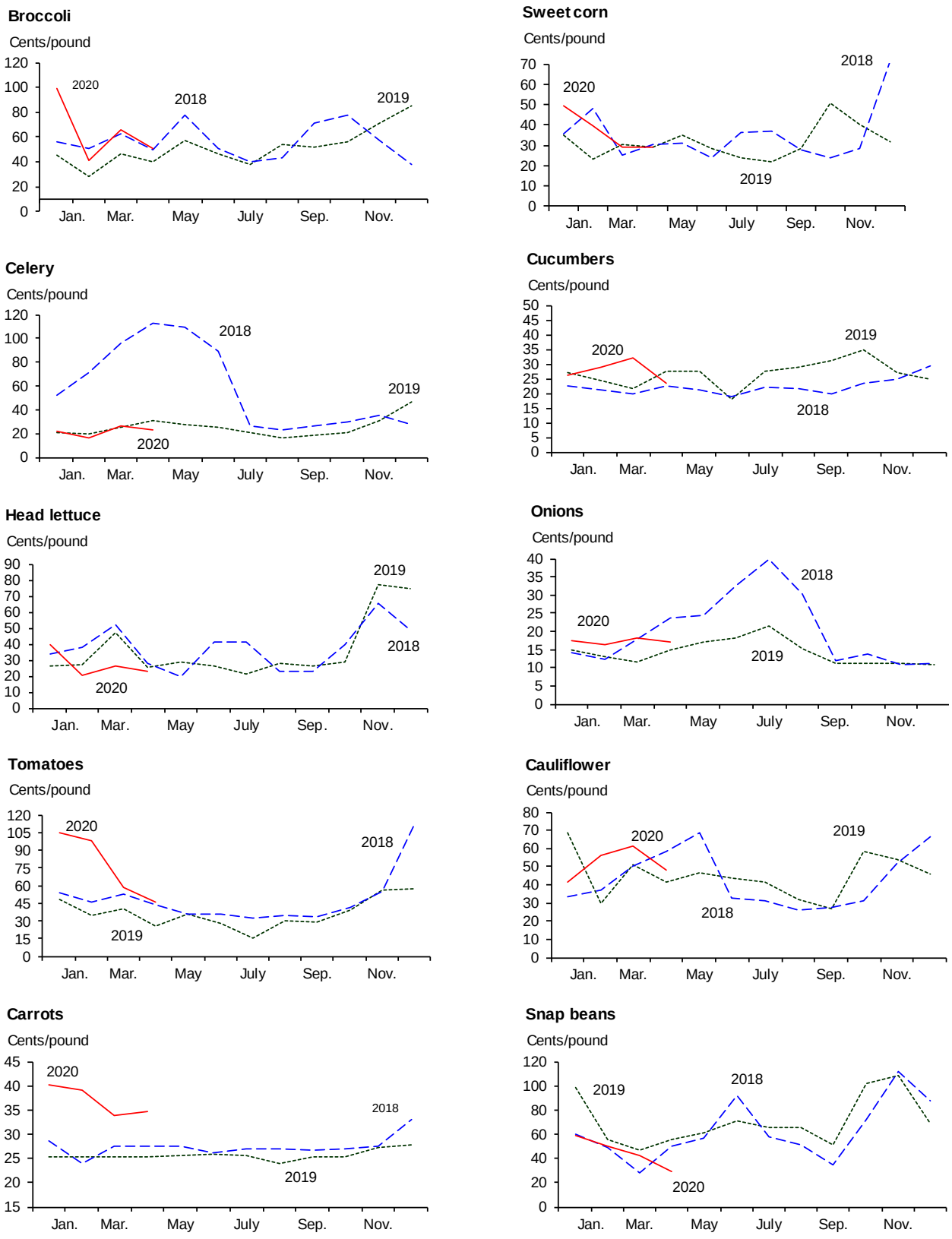
[1] Total values rounded. [2] Includes sweet potatoes and mushrooms. [3] Ratio of total value to total production.

[4] Excludes potatoes, pulses, and mushrooms. [5] Other includes mushrooms, sweet potatoes, and vegetable seed. All trade data are on a calendar-year basis. Hundredweight (cwt) =100 pounds. [6] Because of USDA/NASS program changes, the percentages for area, production, and value were calculated using separate data summaries for comparable States in 2018.

Sources: USDA, Economic Research Service, using data from USDA, National Agricultural Statistics Service, and U.S. trade data from U.S. Department of Commerce, Bureau of the Census.

Figure 1

Point-of-first-sale (farm/grower) price for fresh-market vegetables



Source: USDA, National Agricultural Statistics Service and USDA, Agricultural Marketing Service, *Fruit and Vegetable Market News*.

Per Capita Availability of Dry and Dehydrated Vegetables Up

Per capita use of dry and dehydrated vegetables totaled nearly 46 pounds, up 1 percent from 2018 and the highest on record. Although declines were noted in dry bean and lentil availability, gains were noted in dehydrating onions, chipping potatoes, and dehydrating potatoes. Chipping potatoes are seeing increased demand this spring as consumers are sourcing more of their food from retail markets. Since potato chips draw much of their demand from the retail side of the market, it is likely that per capita use of chips could rise for the fourth consecutive year during 2020. Similarly, availability of products made from dehydrated potato flakes and meal could rise for a fifth consecutive year in 2020. Use in 2019 was the highest since 2012, reflecting new products and a strong economy.

Farm Input Prices to Decline in 2020

Driven largely by a weakening global economy and sinking energy prices, growers are expected to pay less for most of the inputs required to produce, pack, and ship vegetables this year (table 2). According to the U.S. Energy Information Administration forecast in mid-March, weak demand and strong supplies will pressure global oil markets lower into early summer. Then, as supplies ease and economic activity increases, crude oil prices will rise during the later stages of 2020, continuing upward into 2021. As a result, prices for almost all energy-based inputs are expected to decline in 2020.

Growers and truckers can expect to see diesel fuel prices average at least 17 percent below 2019 levels. Fertilizer prices are also expected to average below year-earlier levels for several reasons. Despite some upward pressure from increased corn area, nitrogen fertilizers such as urea are expected to see lower prices due to in-part to lower natural gas prices and burdensome inventories. Reported high inventories of phosphates caused by a backlog of imports in the Midwest are expected to keep prices well below year-earlier levels. U.S. potash (potassium) inventories have been building since 2019 on weak domestic and global demand and increased global production. As a result, potash prices have been running well below year earlier levels. Thus, with lower prices for each of the three fertilizer components, vegetable growers will see lower costs for this input in 2020.

In addition to potential demand issues resulting from the pandemic, the vegetable industry faces greater challenges on the production side. For the fresh-market, one of the biggest may be labor. With some exceptions, most fresh-market vegetable growers rely on access to human capital to produce and place a crop into supply channels. Labor is the only key input expected to

show an increase in cost in 2020. With increasing border restrictions and with a less mobile population during the viral pandemic, it is anticipated that skilled labor will become more scarce, and that wage rates will rise 2 percent or more. Also, procedural changes to various farm tasks to comply with recommended social distancing practices may result in reduced productivity (require more time) for tasks such as harvesting and packing. Wage rates have been one of the few input items that has been steadily rising over the past several years and it appears that this year will be no exception to that pattern.

Although initial projections showed that taxes and interest were expected to rise in 2020, changes in the economic outlook caused by the viral pandemic in March may result in a somewhat lower interest rate outlook. On March 15th, the Federal Reserve lowered the target range for its federal funds rate to a range of 0 to 0.25 percent—the same range as in 2008 (the lowest on record). As a result, credit costs are expected to decline as the year progresses.

Table 2. Selected U.S. indices of prices paid by farmers, 2015-20

Input	2015	2016	2017	2018	2019	2020f	Change
	Index, 2011 = 100						*Percent*
Seeds & plants	124.6	121.4	119.9	118.5	116.0	113.0	-2.6
Fertilizer, nitrogen	91.1	71.6	66.5	66.5	67.0	55.0	-17.9
Fertilizer, potash/phosphate	84.6	70.5	64.4	62.9	57.5	45.0	-21.7
Chemicals, insecticides	107.2	107.7	103.1	100.9	100.3	95.0	-5.3
Chemicals, herbicides	107.4	109.7	106.4	101.7	100.7	96.0	-4.7
Chemicals, fungicides/other	101.7	98.7	95.1	95.7	97.4	93.0	-4.5
Fuels, diesel	61.2	51.8	57.6	67.4	70.1	65.0	-7.3
Fuels, gasoline	67.2	59.0	64.5	70.9	73.1	68.0	-7.0
Farm machinery	114.6	115.4	117.7	120.0	125.6	127.0	1.1
Farm supplies	106.1	106.3	107.6	111.6	115.5	116.0	0.4
Custom services	111.8	111.6	114.3	113.3	118.4	118.4	0.0
Cash rent	137.0	130.4	130.4	126.1	123.3	124.7	1.1
Interest	98.4	103.9	108.8	114.9	115.3	118.1	2.4
Taxes	109.9	111.1	112.6	110.9	109.4	119.5	9.2
Wage rates	111.9	115.9	119.1	126.3	133.2	136.0	2.1
Crop sector 2/	109.2	106.6	108.0	110.2	111.3	110.0	-1.2

f = forecast. 1/ Change from 2019 to 2020.
2/ Input items common to crop production.

Source: USDA, National Agricultural Statistics Service.

Commodity Highlights

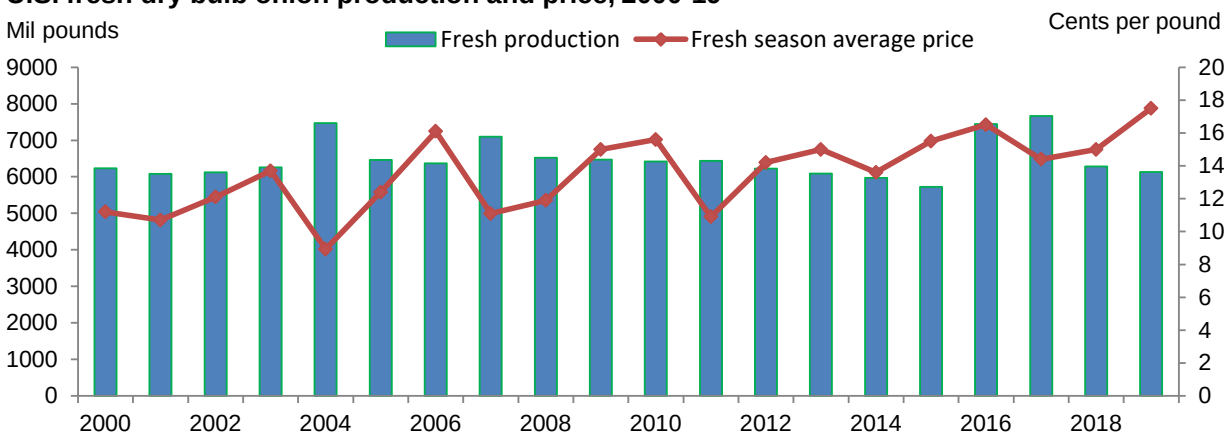
Dry Bulb Onions

Based largely on a 3-percent reduction in per-acre yield, 2019 total U.S. dry bulb onion output declined 4 percent to 69.9 million cwt. Harvested area declined less than 1 percent as reduced spring onion planting in States such as Georgia, Texas, and Washington was nearly offset by rising storage area in California, Oregon, and Idaho. Yield declined in five of the nine surveyed States including top producers California (down 7 percent), Washington, and Oregon (each down 9 percent). Yield in Georgia's Vidalia crop were greatly improved (up 23 percent), recovering from poor spring conditions in 2018. Onion growers managed to get a quality crop into storage or delivered to processing plants despite some initial damage at harvest from an early fall freeze in the Pacific Northwest. As a result, early estimates of shrink and loss (1.2 million cwt) averaged less than 2 percent of total (fresh and processing) production—down from an average of 2.1 percent the previous two seasons. As the storage marketing season nears its close, a clearer estimate of actual crop shrink will emerge.

Fresh-market onion utilized production declined 1 percent to 47.8 million cwt in 2019. Combined with good demand, the National Onion Association reported that stocks of fresh dry bulb onions on January 1 were down 3 percent from a year earlier—to the lowest in several years. Larger fresh-market crops in California (up 14 percent), Idaho, and Georgia were outweighed by smaller crops in most other States. The greatest fresh-market decline likely occurred in

Figure 2

U.S. fresh dry bulb onion production and price, 2000-19



Source: USDA, Economic Research Service using data of USDA, National Agricultural Statistics Service.

Washington, where total onion output was reported to be down 17 percent (NASS did not provide a breakout of fresh production for this State in 2019). Fresh-market onion price at the point of first sale (grower/shipper level) rose 17 percent to $17.50 per cwt—the highest nominal dollar price on record. Higher prices pushed the value of the fresh onion crop up 15 percent to $836 million.

Processing onion utilized production declined nearly 8 percent in 2019 to 20.8 million cwt—30 percent of total utilized onion production. California, which reported an 11 percent smaller crop, accounted for most of the reduction in onions used for processing (largely for conversion into various dehydrated products). Given a smaller crop, processing onion prices rose 11 percent to $8.00/cwt ($160/short ton). With higher prices outweighing reduced output, the value of the 2019 processing onion crop rose to $166 million.

Normally, higher prices the year before would spur onion growers to consider planting a few extra acres the next year. However, in 2020 growers may be a bit more cautious given the economic uncertainty caused by the temporary loss of the foodservice market to the social distancing practices forced by the viral pandemic. Because bulb onions are one of the top fresh vegetable commodities, because they are less perishable than many other fresh items (especially the storage varieties), and because they are nearly ubiquitous in households nationwide, this commodity subsector likely has more options in weathering the storm. It is unknown how long the economic pause will continue and even more uncertain how fast the resulting recovery will be. Among other factors, much depends on how quickly consumers reach a personal comfort level in venturing out to resume former levels of activity.

Sweet potatoes

In 2019, sweet potato production increased 37 percent (using comparable states) to 32 million cwt as both area and yield increased. Driven by an increase in price for the 2018 crop, area planted rose 13 percent. With better weather and fewer abandoned acres than the past few years, area harvested rose 17 percent to 146,700 acres. Despite hot, dry weather in North Carolina, the largest producing State, greater area pushed sweet potato output up near 2017’s record high for the state. Despite this near record, the U.S. crop remains a long way from the 1932 record high of 47.6 million cwt. The value of the 2019 U.S. crop totaled an estimated $588 million—12 percent above a year earlier.

For the first time, USDA, NASS has provided a breakdown of utilized production between fresh and processing uses. Total utilized production was estimated at 31.8 million cwt of which 76

Figure 3

U.S. sweet potato production and price, 2000-19

Note: cwt = hundredweight, a unit of measure equal to 100 pounds.

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

percent (24.3 million cwt) was for the fresh market. This leaves 24 percent (7.5 million cwt) for various processing uses such a freezing, canning, and chipping. Processing uses have been one of the driving forces within the industry over the past 15 years. According to the Census of Agriculture, area harvested for processing has moved steadily upward, nearly doubling since the mid-2000's to 40,763 acres in 2017. North Carolina, Mississippi, Louisiana, and California are the leading processing States. At the same time, the focus of processing has expanded from traditional canned sweet potatoes to a plethora of new and improved products. These products, which include fries, chips, crackers, soups, and various baked goods (made with gluten-free sweet potato flour) are no longer a curiosity but are sold widely, in restaurants and supermarkets.

Fresh-market Vegetables

Outlook Uncertain for 2020 Following Gains in 2019

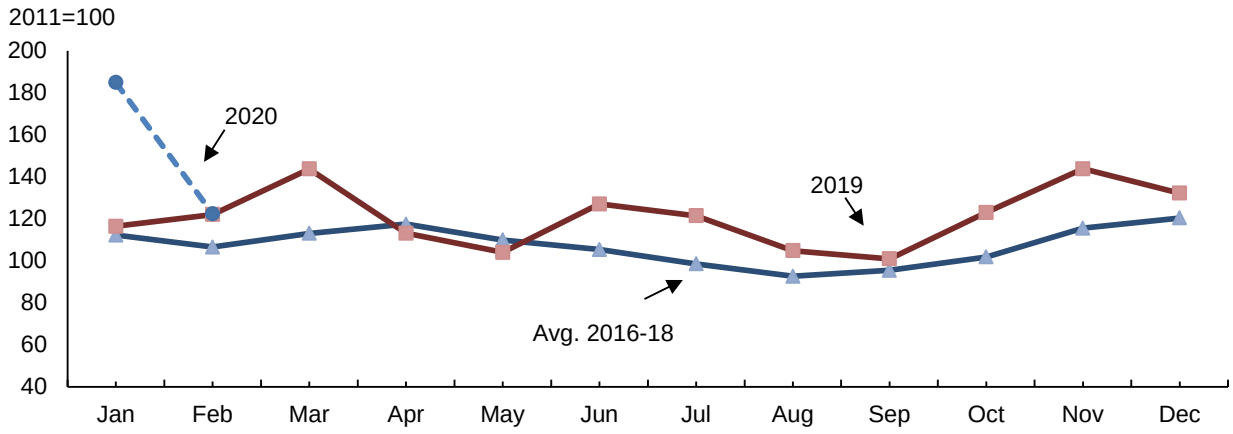
Given that uncertainty now reigns in 2020, the current market situation for fresh-market vegetable growers and shippers may present some short-term difficulties. Following an initial demand surge as worried consumers rushed to fill pantries, a new temporary market paradigm has formed where the vast majority of food now funnels through brick and mortar retailers and online grocers (at-home and away-from-home shares had been roughly equal). The question for growers and shippers is whether increases in these two outlets will offset the sharp reduction in foodservice sales. An offset may not be the case for many fresh vegetables, especially those common in quick service sandwiches and subs (e.g., lettuce, tomatoes, and onions, etc.) as well as items less commonly used at home (e.g. parsley).

Thus, the reduction-in or loss-of foodservice sales coupled with reports of consumers shying away from unpackaged fresh produce, will ultimately reduce sales volume and result in greater than usual economic abandonment (crop losses) for spring-season vegetable growers. For the coming summer season, growers and shippers may have some ability to modify planting schedules to accommodate whatever situation presents itself in the months ahead.

In 2019, U.S. fresh-vegetable utilized production (including potatoes, mushrooms, and sweet potatoes) rose 4 percent, driven by greater output of sweet potatoes, carrots, cabbage, and leaf lettuce. Although production was up, volume remained insufficient given strong demand across the sector, resulting in nominal dollar shipping-point prices averaging 12 percent above a year earlier. Prices ran above the average of the previous three years, peaking in late fall (figure 4).

Figure 4

Index of prices received by growers for vegetables, average 2016-18, 2019-20



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Table 3. Annual U.S. utilized production of selected fresh-market vegetables

Commodity	2016	2017	2018	2019	Change 2018-19 [2]
		Million pounds			*Percent*
Artichokes[1]	98.6	93.6	100.1	100.8	1
Asparagus	64.9	65.3	61.8	58.0	-6
Beans, snap	421.0	377.1	386.3	312.9	--
Broccoli	2,154.8	1,990.8	1,677.8	1,664.2	-1
Cabbage	1,891.8	1,976.5	1,729.7	1,893.0	13
Carrots	2,224.8	2,085.7	3,661.6	4,047.6	12
Cauliflower	728.3	869.0	930.9	1,004.5	8
Celery[1]	1,767.6	1,604.5	1,750.0	1,461.8	-10
Corn, sweet	2,303.7	2,361.3	2,254.8	1,677.3	-9
Cucumbers	728.3	502.9	559.6	460.0	--
Garlic	148.5	175.4	183.1	146.5	-20
Lettuce, all	10,322.1	9,937.9	8,031.8	8,112.5	1
Head	5,384.1	4,939.6	4,056.1	4,144.6	2
Leaf	1,548.6	1,367.5	1,072.8	1,246.7	16
Romaine	3,389.4	3,630.8	2,902.9	2,721.2	-6
Onions	5,167.0	6,038.6	4,843.3	4,784.3	-1
Peppers, bell	1,342.0	1,200.4	1,153.5	950.4	--
Peppers, chile[1]	417.7	333.6	266.5	164.4	-33
Pumpkins	1,159.9	968.4	987.8	907.1	-2
Spinach	696.4	663.4	674.3	870.5	--
Squash	514.8	574.5	511.6	514.5	--
Tomatoes	2,049.6	2,097.0	1,977.4	1,421.5	-12
Selected fresh subtotal	**44,524.1**	**43,853.7**	**39,773.7**	**38,664.2**	**3**
Mushrooms	848.5	838.4	839.1	782.0	-7
Potatoes	11,422.7	10,982.4	10,648.2	11,281.0	6
Sweet potatoes[1]	3,154.6	3,564.6	2,737.8	3,184.5	37
Total	**59,949.9**	**59,239.1**	**53,998.7**	**53,911.7**	**4**

p = preliminary. -- = not available.

[1] All uses. [2] Percentage changes based on data for comparable States for 2018 and 2019.

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

The following are 2019 market highlights for several selected fresh-market vegetables:

Tomatoes: In 2019, field-grown fresh market tomato utilized production in the top two States (California and Florida) declined 6 percent from a year earlier as planted area declined. These two States account for 60 percent of field-grown area and a somewhat larger share of production due to yields above the national average. In addition, various greenhouses around the country boost domestic supplies by about one-fourth, with most of these sold at retail. With a smaller field-grown crop, supply gaps, and strong demand, grower prices rose 19 percent. Import volume increased during the summer but was little changed for the year. Export volume dropped 5 percent on higher prices and lower supplies from the two top producing (and exporting) States. Since peaking at the start of 2020, fresh tomato shipping-point prices have trended lower and bottomed out in early April as unsold product from reduced foodservice demand backed up in the supply chain and at farms in central Florida where a majority of spring tomatoes are grown.

Table 4. Season-average price for selected fresh-market vegetables, 2015-19

Commodity	2015	2016	2017	2018	2019	Change 2018-19
			$/cwt			*Percent*
Artichokes	87.80	78.80	70.00	63.00	78.00	24
Asparagus	116.00	117.00	132.00	122.00	151.00	24
Beans, snap	59.40	60.10	57.10	60.00	59.90	0
Broccoli	49.10	38.20	46.00	43.10	51.30	19
Cabbage	19.30	21.70	19.80	22.90	26.10	14
Carrots	30.50	32.10	30.20	18.40	19.80	8
Celery[1]	24.80	18.10	20.10	25.00	30.20	21
Garlic[1]	78.50	74.00	76.30	78.90	78.20	-1
Lettuce, head	29.10	26.70	35.90	30.10	47.30	57
Lettuce, leaf	59.70	46.20	60.90	51.80	52.20	1
Lettuce, romaine	39.70	30.40	44.80	31.00	32.40	5
Onions	15.50	16.50	14.40	15.00	17.50	17
Peppers, bell[1]	48.30	34.60	48.70	44.30	55.00	24
Spinach	56.50	52.50	68.80	59.50	59.10	-1
Squash[1]	29.00	24.50	29.60	26.60	31.50	18
Sweet potatoes	21.80	20.70	18.40	23.20	18.50	-20
Tomatoes	46.30	42.30	36.80	41.60	49.60	19
Selected average	47.72	43.20	47.64	44.49	50.45	13
Mushrooms	129.00	126.00	131.00	132.00	134.00	2
Potatoes[1]	8.79	9.08	9.17	8.90	9.79	10
Sweet potatoes[1]	21.80	20.70	18.40	23.20	18.50	-20
Overall average	**49.95**	**45.76**	**50.00**	**47.23**	**52.70**	**12**

p = preliminary.

[1] All uses. [2] Beginning in 2016 USDA, National Agricultural Statistics Service reports fresh and processed separately.

Source: USDA, Economic Research Service using data from USDA, NASS.

Onions: Fresh dry-bulb onion utilized production slipped 1 percent in 2019 as both area harvested and average yield edged lower. Export volume jumped 14 percent with movement to top destinations, Canada and Mexico, increasing. The United States is a net importer of fresh onions but import volume declined 4 percent as shipments from Mexico fell 14 percent. Rising imports of Peruvian sweet onions were partly offsetting.

Romaine lettuce: Utilized production of romaine lettuce slipped 6 percent in 2019 as a 12 percent reduction in harvested area was partly offset by rising yields. Farm price rose 5 percent to 32.4 cents per pound, but total crop value declined 2 percent, to $881 million. Buoyed by rising imports, per capita availability gained 2 percent to 12.3 pounds. Crop quality and supplies have been ample this spring.

Carrots: Per capita availability of fresh-market carrots rose for the third consecutive year, reaching 13.6 pounds—the highest since 1997. Underlying this gain in availability was a 12-percent surge in utilized production accompanied by a 2-percent rise in import volume. New

Table 5. Selected fresh-market vegetable trade[1]

Item	2015	2016	2017	2018	2019	Change 2018-19
	---------- Million pounds ----------					*Percent*
Imports, fresh:						
Peppers, bell	1,217	1,422	1,457	1,535	1,616	5
Cabbage	166	216	169	253	285	13
Carrots	427	475	459	494	504	2
Squash[2]	915	1,067	1,077	1,130	1,206	7
Celery	108	114	153	132	245	86
Cucumbers	1,785	1,924	1,944	2,081	2,150	3
Okra	130	129	117	160	162	1
Tomatoes	3,468	3,938	3,944	4,092	4,103	0
Other	4,967	5,313	5,686	5,598	5,832	4
Subtotal	**13,183**	**14,598**	**15,006**	**15,475**	**16,103**	**4**
Mushrooms	787	838	849	838	839	0
Potatoes	882	1,093	1,106	1,073	909	-15
Sweet potatoes[1]	47	34	30	35	35	0
Total	**14,899**	**16,563**	**16,991**	**17,421**	**17,886**	**3**
Exports, fresh:						
Tomatoes, all	214	187	185	183	173	-5
Carrots	179	172	153	164	153	-7
Cauliflower	222	274	249	284	243	-14
Cucumbers	31	29	31	27	32	19
Onions, dry bulb	605	672	682	736	837	14
Peppers, bell	113	102	107	104	103	-1
Garlic	53	123	66	31	25	-19
Asparagus	11	33	41	55	52	-5
Other	1,641	1,694	1,571	1,562	1,512	-3
Subtotal	**3,069**	**3,286**	**3,085**	**3,146**	**3,130**	-1
Mushrooms	19	17	13	11	17	55
Potatoes	905	1,078	1,204	1,061	1,203	13
Sweet potatoes[1]	409	528	650	668	580	-13
Total	**4,402**	**4,909**	**4,952**	**4,886**	**4,930**	**1**

[1]Excludes melons, dry pulses. [2]Excludes chayote.

Source: USDA, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census.

products such as various organic carrots as well as carrot packs containing yellow, purple and orange carrots, may be expanding the market. Signaling favorable demand in the face of rising production, fresh-carrot shipping-point prices rose 8 percent to 19.8 cents per pound, helping to push total crop value up 19 percent to $800 million.

Cauliflower: Over the past few years, fresh cauliflower has experienced a renaissance in popularity which was lost after the heyday of mashed cauliflower side dishes in the early 2010s. In 2019, per capita availability jumped 21 percent to a record 3.0 pounds as both domestic production (up 8 percent) and imports increased. Fresh cauliflower imports surged 34 percent in

Table 6. Fresh market vegetables: Per capita availability, 2015-19

Commodity	2015	2016	2017	2018	2019p	Change 2018-19
	Pounds per capita					*Percent*
Artichokes, all	1.41	1.39	1.43	1.35	1.38	2
Asparagus	1.46	1.56	1.62	1.76	1.75	-1
Bell pepper	10.74	11.08	11.31	11.16	11.31	1
Broccoli	7.41	7.46	7.12	5.93	6.14	4
Cabbage	6.29	5.91	6.20	5.68	6.46	14
Carrots	8.80	7.82	7.36	12.20	13.61	12
Cauliflower	1.58	1.66	2.37	2.50	3.02	21
Celery	5.15	5.04	4.74	4.89	5.34	9
Cucumbers	7.57	8.12	7.43	7.99	8.01	0
Eggplant	0.85	0.86	0.88	0.91	0.88	-3
Garlic, all	2.38	2.90	2.98	2.40	1.92	-20
Greens, leafy [2]	2.43	2.10	3.21	2.89	2.86	-1
Lettuce, head	13.57	16.87	15.31	12.33	12.72	3
Lettuce, romaine/ leaf	11.90	14.54	15.08	12.12	12.33	2
Onions, bulb	18.27	22.75	25.07	20.50	20.48	0
Pumpkins, all	3.13	7.02	6.45	6.26	5.83	-7
Beans, green/snap	1.59	1.70	1.55	1.63	1.78	9
Spinach	1.73	1.97	1.86	1.87	2.48	33
Squash, all	4.65	5.73	5.69	5.64	5.87	4
Corn, sweet	8.62	7.10	7.22	6.80	6.77	0
Tomatoes [3]	20.57	20.32	20.14	20.28	20.30	0
Others [4]	1.20	1.51	1.57	1.64	1.71	4
Subtotal	**141.89**	**155.86**	**157.10**	**149.23**	**153.32**	**3**
Mushrooms	2.89	2.96	2.93	2.94	2.81	-4
Potatoes	34.17	33.74	34.86	33.02	34.14	3
Sweet potatoes, all	7.57	7.23	8.01	5.56	7.91	42
Total	**186.52**	**199.79**	**202.90**	**190.75**	**198.18**	**4**

p = preliminary.
[1] Availability is a proxy for calendar-year consumption. [2] Collards, kale, mustard greens, and turnip greens. [3] Includes both domestic and imported hothouse tomatoes. [4] Includes brussels sprouts, escarole, endive, okra, radishes, and lima beans.
Source: USDA, Economic Research Service, *Vegetable and Pulses Yearbook* (March 2020).

2019, with rising volume from both Mexico (accounts for 74 percent of imports) and Canada. This was the sixth consecutive year that import volume has risen, and in 2020, the U.S. could become a net importer of fresh cauliflower for the first time.

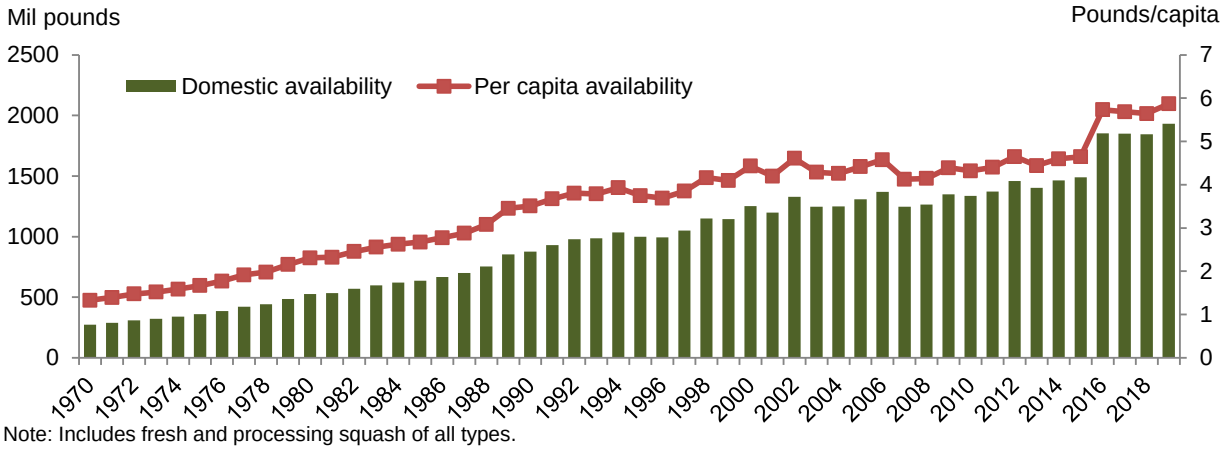
Broccoli: While cauliflower has been surging, fresh broccoli has recently lost steam (mostly in California) as utilized production slipped 1 percent in 2019—the third consecutive decline. Reduced acreage in California more than offset rising yield. Despite lower domestic output, per capita availability managed to rise 4 percent to 6.1 pounds as imports supplemented domestic volume. Import volume (mostly from Mexico) rose 17 percent to a record 493 million pounds. The U.S. has consistently been a net importer of fresh broccoli since 2013 as exports, which are one-third their 2000 peak, have slowly eroded. With demand exceeding supply, the shipping-point price rose 19 percent to 51.3 cents per pound pushing crop value up to $853 million in 2019.

Squash: Utilized production of all squash (summer and winter types) fell 2 percent (based on comparable states) to 699 million pounds in 2019. About 75 percent of the squash grown in the United States is used in the fresh-market. Michigan, California, and Florida are the leading fresh-market States with Oregon the top processing State. In Michigan, the top producing State, winter squash (e.g., butternut and Hubbard) accounts for two-thirds of area. Summer squash (e.g., yellow straight-neck and zucchini) accounts for about 53 percent of the squash grown domestically. Summer squash is primarily grown in Florida, California, and Michigan, while winter squash is primarily grown in Michigan, New York, and California. Driven by expanding imports and seemingly endless varieties, per capita availability of squash rose 4 percent, to 5.9 pounds in 2019—the highest in more than 60 years. Imports, which increased 7 percent in 2019, have more than doubled since 2008 and tripled since the late 1990s. Exports are minor and account for about 1 percent of supply. Although total availability was up 5 percent in 2019 to 1.9 billion pounds, favorable demand pushed shipping-point prices up 18 percent to 31.5 cents per pound.

Artichokes: Per capita availability of artichokes for all uses rose 2 percent to 1.4 pounds in 2019. Production, all from California, has not changed greatly over the past 30 years, averaging 101 million pounds annually. Unsurprisingly, production in 2019 rose 1 percent to 101 million pounds. Total artichoke imports, which increased 3 percent in 2019, have been relatively steady over the past 15 years. Import volume accounts for 79 percent of domestic availability with the majority consisting of prepared and preserved product (largely canned artichokes). Peru (59 percent) and Spain (28 percent) are the leading suppliers of processed artichokes. U.S. exports are small (3.9 million pounds in 2019) and consist wholly of fresh product.

Figure 5

U.S. availability of all squash, 1970-2019



Note: Includes fresh and processing squash of all types.

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Processing Vegetables

Tomato Area to Rise in 2020 on Lower Stocks, Higher Prices

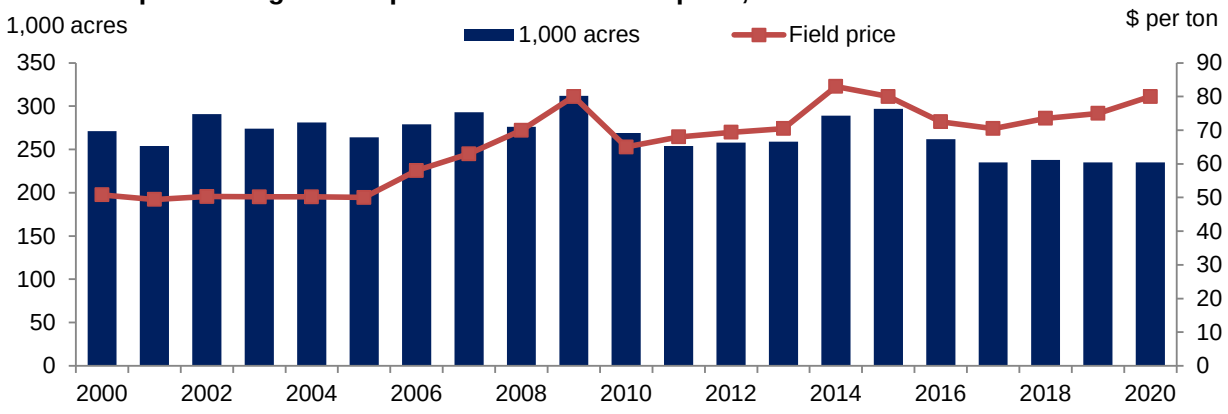
An early (Jan. 22) crop intentions report indicated that California tomato processors anticipate contracting for more tomatoes in 2020 (figure 6). Processors intend to contract for 4 percent more processing tomatoes than a year earlier—a total of 12 million short tons if realized. Since most of the end products are storable, current indications are that the industry intends to move forward with these plans.

If realized, contract output would exceed the average of the past three years by 6 percent, but would remain well below the 2015 contract record high of 14.3 million short tons. With many growers using advanced irrigation and fertigation techniques, favorable weather and a yield of 51.1 tons per acre was assumed by processors. This would be up from last year's weather-reduced level but just below 2018's record high. An additional 0.5 million tons could be processed from open-market purchases (non-contract) and in other States. California is the source for about 96 percent of the tomatoes grown nationally for processed products such as sauces, paste, soup, juice, and ketchup. The next update for this year's California processing tomato crop will be released by USDA, NASS on May 28.

According to the California Tomato Growers Association (CTGA), in 2019, the base price (price at the first delivery point, excluding premiums) averaged $75 per short ton (unadjusted for inflation), up from $73.50 the previous season. The base price this year is expected to rise based on lower industry stock levels and the initial CTGA price position. Although the settled

Figure 6

California processing tomato planted area and field price, 2000-20



Note: Ton is a 2,000 pound short ton. Data for 2020 is projected.
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, and California Tomato Growers Association.

Table 7. Annual U.S. utilized production of selected processing vegetables

Commodity	2016	2017	2018	2019	Change 2018-19 [1]
	Million pounds				*Percent*
Tomatoes	26,341.6	21,908.5	25,585.3	22,372.5	-9
Corn, sweet	4,960.0	5,175.6	5,083.3	4,572.6	-7
Cucumbers	1,003.8	1,385.8	982.5	1,030.6	--
Beans, snap	1,579.1	1,426.9	1,318.2	1,341.1	2
Carrots	949.1	1,013.9	914.1	932.6	16
Peas, green [2]	612.4	601.2	506.9	503.3	8
Spinach	161.6	145.7	135.9	90.1	-33
Pumpkin	549.7	591.7	524.9	415.1	-18
Cabbage	327.8	403.0	192.1	268.8	40
Dual uses:					
Broccoli	91.8	47.6	49.5	79.8	61
Asparagus	18.3	18.6	15.7	15.6	-1
Cauliflower	17.8	36.1	18.4	0.9	-95
Selected processing subtotal	**36,613.0**	**32,754.7**	**35,326.8**	**31,623.0**	-4
Potatoes	27,961.1	28,441.1	28,920.9	29,110.2	1
Mushrooms	94.9	95.0	78.2	64.5	-17
Selected total	**64,669.0**	**61,290.8**	**64,325.9**	**60,797.7**	-5

p = preliminary.

[1]Percentage changes based on data for comparable States for 2018 and 2019. -- = not available. [2] All uses.

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

first delivery point nominal dollar price is expected to rise, it is unlikely that current market conditions would push it above the 2014 record-high of $83 per ton.

Although industry data indicate that tomato stocks on March 1, 2020 were down 8 percent, average monthly disappearance was lower—declining 9 percent over the previous nine months (due largely to weak export demand). On a fresh-equivalent basis, estimated disappearance has been running at 1.06 million tons per month. However, preliminary estimates suggest that domestic per capita use of processing tomatoes rose 4 percent in 2019 to 68.0 pounds, meaning most of the downward pressure on month-to-month movement was a result of weak export demand. With a strengthening dollar, export weakness has continued into early 2020 and may not improve until later in the year. Most analysts project profound weakness in the global economy into early summer of 2020 due to the viral pandemic. With operations at foodservice venues severely reduced beginning in late winter and extending into spring—part of the effort to combat the pandemic—away-from-home spending on tomato products such as pizza sauces, pasta, and salsa will likely decline this year. Thus, domestic use of processed tomato products may depend much more on domestic retail sales in 2020 than usual.

Table 8. Season-average price for selected processing vegetables, 2015-19

Commodity	2015	2016	2017	2018	2019p	Change 2018-19
			$/ton			*Percent*
Asparagus	1,650.00	1,680.00	1,570.00	1,580.00	1,610.00	2
Beans, green/snap	233.00	191.00	188.00	182.00	173.00	-5
Broccoli	601.00	490.00	388.00	636.00	490.00	-23
Cabbage	--	231.00	202.00	122.00	178.00	46
Carrots	123.00	151.00	133.00	131.00	137.00	5
Cauliflower	480.00	990.00	494.00	646.00	639.00	-1
Corn, sweet	103.00	87.40	78.50	79.70	75.80	-5
Cucumbers	324.00	313.00	352.00	332.00	279.00	-16
Onions	--	162.00	173.00	144.00	160.00	11
Peas, green	320.00	254.00	250.00	251.00	251.00	0
Pumpkins	--	42.90	46.20	44.20	48.80	10
Spinach	138.00	160.00	196.00	212.00	279.00	32
Squash	--	196.00	148.00	166.00	160.00	-4
Tomatoes	93.70	87.30	82.70	81.50	80.00	-2

p = preliminary. -- = not available.

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Processing Vegetable Output Declines in 2019

Utilized production of the major vegetables used for processing declined 5 percent (based on comparable States) to 60.8 billion pounds in 2019 (table 6). Half of the leading processing crops registered decreased output, with tomatoes the major change agent on the downward side. Excluding tomatoes, output of processing vegetables increased 5 percent, with much of the gain coming from potatoes, snap beans, and cucumbers. Production of sweet corn used for canned and frozen products remained steady, while output of cabbage, broccoli, and carrots increased.

The value of production for most processing vegetables declined in 2019 as prices paid by processors fell. The average price for vegetables delivered to the processing-plant door declined for most major processing vegetables such as sweet corn (down 5 percent to $75.80 per ton), snap beans (down 5 percent to $173 per ton), and cucumbers for pickles (down 16 percent to $279 per ton). Lower prices led to reduced value of production for each of these crops in 2019. In general, crop values are expected to improve in 2020 assuming favorable weather and advancing contract prices spurred by reduced inventories and a surge in demand this spring because consumers stocked up for increased at-home meal preparation.

Table 9. Selected processed vegetable trade value, 2015-19[1]

Item	2015	2016	2017	2018	2019	Change 2018-19
			---------- Million dollars ----------			*Percent*
Imports						
Canned vegetables	1,432	1,485	1,618	1,651	1,594	-3
Tomatoes	178	183	194	214	232	8
Artichokes	140	142	152	139	139	0
Peppers	135	125	125	127	113	-11
Mushrooms	109	106	109	105	108	3
Frozen vegetables	1,770	1,899	2,035	2,286	2,346	3
Potatoes	734	783	863	960	970	1
Broccoli	307	320	296	341	360	5
Cauliflower	39	40	57	64	80	25
Dried and dehydrated	586	609	644	697	646	-7
Starches	153	155	163	199	212	6
Mushrooms, dried/dehydrated	145	136	138	141	132	-7
Potato chips	67	70	75	90	102	13
Garlic, dried/dehydrated	69	99	92	54	22	-59
Selected total imports	**3,789**	**3,993**	**4,297**	**4,634**	**4,586**	**-1**
Exports						
Canned vegetables	1,957	1,897	1,854	1,804	1,782	-1
Tomatoes	1,385	1,346	1,283	1,240	1,247	1
Sweet corn	114	108	110	108	96	-11
Cucumbers	61	61	65	63	71	12
Frozen vegetables	1,376	1,502	1,532	1,505	1,582	5
Potatoes	1,063	1,145	1,174	1,159	1,251	8
Sweet corn	98	112	110	107	105	-2
Dried and dehydrated	546	517	528	488	504	3
Potato chips	197	195	198	190	185	-3
Potatoes, dried/dehydrated	153	120	125	119	141	19
Onions, dehydrated	90	80	81	80	79	-2
Selected total exports	**3,880**	**3,916**	**3,914**	**3,797**	**3,869**	**2**

Note: Potato chips were grouped with dried and dehydrated for the purposes of this table.

Source: USDA, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census.

Census 2017: Share of Area Used For Processing

The 2017 Census of Agriculture reports vegetable area for both fresh-market and processing by commodity (2002 was the first time this critical breakdown was reported in the Census). Processing as defined here does not include fresh-cut products. For all vegetables and melons (excluding mushrooms and pulse crops), processing accounted for 40 percent of total vegetable, potato, sweet potato, and melon harvested area in 2017. Area for processing was harvested by 16 percent (11,901 farms) of all farms reporting vegetables, potatoes, sweet potatoes, and melons on their operation. Figure 7 indicates the share of area devoted to processing for several selected vegetables. Farms harvesting potatoes reported the greatest number of acres devoted to processing followed by sweet corn and tomatoes. Among all vegetables and herbs, farms producing green peas had the highest concentration of acreage

Table 10. Vegetables for processing: Per capita availability, 2015-19

Commodity	2015	2016	2017	2018	2019p	Change 2018-19
	Pounds per capita					*Percent*
Canning						
Asparagus	0.06	0.08	0.07	0.06	0.06	0
Beets	0.54	0.53	0.53	0.52	0.52	-1
Cabbage	0.91	1.04	1.31	0.77	0.66	-14
Carrots	0.69	1.06	1.12	1.03	1.24	20
Peppers, chile, all	0.89	0.95	0.94	0.85	0.91	6
Cucumbers[2]	3.42	2.99	3.66	3.33	3.41	3
Peas, green	0.84	0.76	0.65	0.61	0.66	9
Beans, green/snap	2.95	3.19	3.12	2.86	2.90	1
Spinach	0.15	0.16	0.14	0.13	0.13	1
Corn, sweet	5.34	5.02	5.05	5.18	5.27	2
Tomatoes	56.33	61.16	57.89	65.58	68.00	4
Other canning	8.43	9.02	8.85	8.64	8.87	3
Canning subtotal	80.55	85.97	83.33	89.57	92.63	3
Freezing						
Asparagus	0.12	0.16	0.14	0.09	0.10	11
Broccoli	2.59	2.64	2.37	2.50	2.64	6
Carrots	1.36	1.90	2.43	2.35	1.76	-25
Cauliflower	0.34	0.41	0.53	0.58	0.68	17
Peas, green	1.48	1.00	1.30	1.28	1.25	-2
Beans, green/snap	1.90	1.99	1.90	1.85	1.92	4
Spinach	0.73	0.70	0.70	0.77	0.72	-6
Corn, sweet	8.02	7.45	8.06	7.92	6.85	-13
Other freezing	3.94	3.92	3.97	5.31	5.71	8
Freezing subtotal	20.47	20.16	21.40	22.64	21.64	-4
Other processing						
Mushrooms	1.06	1.05	1.02	0.99	0.99	0
Onions, dehydrating	1.38	1.71	1.39	0.62	1.72	179
Potatoes	81.25	76.47	82.92	82.99	84.69	2
Other subtotal	83.69	79.23	85.34	84.59	87.40	3
Grand total	**184.71**	**185.36**	**190.07**	**196.80**	**201.67**	2

p = preliminary.

[1]Availability is an imperfect proxy for calendar-year consumption. [2]For pickling.
[3]Includes french fries and other frozen potato products, chips, and others.

Source: USDA, Economic Research Service, *Vegetable and Pulses Yearbook* (March 2020).

destined for processing (96 percent), followed by horseradish and distantly by tomatoes. Eggplant had the lowest share of acres devoted to processing (1 percent) among those crops that typically have a processing component.

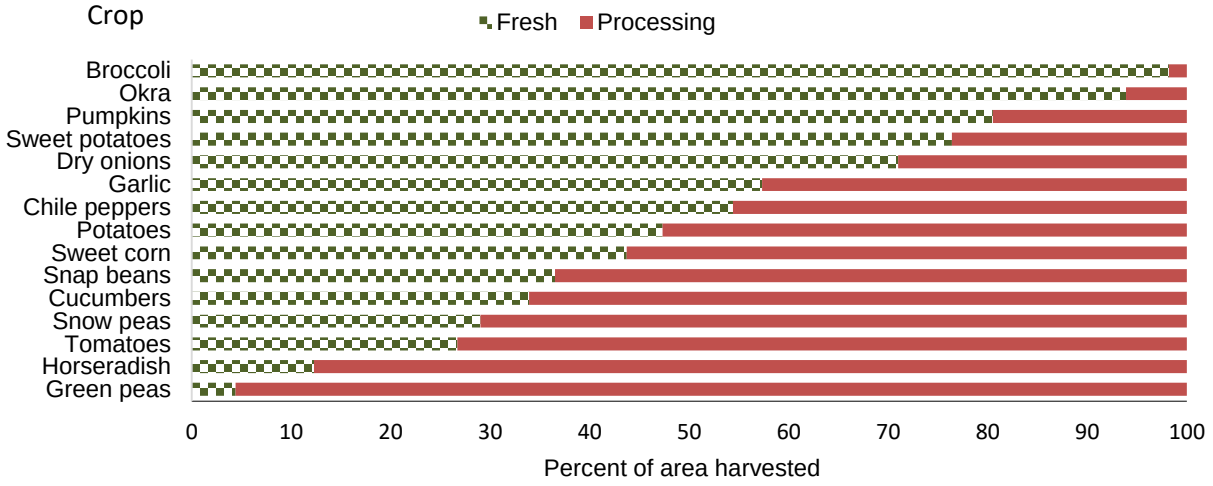
The Census also indicated that 52 percent of the vegetable and melon area devoted to processing was produced on farms growing at least 1,000 acres of vegetables for processing. This area was farmed by just 4 percent (479 farms) of the growers harvesting vegetables for

processing. About 29 percent of operations harvested between 1 and 4.9 acres of processing vegetables in 2007 (the most common enterprise size for processing vegetables), accounting for less than 1 percent of the area devoted to processing vegetable production.

Since the 2007 Census, there have been some notable changes in the share of vegetable area devoted to processing. Of course, the Census is a one-year snap shot and does not necessarily reflect ongoing trends as events (weather, relative prices, inventories, etc.) specific to that year can impact the area reported. However, it is possible to gain some insight by matching well-known annual consumption trends with changes between the 2007 and 2017 Census years. For example, rising popularity of pumpkin products over the past decade has likely supported the rising share of area devoted to processing (mostly canned pumpkin), with processing area up 48 percent between 2007 and 2017. Similarly, sugar snap/snow pea processing has jumped from 56 percent of area to 71 percent in 2017 on the strength of various frozen and mixed vegetable medleys. The appearance of various sweet potato chip and fry products has contributed to a gain in area since the 2007 Census (total processing area has doubled).

On the opposite side of the spectrum, although total area devoted to brussels sprouts more than doubled from 2007 to 2017, the area used for processing declined, with processing share falling from 23.9 percent to 3.5 percent in 2017. The appearance of fresh brussels sprouts on various restaurant menus as a trendy vegetable has likely been a key driver contributing to a rise in fresh use at the expense of processed. In addition, rising imports of lower-priced fresh and frozen brussels sprouts (up 295 percent since 2010) likely played a role in the decline of processing area.

Figure 7
Share of selected vegetable area destined for processing, 2017



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Potatoes

Production Lower in 2019, Uncertain in 2020

With both lower average yield and reduced harvested area, 2019 U.S. potato production declined 2 percent to 423 million cwt. Production declined 8 percent in the leading producing State of Idaho as untimely rains and early frost delayed harvest and affected yield and quality. Similarly, rain and cold also delayed and impacted harvest in North Dakota—the fifth leading producing State and the top supplier of red potatoes.

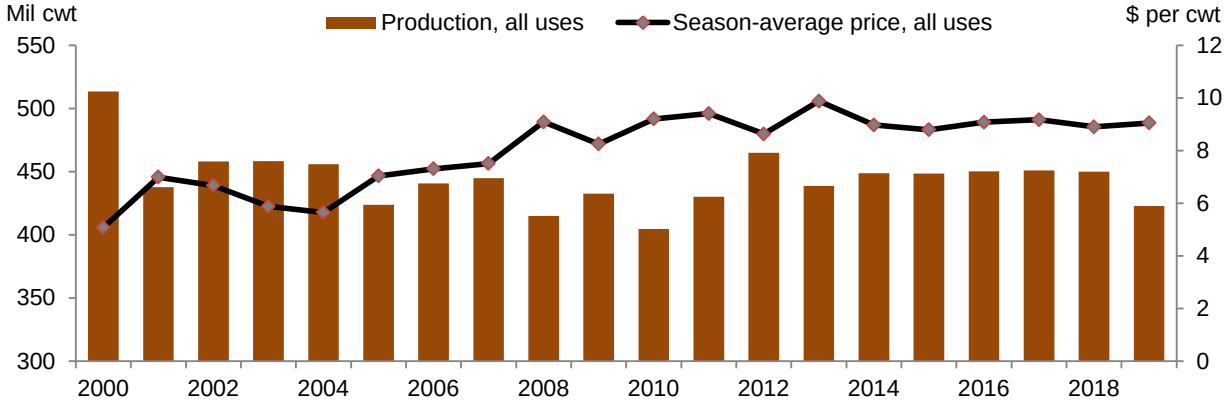
U.S. harvested area declined 1 percent despite a small increase in plantings. Weather-related acreage losses were higher in 2019, with 97 percent of planted area able to be harvested—down from an average of 99 percent the previous two crop years. Harvest issues were most noteworthy in North Dakota, where 21 percent of planted area was left unharvested. An 8 percent rise in yield softened crop losses in the State, with potato production down 14 percent.

Potato yield increased 1 percent in 2019 to 449 cwt per acre—besting the previous year's record high. Michigan set the pace with it's own record high of 425 cwt—up 12 percent from a year earlier. In addition to North Dakota, yields were up in several other States including California (up 10 percent) and Wisconsin (up 2 percent).

With a smaller crop and good demand to begin the marketing year, season-average potato prices were estimated at $9.79 per cwt for 2019/20—up 10 percent from 2018/19. As of the second week of April 2020, prices for white potatoes have held steady while red and yellow potato prices have crept up given low stocks and good retail demand. The market for Russet

Figure 8

U.S. potato production and price, 2000-19



Note: Cwt is a unit of measure equal to 100 pounds.
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service..

potatoes is where the impact of reduced foodservice and institutional demand has been felt, with prices for 50-pound cartons and baled products down 16 percent since the end of March.

Although always a challenge, determining the outlook for 2020 was much easier prior to the start of the unprecedented global viral pandemic. Because potatoes are closely linked to the foodservice sector, the industry could struggle with a messy end to the 2019/20 season and a sluggish start to the 2020/21 season. This is because foodservice demand for both fresh and frozen product is sharply lower this spring quarter as schools and cafeterias have closed and most restaurants have moved to takeout and delivery.

Utilization of potatoes for frozen french fries accounts for more than a third of the annual potato crop, with the vast majority (more than three-fourths) moving through foodservice or the export market. At retail, frozen fries have a much smaller footprint, with minimal potential for taking over the vast volume of foodservice products. Potato exports will also eventually lag as businesses and consumers in most other nations are sharing the same social experience as the United States. Partially offsetting these negative demand impacts will be reduced imports and an uptick in fresh table potato and potato product (chips, frozen, soups, etc.) movement at the retail level as consumers prepare more meals at home.

Thus, as the country eventually returns to normal everyday business the question remains how quickly consumers will return to business as usual. This is a key question faced by growers and processors who have decided or are now deciding how many acres to plant or contract. If demand is slow to return, the industry may see excessive shrink or diversion to feed, an extended overlap between old crop and new crop, overstocked freezers and warehouses, and idled processing facilities. As there is no easily applied precedent here (on which to base forecasts), and seed and inputs were already ordered and/or received, growers (and their processor partners) face difficult decisions.

French Fry Exports and Imports Both Up

Potato trade continued to show striking balance between export and import volume (table 11). In the first six months of the 2019/20 marketing year, the United States exported 6 percent more potatoes and potato products while importing 7 percent more. Although there are some differences between categories, most of the major categories show similar totals. Frozen french fry exports, the potato trade volume leader, were up 9 percent (for both value and volume) during the September-to-February period with double digit increases for many destinations, including Mexico (29 percent), the Philippines (24 percent), and Canada (28 percent).

Table 11. U.S. potato trade volume [1]

Commodity	September-August 2016/17	2017/18	2018/19	September-February 2018/19	2019/20	Change 18/19-19/20
	---------- *1,000 cwt* ----------					*Percent*
Exports						
Fresh	10,946	9,880	11,706	4,688	4,494	-4
Frozen, all	22,699	22,395	22,955	10,941	11,840	8
French fries	20,210	19,854	20,281	9,604	10,500	9
Other frozen	2,489	2,541	2,674	1,337	1,340	0
Chips	1,137	1,082	1,076	543	519	-4
Dried & dehydrated [2]	2,192	2,023	2,131	992	1,139	15
Other prep/preserved	809	896	950	409	431	5
Seed	1,107	385	619	158	186	18
Total	**61,589**	**59,057**	**62,392**	**28,670**	**30,449**	**6**
Imports						
Fresh	9,387	9,261	7,393	4,365	4,751	9
Frozen, all	20,446	22,084	21,446	10,588	11,420	8
French fries	18,497	19,821	18,759	9,349	9,521	2
Other frozen	1,950	2,262	2,687	1,239	1,899	53
Chips	393	453	526	246	265	7
Dried & dehydrated [2]	4,169	4,620	4,647	2,290	2,319	1
Seed	1,657	1,533	1,543	477	484	1
Total	**56,500**	**60,034**	**57,001**	**28,555**	**30,658**	**7**

[1] Cwt= hundredweight, a unit of measure equal to 100 pounds. [2] Includes starch.

Source: USDA, Economic Research Service using data from U.S. Dept. of Commerce, Bureau of the Census.

Frozen fries are also the volume leader on the import side with a 2 percent increase through February. French fry demand across North America was strong before the viral pandemic hit. All of the gain in frozen French fry imports came from European nations, including Belgium-Luxembourg, the Netherlands, and Germany at the expense of Canadian processors who have seen sales to the U.S. drop 1 percent so far this season after experiencing a 7 percent decline last season (2018/19).

Per Capita Availability Up 2 Percent

Powered by gains in fresh (up 3 percent) and chip (up 7 percent) use, per capita availability of potatoes increased 2 percent to 118.8 pounds in 2019. Fresh availability remained near the decade average, which was down 19 percent from average fresh use during the 2000s. Only canning use (down 55 percent) was weaker over the past 20 years. Given product innovation and versatility, potato chip use continues to show resiliency and is the sole potato food product to post gains this past decade, rising 8 percent during the 2010's. Seen as a comfort food with a strong retail presence, chip use is expected to post another strong year in 2020. Frozen product use has changed little the past 3 years, but is expected to decline in 2020.

Dry Edible Beans

Area Expected to Rise in 2020

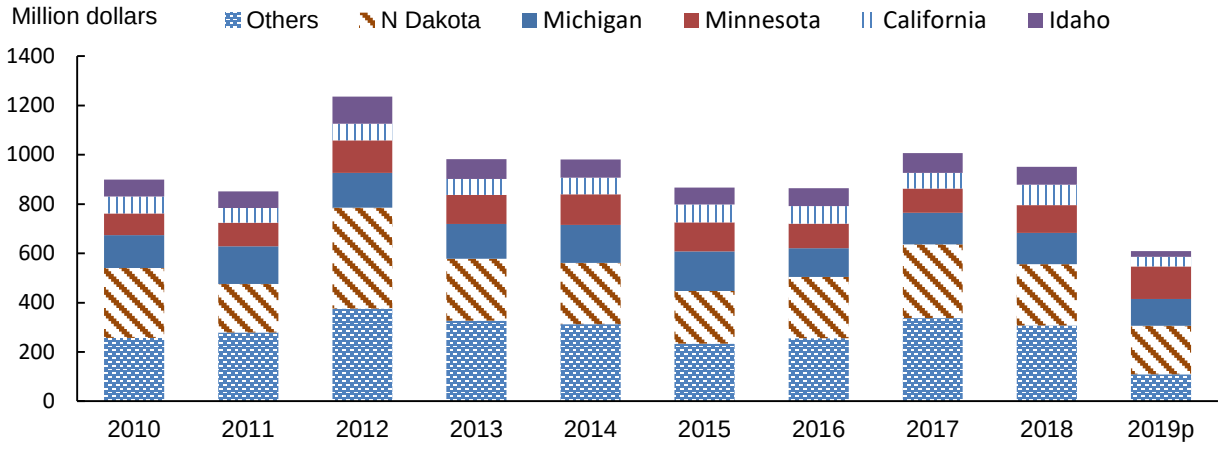
Prospective plantings of dry edible beans are expected to rise 7 percent this spring from last year's 1.29 million acres (table 12). Actual acreage may not match intentions as producers adjust their business plans over the next few months based on weather, the economy, and various price and income expectations. Dry bean area is up largely because prices for most classes of dry beans are running well above the previous year and potential returns are very competitive with those for alternative crops like wheat, corn, and soybeans. Acreage is expected to rise in eight of the nine surveyed States.

North Dakota, the leading producer of all dry beans (including pinto and navy), indicated a 6 percent rise in area planted compared with a year earlier. Minnesota growers plan a 2-percent increase in dry bean area to a record-high 215,000 acres. Area in Nebraska, the top producer of Great Northern beans and second largest of pinto beans, is expected to jump 21 percent. Prospective area in California is projected to plummet 42 percent to 16,000 acres—the smallest area on record. Since reaching an apex in 1918, dry bean area in California has been trending slowly lower.

Given greater area and assuming average weather featuring yields close to the mean of the past five years (18.2 bags per acre) would produce a dry bean crop at least a tenth larger than in 2019. The next area estimate for dry beans will be released in the June 30 *Acreage* report.

Figure 9

U.S. dry edible beans: Crop value by major state, 2010-19



p=preliminary. [1] Includes chickpeas.

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Table 12. U.S. dry beans: Area, yield, production, price, and crop value, 2000-20

Year	Acreage		Yield per acre	Production	Season avg. price	Crop value
	Planted	Harvested				
	----- 1,000 acres -----		*Cwt/acre*	*Mil cwt*	*$/cwt*	*$ Mil*
2000	1,652	1,512	16.7	2,521	15.50	416
2001	1,289	1,121	16.1	1,800	22.10	427
2002	1,844	1,665	17.7	2,945	17.10	519
2003	1,363	1,306	16.9	2,208	18.40	423
2004	1,301	1,169	14.7	1,715	25.70	452
2005	1,533	1,440	17.7	2,552	18.50	513
2006	1,486	1,399	16.2	2,262	22.10	554
2007	1,402	1,358	17.7	2,407	28.80	749
2008	1,412	1,363	17.9	2,445	34.60	910
2009	1,444	1,370	17.5	2,398	30.00	790
2010	1,765	1,699	17.6	2,986	28.00	899
2011	1,082	1,033	17.1	1,769	42.10	851
2012	1,535	1,484	19.3	2,859	38.00	1,235
2013	1,141	1,096	19.2	2,103	39.10	982
2014	1,488	1,437	18.2	2,610	32.30	981
2015	1,559	1,506	18.3	2,754	27.30	866
2016	1,339	1,238	18.8	2,328	29.20	863
2017	1,472	1,412	20.5	2,890	26.70	1,006
2018	1,231	1,182	21.1	2,496	25.40	951
2019	1,287	1,177	17.7	2,081	29.10	609
2020f	1,372					

f = forecast. Note: This table excludes chickpeas with the exception of crop value.

Source: USDA, ERS based on data from USDA, National Agricultural Statistics Service.

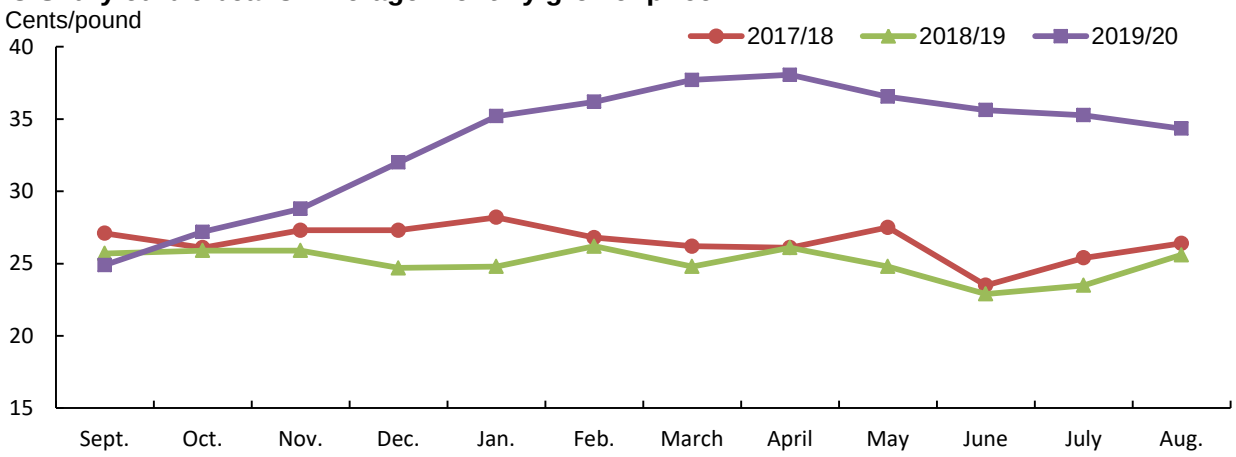
The preliminary 2019/20 marketing year average grower price for all dry beans was estimated at $29.10 per hundredweight (cwt)—up 15 percent from a year earlier. During the first six months of the marketing year (September 2019–February 2020), the U.S. aggregate grower price for all dry beans averaged 20 percent above a year earlier and was the highest first-half average since 2014. Prices have moved higher every month since the marketing year began with prices for all dry beans averaging 38 percent above a year earlier this past February. Grower prices across virtually all dry bean classes have remained above a year ago (figure 9).

According to USDA's *Bean Market News*, grower prices in early April were averaging about one-fourth higher than a year earlier. The greatest separation from a year earlier was reported for pinto beans (up 65 percent to $35.50/cwt) and Great Northern beans (up 54 percent to $37.00/cwt). With a smaller crop last year, stock levels for most bean classes are below average with pinto stocks estimated to be the lowest since the late 1980's. The unexpected additional demand in March and early April from consumers stocking pantries likely further reduced inventories while adding strength to dealer (wholesale) prices. For example, pinto

dealer prices are now more than double year earlier levels at $55/cwt, while black beans are running 27 percent higher at $43/cwt.

Figure 10

U.S. dry edible beans: Average monthly grower price



Source: USDA, National Agricultural Statistics Service, *Agricultural Prices.*

Table 13. U.S. dry bean calendar-year export volume[1]

	Jan -Dec			Jan-Feb		Change
Commodity	2017	2018	2019	2019	2020	2019-20
	1,000 cwt (bags)					*Percent*
By class						
Navy	2,005.6	1,242.0	1,631.4	248.5	226.1	-9
Dark-red kidney	999.2	1,114.3	1,441.9	299.0	299.7	0
Pinto	1,123.4	1,105.9	1,328.6	126.9	148.8	17
Black	1,274.7	1,138.5	1,107.5	166.6	286.1	72
Great Northern	275.7	201.6	519.6	140.0	32.6	-77
Light-red kidney	200.0	354.9	258.4	42.4	48.4	14
Lima, all	204.6	183.2	248.3	74.7	44.5	-40
Small red	182.1	249.4	240.1	42.9	40.0	-7
Other	2,341.3	1,826.4	1,316.9	198.5	130.1	-34
Total	**8,606.6**	**7,416.2**	**8,092.7**	**1,339.5**	**1,256.3**	**-6**
All by destination						
Mexico	2,266.1	2,179.4	1,808.1	268.0	329.1	23
Canada	1,589.5	1,002.8	1,091.5	195.2	112.3	-42
Italy	1,038.0	854.4	1,018.0	206.9	185.8	-10
Dominican Republic	432.9	506.4	586.3	28.1	47.1	68
United Kingdom	838.8	622.6	559.3	108.7	109.5	1
Haiti	236.1	173.9	311.7	38.0	57.9	52
Japan	154.2	168.4	176.4	43.4	41.8	-4
Colombia	140.0	215.1	174.1	29.3	30.0	2
Other	1,911.0	1,693.2	2,367.3	421.9	342.8	-19
Total	**8,606.6**	**7,416.2**	**8,092.7**	**1,339.5**	**1,256.3**	**-6**

[1]Excludes garbanzo beans. Cwt = hundredweight, a unit of measure equal to 100 pounds.

Source: USDA, Economic Research Service using data from U.S. Dept. of Commerce, Bureau of the Census.

Table 14. U.S. dry bean calendar-year import volume[1]

Commodity	Jan -Dec			Jan-Feb		Change
	2017	2018	2019	2019	2020	2019-20
	1,000 cwt (bags)					*Percent*
Mung bean	473.9	467.2	477.6	77.9	80.8	4
Black	316.3	310.0	245.6	44.2	45.9	4
Light-red kidney	158.3	160.2	175.9	20.1	38.0	89
Pinto	161.1	162.2	154.0	26.4	32.5	23
Blackeye	29.0	64.9	150.1	56.0	32.5	-42
Small red	126.2	131.2	137.0	14.6	28.1	92
Navy	57.6	56.2	62.8	20.6	2.2	-89
Dark-red kidney	53.5	57.3	36.6	4.5	7.3	62
Other	955.5	1,044.2	711.5	152.1	186.5	23
Total	**2,331.4**	**2,453.4**	**2,151.1**	**416.4**	**453.8**	**9**
All by source						
Canada	607.4	669.1	607.5	116.6	127.4	9
India	274.3	279.4	331.1	40.2	46.1	15
China	384.7	425.1	265.3	55.9	48.2	-14
Mexico	444.9	484.8	253.8	34.7	45.4	31
Other	620.1	595.0	693.4	169.0	186.7	10
Total	**2,331.4**	**2,453.4**	**2,151.1**	**416.4**	**453.8**	**9**

[1]Excludes garbanzo beans. Cwt = hundredweight, a unit of measure equal to 100 pounds.

Source: USDA, Economic Research Service using data from U.S. Dept. of Commerce, Bureau of the Census.

Exports Rise in 2019

During calendar year 2019, the volume of U.S. dry bean exports (excluding garbanzo beans) increased 9 percent from a year earlier to 8.1 million bags (cwt) (table 13). Among the leading dry bean classes, exports of Great Northern, navy, dark-red kidney, and pinto beans posted the largest increases. The leading destinations for U.S. dry beans during 2019 were Mexico (22 percent of total volume), Canada (13 percent), Italy (13 percent), and the Dominican Republic (7 percent). Although the volume leader, exports to Mexico declined 17 percent as their domestic supplies were up due to favorable crops. Despite elevated U.S. prices, the recent strength of the peso and a smaller 2019 Mexican crop, exports to Mexico are off to a strong start in 2020.

Dry bean imports were also lower in calendar 2019 despite the strong dollar and a small U.S. crop (table 14). Volume was up 2 percent for volume-leader mung beans and gains have continued for this bean class into the first two months of 2020. Increased imports of blackeye, light-red kidney, and navy beans were more than offset by reduced volume of dark-red kidney, black, and miscellaneous classes. Black bean import volume was down 21 percent because domestic supplies remained relatively steady as higher acreage in 2019 offset below-average yields in the upper Midwest. Canada shipped 28 percent of dry bean imports in 2019, followed distantly by India (50 percent was mung beans) and China (57 percent was mung beans).

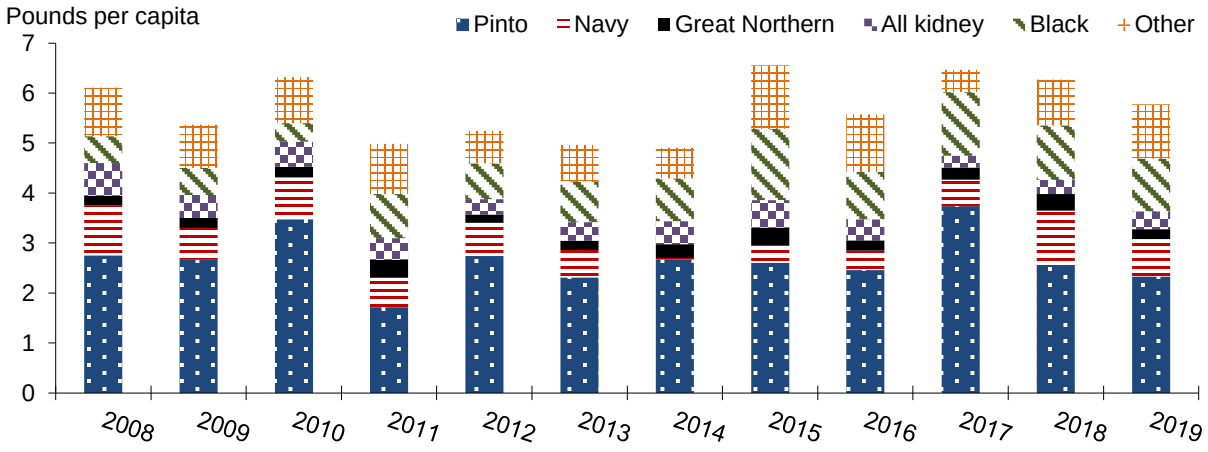
Dry Bean Per Capita Use Drops

Excluding chickpeas (garbanzo beans), total 2019 domestic availability of dry edible beans declined 17 percent—the steepest annual drop since 2011 when production was reduced 47 percent. On a per person basis, domestic availability of dry beans fell to 4.8 pounds (figure 11). Dry-bean supply declined as higher beginning stocks were outweighed by a smaller crop and reduced imports. In addition, stronger foreign demand (exports) left a smaller residual for the domestic market.

In 2019, reductions in net availability were noted for both white (down 52 percent) and nonwhite bean (down 14 percent) classes. White beans (e.g., navy, Great Northern, baby lima) accounted for 16 percent of all dry beans used domestically during the 2010s, down from 22 percent during the 2000s. Meanwhile, nonwhite beans (e.g., pinto, dark red kidney, black) continue to wrest market share from white bean classes, led by black beans. Black bean share of the dry bean category stood at 26 percent in 2019, up from 10 percent a decade earlier. Per capita use of black beans totaled 1.22 pounds, down 3 percent from a year ago but 125 percent above that of 2009.

Over the next few months, dry beans will serve as an economical protein source that consumers can reliably store and turn to in times of economic stress. Expectations for a larger crop this fall, easing dry bean prices, and the re-opening of restaurants may boost demand for dry beans. Considering these factors, it is likely that dry bean use will register welcome gains in 2020 and into 2021.

Figure 11
Dry edible beans (excluding garbanzo): Per capita availability, 2008-19



Source: USDA, Economic Research Service calculations.

Dry Peas and Lentils

Lower Area in Prospect for 2020

According to the USDA's Prospective Plantings report, area planted to dry edible peas, lentils, and chickpeas is expected to decline 14 percent this spring from last year's 2.04 million acres (table 15). While lentil area is expected to slip only 2 percent below last year's already low level, area devoted to all chickpeas is expected to plummet 41 percent because of abundant stocks and lower prices for large (Kabuli) chickpeas (also known as garbanzo beans). Prospective area for small (desi) chickpeas is projected to fall 5 percent. For dry edible peas, which are comprised of green and yellow peas (sold whole or split), area projected to be sown is down 12 percent from 2019's 1.1 million acres. Austrian winter peas and wrinkled seed peas are no longer estimated separately by USDA but have been included with other dry edible peas starting in 2019.

In Canada, expectations earlier in the year were for little change in area (but higher yield and production) of dry peas and lentils and a decline in chickpea acreage. Some industry analysts now expect lentil area to rise in Canada as world demand and prices strengthen. Statistics Canada is slated to release their 2020 acreage estimates on April 24.

With a decline in planted area, output of all dry peas, lentils, and chickpeas is expected to decline in 2020, given average yields. The five-year average yield for dry peas and lentils would be below the relatively favorable 2019 performance, while chickpea yields would improve. As a result, the present outlook points to a drop of about one-fourth in total dry pea, lentil, and chickpea output in 2020, with chickpeas and dry peas declining the most.

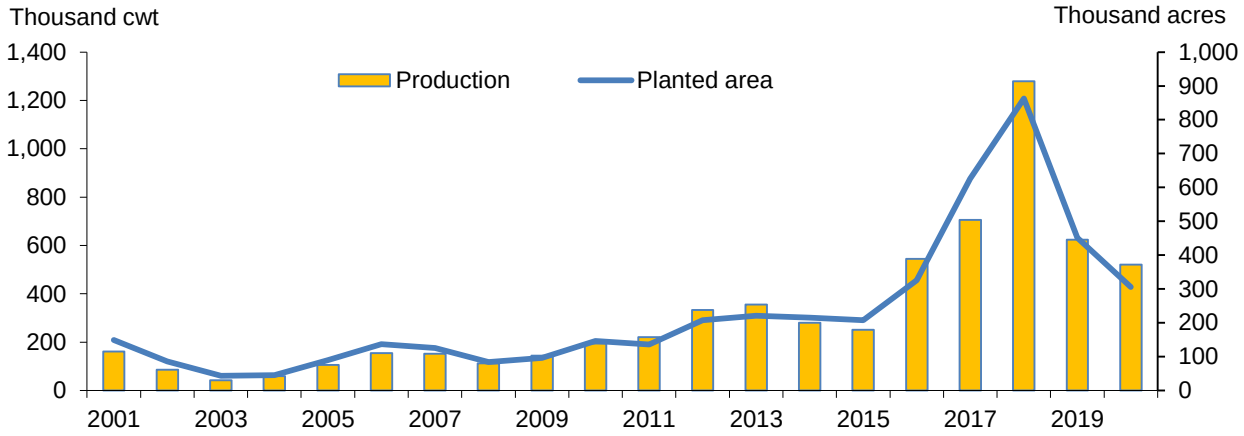
Table 15. Dry peas, chickpeas, and lentils: Planted area, 2016-20

Commodity	2016	2017	2018	2019	2020f	Change 2019-20
			1,000 acres			*Percent*
Dry peas	1,383.0	1,128.0	856.5	1,103.0	971.0	-12
Lentils	933.0	1,104.0	780.0	486.0	474.0	-2
Chickpeas, all	325.3	625.5	863.2	451.4	306.0	-32
Large chickpeas	211.5	448.0	637.5	346.4	206.0	-41
Small chickpeas	113.8	179.5	225.7	105.0	100.0	-5
Total	2,641.3	2,857.5	2,499.7	2,040.4	1,751.0	-14

f = USDA, National Agricultural Statistics Service (NASS) forecast.

Source: USDA, NASS, *Crop Production* and *Prospective Plantings*.

Figure 12:
U.S. chickpea planted area and production, 2001-20 [1]



[1] Production for 2020 is a USDA, ERS forecast. Cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: USDA, National Agricultural Statistics Service.

Prices Lower in 2019/20

Season average prices for dry peas, lentil, and chickpeas are all averaging below a year earlier well into the 2019/20 marketing season. Prices for dry edible peas are projected to average just under one-tenth below a year earlier. Although green pea prices in early April have moved close to year earlier levels, yellow peas remain well below last April according to USDA's Bean Market News. Richlea (green) lentil prices have also moved above a year earlier but Pardina (primarily exported) and Brewer (those commonly sold in U.S. consumer markets) lentil prices remain below year-earlier levels. Brewer prices in the Pacific Northwest are about one-fourth lower than last April. Chickpea prices also remain under year-earlier levels with both expected to average 10 to 20 percent below a season ago.

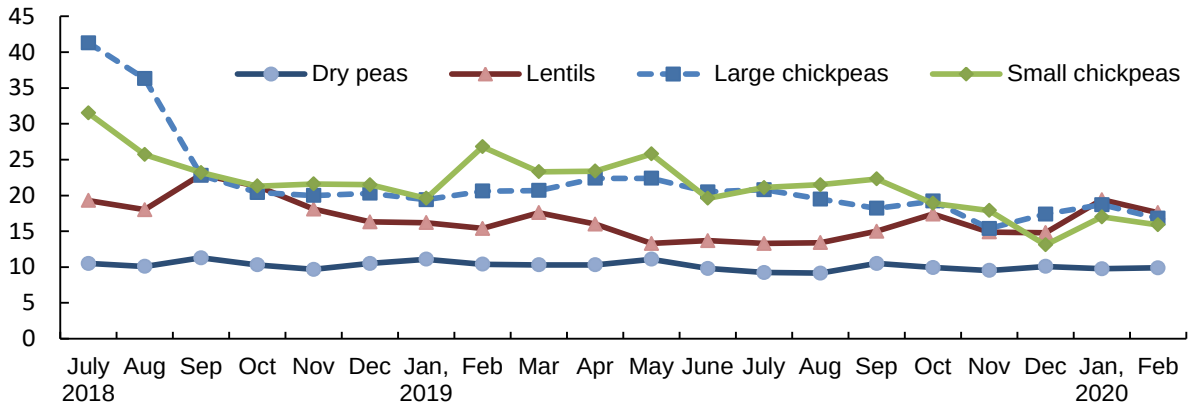
Exports Up, Imports Down

The good news emanating from lower prices is the offset provided against the strong dollar which is helping to maintain competitiveness in global markets. Through February, 2019/20 dry pea, dry lentil, and dry chickpea export volume was running 39 percent above a season ago (table 16). Buoyed by large stocks and lower prices, lentil exports were up 122 percent through February and already exceed seasonal totals posted the past two years. Exports of green peas, the usual seasonal volume leader, are up 14 percent largely due to above-average sales to Canada and China. China's purchases of U.S. green peas (largely feed peas) are up 29 percent through February and have already exceeded last year's total, which declined during a brief

Figure 13

Dry peas, chickpeas, and lentils: Average monthly grower prices, 2018-20

$ per cwt



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Table 16. U.S. dry edble peas and lentils: Trade volume by class [1]

	July-June			July-February		Change
Commodity	2016/17	2017/18	2018/19	2018/19	2019/20	18/19-19/20
	1,000 cwt (bags)					*Percent*
Exports						
Green peas	11,227	4,991	5,646	3,500	4,002	14
Yellow peas	3,660	609	284	186	301	62
Split peas	1,576	1,400	1,745	1,128	1,504	33
Austrian winter peas	24	52	30	26	12	-51
Misc. dry peas	1,751	531	714	465	320	-31
Lentils, all	7,495	3,568	3,240	1,964	4,353	122
Chickpeas, all	2,463	2,673	3,187	1,622	1,823	12
Total	**28,196**	**13,823**	**14,845**	**8,891**	**12,316**	**39**
Imports						
Green peas	104	224	97	78	24	-69
Yellow peas	530	987	1,947	1,204	812	-33
Split peas	657	967	554	402	297	-26
Austrian winter peas	7	2	2	1	3	200
Misc. dry peas	152	294	429	285	259	-9
Lentils, all	619	955	1,384	918	608	-34
Chickpeas, all	871	1,276	962	535	378	-29
Total	**2,940**	**4,705**	**5,375**	**3,423**	**2,381**	**-30**

[1] This table excludes planting seed. Chickpea data are for a Sep-Aug year. Cwt= hundredweight which equals 100 pounds.

Source: USDA, Economic Research Service using data from U.S. Dept. of Commerce, Bureau of the Census.

trade disagreement. However, given the strong dollar and expectations of strengthening prices on shrinking stocks later in the year, total 2019/20 green pea export volume will not likely approach the high 2016/17 season total of 11.2 million cwt.

Given low prices and good world demand, chickpeas could post another record-high export volume (last year was the latest record-high). Exports through February to volume leaders Canada and Pakistan are up strongly, the former up 10 percent, the latter up 81 percent. Shipments to Italy are up 94 percent as 2019/20 seasonal exports are on track to surpass the 2017 record high.

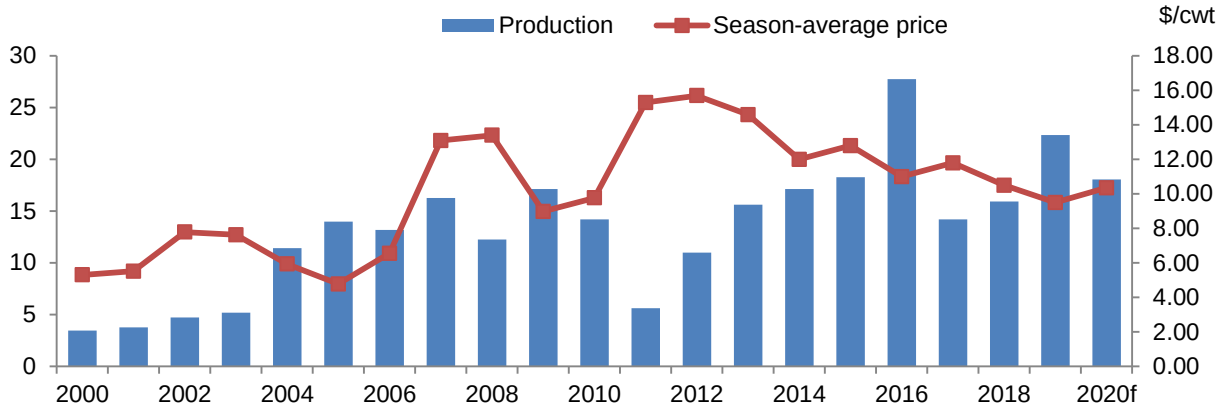
The United States is a net exporter of peas, lentils, and chickpeas. With strong domestic supplies from the 2019 crop, imports are averaging 30 percent below a year earlier through February. With a larger crop of green and yellow peas boosting stocks and dropping prices, imports have declined 69 and 33 percent, respectively (table 16). Imports from Canada are down 50 percent through February. Dry pea imports from Canada usually account for more than 80 percent of a season's total but through February sit at 59 percent of volume. Imports from Russia, a recent and significant entrant to the U.S. dry pea market, are up 227 percent and account for 26 percent of U.S. dry pea imports.

Strong Yields Boost Dry Peas in 2019

Production of dry edible peas totaled 22.3 million cwt in 2019 powered by strong yields and 26 percent greater harvested area. This crop was second only to the 2016 record high. Despite a cold, wet spring in the upper Midwest, higher dry pea yields in this region boosted national yields 8 percent to 21.24 cwt per acre.

After two consecutive stock-boosting crops in 2017 and 2018, the 2019 lentil crop declined 36 percent to 5.39 million cwt. Area harvested declined 40 percent but yields increased 7 percent to 12.5 cwt per acre due largely to strong yields in Montana, which is now the largest producing State. Montana battled an excessively wet season interspersed with hail storms, yet managed to produce a strong lentil crop.

Figure 14
U.S. dry edible pea production and price, 2000-20



f = USDA, Economic Research Service forecast.
Source: USDA, National Agricultural Statistics Service.

Special Article

Fresh and Processed Vegetable Exports through United States Ports of Entry

Gary Lucier and Broderick Parr

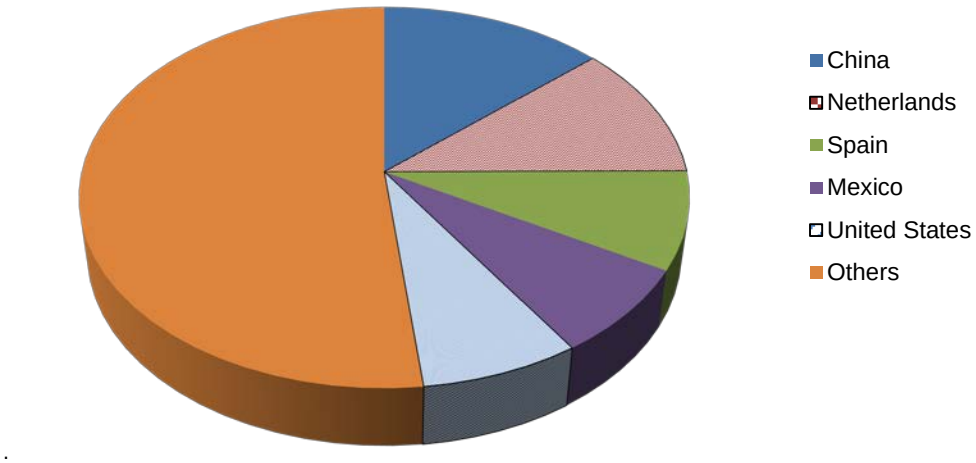
At U.S. ports of entry, Customs and Border Protection oversees import and export of merchandise, clear travelers, collect duties, and enforce U.S. import and export laws and regulations. These ports of entry (or more simply, ports) include air and water ports, rail links, and land-based crossings. The threat of a global viral pandemic has placed an emphasis on supply chains and the ways vegetables and other critical products move from one country to another. The purpose of this paper is to analyze vegetable exports through the network of United States ports and illustrate both where and why products exit through particular ports. This paper uses the value of total exports (includes re-exports) by port as reported by the U.S. Bureau of the Census. [1] [2]

The United States is a critical contributor to world vegetable trade in both import and export markets. Globally, the United States is the fifth largest producer of vegetables (this term also includes potatoes, sweet potatoes, mushrooms, and pulse crops). U.S. vegetable markets are well integrated into the global economy. During the 2017−19 period, 6 percent of U.S. fresh vegetable supplies were exported, which annually contributed $7 billion (net of re-exports) directly to the sector's economy. Given U.S. consumers' dietary reliance on year-round vegetable supplies, an even greater economic impact derives from the importation of vegetables. During the 2017−19 period, over 30 percent of domestic vegetable use was satisfied through imported products, with more than $11 billion entering the country annually during this

[1] *Exports are valued on a free alongside ship (FAS) basis, which reflects transaction price including inland freight, insurance and other charges incurred in placing the merchandise alongside the ship at the port of export.*

[2] *This article uses Census "USA Trade OnLine"* ***total export port data*** *(which does not net out product that was trans-shipped through the U.S.) in order to show total vegetable industry-based export activity at U.S. ports. For most analyses of U.S. trade, ERS uses data which are net of re-exports. This means products that come into the US from other countries and are then re-shipped to other countries (re-exports) have been netted out of exports. For vegetables, most re-exporting occurs when trade between Mexico and Canada is trans-shipped through the United States. For example, fresh tomatoes from Mexico destined for Canada are the top re-exported vegetable. These tomatoes enter at the southern border and are then trucked to ports along the Canadian border and "exported" to Canada. This article includes re-exported products.*

Figure 1
Share of Global Vegetable Export Value, 2017



Source: USDA, Economic Research Service using data from United Nations, Food and Agriculture Organization (FAOStat).

period. Ancillary indirect economic impacts from both sides of vegetable trade are also realized among various supporting industries such as warehousing, transportation, and marketing.

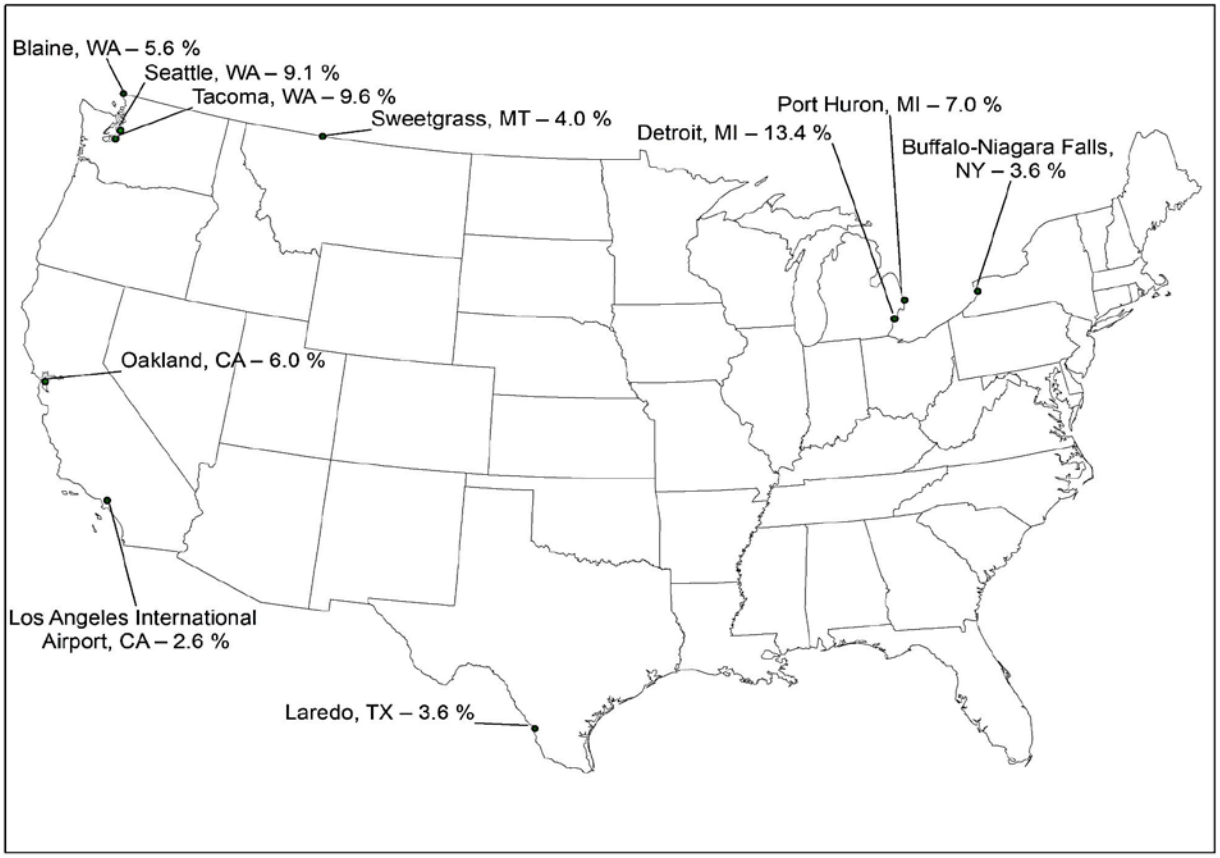
The U.S. Role in World Vegetable Markets

During the 2016−18 period (the latest available), U.S. farm cash receipts for all crops averaged $195 billion, of which $19.5 billion (10 percent) came from the sale of vegetables. Within aggregate farm cash receipt groupings, vegetables comprise the third most important crop commodity group in the nation. The top five vegetables in terms of cash receipts were potatoes, lettuce, tomatoes, mushrooms, and onions. Combined, these crops account for 57 percent of the nation's vegetable cash receipts.

According to data supplied by the Food and Agriculture Organization of the United Nations (FAOStat), the United States was the fifth-largest exporter of fresh and processed vegetables by value in 2017 (the latest available FAOStat data as of this writing). The U.S. accounted for 7 percent of world vegetable export value, trailing China (14 percent), the Netherlands (11 percent), Spain (8 percent), and Mexico (8 percent) (figure 1).

In 2019, the global U.S. vegetable trade balance improved slightly as U.S. exports and imports both increased, causing the trade deficit to decline by $141 million to $4.36 billion. U.S. domestic vegetable exports (net of re-exports) and imports for consumption in 2019 were $7.0 billion (up 4 percent) and $11.4 billion (up 1 percent), respectively. Trade deficits with top trading partners such as Canada and China declined in 2019. These gains were achieved despite trade disputes, a lackluster world economy, and tepid global demand.

Figure 2
Top Ten U.S. Export Ports for Vegetables and Pulse Crops



Source: USDA, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census, USATrade Online.

U.S. Vegetable Exports by Port

There are 328 individual ports of entry in the United States. Despite this large number of possible exit points, 10 of these U.S. ports accounted for about two-thirds of vegetable and vegetable product export value annually over the 2017−19 period (figure 2). Further, the top five ports accounted for 45 percent of vegetable export value. These ports are Detroit, Tacoma, Seattle, Port Huron, and Low Value Port. Because this fifth port is not a port in the physical sense, it will be discussed separately and in its place in the top-five discussions will be the Port of Oakland, which closely follows in sixth place. These top ports are described below.

Port of Detroit

The Port of Detroit is the top exit point for U.S. vegetable and vegetable product exports, with 13 percent of annual export value during the 2017−19 period. The port is located along the west side of the Detroit River, and is the largest seaport in the State of Michigan. The port contains

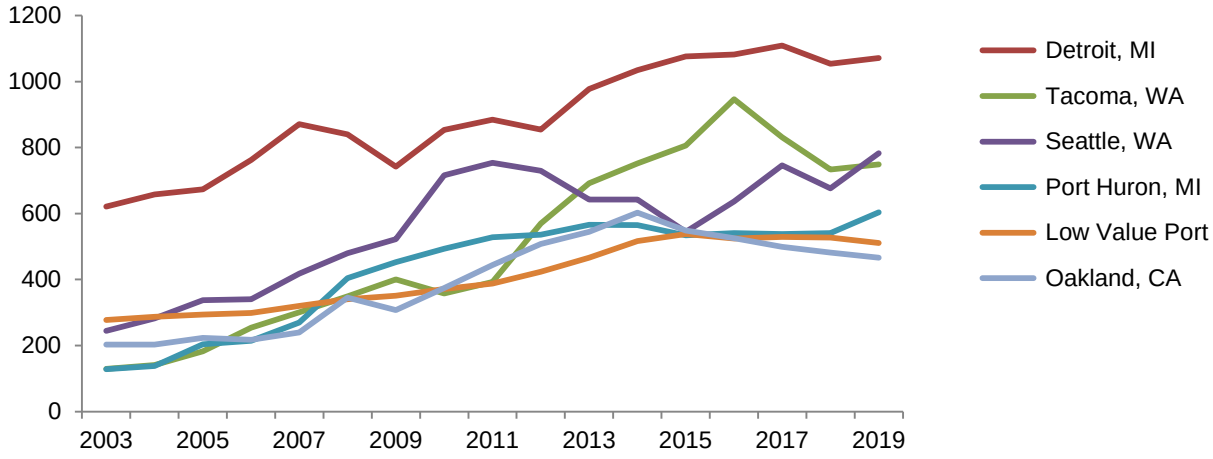
several terminals in Detroit, River Rouge, and Ecorse. The Port of Detroit's single most valuable commodity is steel (it is the third largest steel-handling port in the nation), and the largest commodity handled by tonnage is ore. The Port of Detroit supports close to 6,000 jobs in Southeast Michigan.

For ground transport, most trucks cross into Windsor, Ontario from Detroit over the aging privately-owned Ambassador Bridge. However, by the end of 2024, Canada is scheduled to have completed the new 6 lane Gordie Howe Bridge, which should greatly ease the congestion currently experienced at this busy port. After Laredo, Texas (another busy and congested port), Detroit/Windsor is the largest U.S. border crossing. According to the U.S. Bureau of Transportation, the number of trucks crossing the U.S.-Canadian border at Detroit exceeds 2.6 million annually—more than one-fourth of all truck crossings into Canada.

During 2017−19, nearly $1.1 billion in vegetables were exported through the Port of Detroit (figure 3). This city has been the leading vegetable export port for decades, with 99 percent of 2017−19 exports destined for Canada. Most of the remainder was shipped to Europe via the St. Lawrence Seaway (which opened in 1959). Detroit owes its top spot to well–developed port facilities and proximity to the major Canadian population centers with over half of Canada's population within a one-day drive. The Canadian market accounts for 45 percent of all U.S. vegetable exports.

Because the Port of Detroit is the leading exit point for U.S. vegetables exported to Canada, it handles virtually every six-digit Harmonized System (HS) code exported by U.S. producers. Four of the top five vegetables exported through the port of Detroit were fresh-market

Figure 3
U.S. vegetable export value by leading ports, 2003–19
Million dollars



Source: USDA, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census, USATrade Online.

commodities led by tomatoes (15 percent of the port total) and peppers (11 percent). A bit more than half of all fresh tomatoes and peppers exported to Canada are shipped through the port of Detroit. Because Canada's northern location features a relatively narrow growing season, the nation imports a wide variety of fresh vegetables from the U.S. and Mexico through most of the year. Among the top 20 6-digit HS vegetable categories exported to Canada, 14 consisted of fresh-market commodities. Despite the importance of fresh items here, the fourth-leading vegetable export was processed tomato sauces and ketchup ($97 million, with the value split roughly evenly between sauces and ketchup. About 30 percent of sauce and ketchup exported to Canada move through the port of Detroit. Other processed items included canned and frozen vegetables and potato preparations (about evenly split between chips and other dehydrated potato products).

Port of Tacoma

The second-leading U.S. port for vegetables and vegetable product export value is the Port of Tacoma in the State of Washington. The port of Tacoma is on Commencement Bay on the southern end of the Central Basin of Puget Sound. The port covers 2,400 acres and is one of the top 10 container ports in North America. On average during 2017−19, almost 10 percent ($772 million) of all U.S. vegetable and vegetable product exports moved through the Port of Tacoma. Nominal dollar vegetable exports through the Port of Tacoma rose 120 percent between 2007−09 and 2017−19—the fastest growth among the top 10 ports.

As a West Coast container port, Tacoma is well situated to serve Asian markets. During 2017−19, countries in Asia accounted for 96 percent of vegetable exports moved through Tacoma. Japan, Taiwan, and the Philippines were the top 3 destinations for U.S. vegetables exported through Tacoma. During the 2017−19 period, 49 percent ($381 million) of U.S. vegetables and allied products exported through Tacoma were destined for Japan, with Taiwan a distant second at 9 percent.

Unsurprisingly given the port's proximity to Pacific Northwest potato processors, the top vegetable product moved through Tacoma over this three-year period was frozen potatoes (mostly French fries). Two-thirds of all vegetable products moved by this port were frozen potato products. Further underscoring the importance of potato production and processing in the region, 76 percent of Tacoma's exports were various potato products (fresh, frozen, dehydrated, etc.), with three of the top five commodities being potato-based. Processed sweet corn completed the top 5 Tacoma exports, with frozen ($57 million) and canned ($27 million) products--both of which boast significant production and processing in the Pacific Northwest.

Port of Seattle

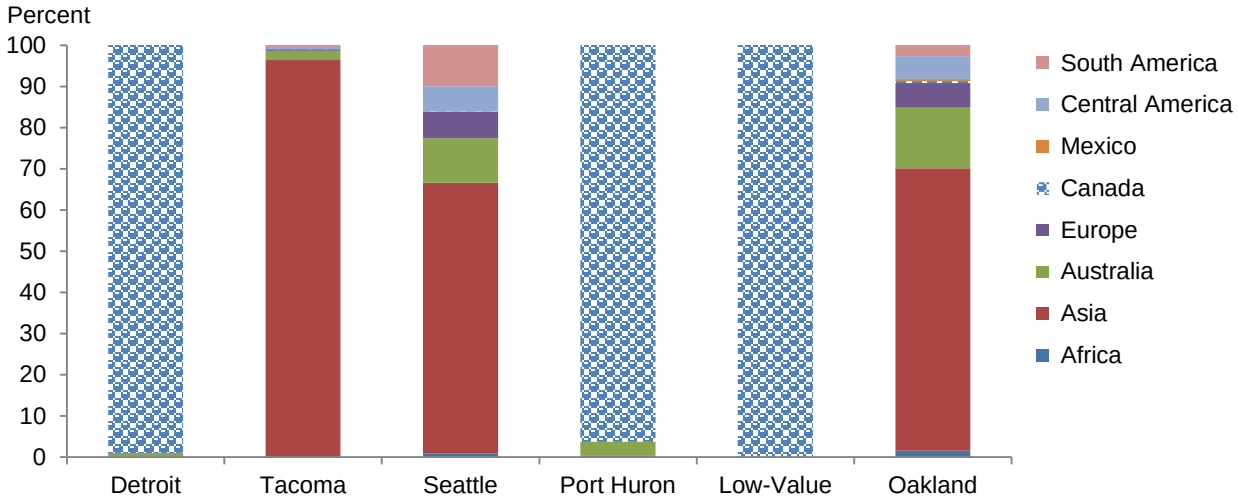
On average during 2017−19, 9 percent ($735 million) of all U.S. vegetable and vegetable product exports moved through the Port of Seattle in Washington State. The third most important U.S. port for vegetables, the port of Seattle is situated on Elliott Bay in the Central Basin of Puget Sound. The marine cargo operations of the port of Seattle and the port of Tacoma (described in the previous section) work together in a partnership formed in 2015 called the Northwest Seaport Alliance (NWSA). The NWSA ports are the U.S. ports closest to Asia. Together, they constitute the fourth-largest container gateway in North America. Three of the top four NWSA export commodities are agricultural products, with electrical machinery and electronics in second place. These two ports also handle more than three-fourths of shipments to Alaska from businesses in the continental U.S. Seattle's vegetable export value has risen 55 percent over the past decade—below Tacoma's strong growth but above the 48 percent national average.

Consistent with the port's "proximity" to Asia, China was the leading destination for vegetables exported through Seattle during the most recent three-year period, with 10 percent ($75 million) of the port total. South Korea (10 percent) and Japan (8 percent) round out the top three destinations. Since peaking in 2010, Seattle has been steadily losing share of the relatively slow-growth Japanese vegetable export market to ports such as Tacoma, Oakland, and Los Angeles.

Seattle is also an important gateway to the growing Southern Hemisphere market, with sales to South American nations rising and accounting for 10 percent of Seattle's vegetable export value (figure 4). Exports to Europe from the Port of Seattle have also shown strong growth (up 411 percent) since 2007−09. Europe comprised another 10 percent of vegetable shipments for this port, led by bulk containerized vegetables produced in the Northwest such as frozen vegetables and dry pulse crops.

Washington is the second-largest potato-producing State and along with Idaho, is one of the top two potato processors. Thus, proximity to the source of such popular vegetable products gives the State's ports an economic advantage in securing overseas export business. To this end, 56 percent of all U.S. exports moving through the port of Seattle consisted of various potato products (fresh, frozen, etc), led by frozen potatoes (largely french fries). After frozen potatoes (51 percent of port total), dried chickpeas (11 percent), dried lentils (10 percent), dried peas (7 percent), and frozen sweet corn (4 percent) round out the top five vegetable exports through Seattle. Dried pulse crops (peas, chickpeas, and lentils) have been long-time regional specialty

Figure 4
Destination of vegetable exports by top U.S. ports, 2017−19



Source: USDA, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census, USATrade Online.

crops in the Northwest and those markets have been expanding over the past decade driven by new products and uses.

Port Huron

The fourth leading port for vegetables and vegetable product exports is Port Huron in Michigan. During 2017−19, this port (part of the Detroit District) accounted for 7 percent ($561 million) of U.S. vegetable and product export value. As with the port of Detroit, the vast majority (96 percent) of these exports was destined for Canada, with most of the remainder heading to Europe. The facility consists of 2 airports, a ferry dock, and a bridge crossing. Annually, nearly 1 million trucks cross the St. Clair River via the twin-span Blue Water Bridge, which connects Port Huron, Michigan to Sarnia, Ontario.

Port Huron conveys a wide variety of vegetable and pulse crops to consumers in Canada. The top five vegetables trucked/shipped to Canada from this port accounted for just 31 percent of the $561 million total during 2017−19. Four of the top five commodities were fresh-market vegetables led by ever popular leaf/romaine lettuce (11 percent) and expanding demand for cabbage/kohlrabi (7 percent). Pickled cucumbers (5 percent), which are produced in Michigan, were the third leading commodity exported from Huron into Canada. European nations (3 percent) were the second most important destination for vegetables shipped from the port of Port Huron. About half of these shipments consist of dry edible beans, which are widely available from nearby farms and elevators in the “thumb” area of Michigan. Dehydrated potato

flakes/granules (16 percent) and canned sweet corn (6 percent) were also shipped to Europe from this port during 2017−19.

Port of Oakland

Rounding out the top five physical U.S. vegetable export ports is Oakland, California. On average during 2017−19, about 6 percent ($482 million) of all U.S. vegetable and vegetable product exports moved through the port facilities in Oakland, California. Exports move offshore through Oakland International Airport and the Oakland Seaport. Most vegetables and products move through the seaport via one of the 4 commercial terminals. As with many West Coast ports, Oakland is a principal gateway to Asia for U.S. vegetables and vegetable products and agricultural products in general. China is Oakland's leading trade partner for all export products.

The top 10 destinations for vegetable exports through Oakland in 2017−19 accounted for two-thirds of the port's total export value. The top 5 accounted for 49 percent and consisted of Japan (26 percent), Taiwan (9 percent), Philippines (5 percent), South Korea (5 percent), and Italy (4 percent). About 69 percent of Oakland's vegetable exports moved to Asian nations; 15 percent headed to Europe, and 8 percent moved to South and Central America.

Given the port's proximity to some of the world's largest tomato-processing firms it is logical that processed-tomato products such as paste, sauces, ketchup, and juice accounted for 38 percent of the port's vegetable exports. Fresh-market vegetables accounted for 16 percent of Oakland's vegetable exports ($78 million), supported by California's leading position in fresh-market production. And considering that California is home to most of the nation's vegetable dehydration capacity, Oakland is a logical choice for exports of dried onions ($51 million). In summary, the top five vegetable products moved through Oakland over the 2017−19 period consisted of tomato paste (30 percent), dried onions (10 percent), processed potatoes (mostly chips and granules) (7 percent), pickled vegetables (7 percent), and tomato sauces and ketchup (6 percent).

Low Value Port

The fifth largest port for U.S. vegetable exports is the termed the Low Value Port. This is not a physical port but rather an aggregation of individual export shipments that fall below the $2,500 threshold. Currently for vegetables, the Low Value Port contains only data on receipts of small shipments sent to Canada. The United States trade system requires that shippers provide detailed documentation on all commodity shipments that exceed $2,500. Data on export shipments that fall below the $2,501 threshold and do not enter Canada are generally merged

into a single low-value HS chapter 98 code (9880.00.4000) where no commodity or port detail is available.

The Low Value Port HS commodity-level detail from Canada exists because U.S. exports to Canada are actually Canada's reported imports from the United States (under the same data sharing agreement, Canada's exports to the United States are the U.S.-reported imports from Canada). This data sharing agreement has solved the serious export underreporting prevalent in vegetable (among other industries) data prior to the 1994 adoption of this methodology. Because no tariffs are collected with exportation, many countries are less rigorous in export documentation.

On average during 2017−19, just under 7 percent ($522 million) of all U.S. vegetable and vegetable product exports were grouped into the Low Value Port. As stated above, these exports all enter Canada but because of limited documentation, no physical port can be assigned to the shipments. Exports assigned to the Low Value Port have increased 55 percent over the past decade. The top 15 commodities are fresh-market vegetables, led by leaf/romaine lettuce (15 percent), edible brassicas (15 percent), and unspecified fresh vegetables (8 percent).

Figure 5
Leading export ports and destination countries for selected vegetables, 2017-19

Commodity	Port	Port share of commodity	Top destination from port Country	Share 1/
		Percent		Percent
Frozen Potatoes	Tacoma, WA	43.77	Japan	47.52
	Seattle, WA	32.02	South Korea	15.45
	Laredo, TX	8.79	Mexico	100.00
Planting Seed	Los Angeles Intl Airport, CA	15.12	Netherlands	23.61
	Nogales, AZ	10.99	Mexico	99.61
	San Francisco Intl Airport, CA	9.35	Netherlands	20.87
Leaf/Romaine Lettuce	Detroit, MI	26.10	Canada	100.00
	Low-value port	19.27	Canada	100.00
	Port Huron, MI	15.35	Canada	100.00
Tomato Sauce/Ketchup	Detroit, MI	28.84	Canada	99.99
	Buffalo-Niagara Falls, NY	10.25	Canada	99.75
	Oakland, CA	8.23	Japan	45.55
Edible Brassicas	Low-value port	24.39	Canada	100.00
	Detroit, MI	20.73	Canada	100.00
	Port Huron, MI	12.95	Canada	100.00

1/ The destination country share of the port's exports of the given commodity.

Source: USDA, Economic Research Service from data of U.S. Department of Commerce, Bureau of the Census, USA Trade Online.

Exit Points for Major Vegetable Commodities

Because the U.S. has a complex and multi-faceted transportation network, the determination of which port a particular commodity exits the country is not necessarily limited by what form it is in (fresh or processed) or where it is produced. The port choice may also be influenced by where the product is headed. In many cases, exporters have several port options from which to choose but one will usually stand out as proving to be the best fit and/or the lowest cost. However, the determination of port and associated control of export shipping costs can be challenging. Some factors involved in choosing a port include; 1) need for speed (faster costs more); 2) available mode of transport (truck/rail, air, water−ocean cargo costs less than air freight); 3) product characteristics (most perishable fresh vegetables are not a good fit for a long ocean voyage), 4) location (some ports may specialize in exports to certain regions at lower costs), 5) fuel costs (can influence the relative costs of the various transport modes).

There are 92 active (containing data) 6-digit HS commodity/commodity group codes for U.S. vegetable and pulse exports. Over the 2017−19 period, the top ten 6-digit commodity codes accounted for 52 percent of U.S. vegetable export value. These 10 commodity groupings were led by frozen prepared potatoes, which mostly consist of french fries (figure 5).

A. Frozen Potatoes

Frozen potatoes accounted for nearly 15 percent ($1.2 billion) annually of U.S. vegetable and pulse export value during 2017−19 (re-exports averaged $14 million/year). At the 10-digit level, this category breaks down into frozen french fries (91 percent of the category) and other frozen potatoes (e.g., hash browns, diced, sliced, tots, etc.). The top three ports accounted for 85 percent of frozen potato export value during the 3-year period covering 2017−19. Tacoma (44 percent of fry exports) and Seattle (32 percent) easily led all U.S. ports followed distantly by Laredo, Texas (9 percent).

The overwhelming concentration of frozen potato exports at the two Washington ports is partly because of the location of leading french fry plants in the region. It is also a reflection of the large volume of frozen warehouse space at the two ports and the “proximity-to” and “specialization-in” export movement to Asian nations (such as Japan and Taiwan) which are top markets for U.S. frozen potato products. The value of frozen potato exports from Tacoma (up 117 percent) has grown at a more rapid pace than Seattle (up 59 percent) over the past decade. However, the fastest growth in frozen potato exports among the top 10 ports has been in Port Hueneme—a port in the Los Angeles district. Although this port accounts for just 2 percent of frozen potato exports, value shipped has jumped by a factor of 10 since 2007−09. This growth

was based entirely on rising exports to Central America, with most to Guatemala and El Salvador.

B. Planting Seed

The second-leading vegetable export by value during 2017−19 was vegetable seeds used for planting. This category excludes potato and pulse crop seeds which are covered under other HS codes. Although not directly consumed, seeds for sowing are a critical input to the U.S. and world vegetable industries. Globally, the United States is one of the top producers (and consumers) of vegetable seed and is a net exporter. U.S. exports of vegetable seeds for sowing accounted for 8 percent of vegetable exports, totaling $607 million on average annually. Given the global nature of the seed industry and Mexico's large vegetable and vegetable seed sector, re-exports of vegetable seeds are large--averaging $249 million annually during 2017−19. At the 10-digit HS level, this 6-digit seed category breaks down into 22 different commodity categories led by tomato seed (22 percent of the HS-6 seed code), onion (14 percent), miscellaneous vegetable (10 percent), carrot (8 percent), and capsicum pepper (8 percent).

As a top producer of top-grade seed and because of the global expanse of the seed industry, the U.S. ships vegetable seeds to virtually every region of the world. This wide distribution spills over to port utilization, with seed exports not as concentrated by port compared with many other vegetable commodities. The top 5 ports shared less than half of exports, while the top 10 ports accounted for two-thirds of vegetable seed exports. Also, the very high value-to-weight ratio of seed endears it to air transport, with two of the top three seed shipping ports being airports. The top port was Los Angeles International Airport which accounted for 15 percent of vegetable seed exports, while San Francisco International Airport was third with 9 percent of export value during the 2017−19 period. Nogales, Arizona which primarily ships overland into Mexico, was second with 11 percent of export value.

C. Leaf/Romaine Lettuce

The third largest vegetable export commodity by value during the 2017−19 period was fresh leaf and romaine lettuce (excludes traditional head/iceberg lettuce). This category accounted for 5 percent or $402 million) of U.S. vegetable export value (re-exports were relatively minor and averaged $5 million/year). The 10-digit breakdown includes all non-organic, non-head (iceberg/cabbage style) lettuce (85 percent) and 3 organic codes which include organic non-head lettuce (8 percent) with 2 organic packaged salad mix codes accounting for the remainder of the 6-digit HS category. Over the past 2 decades, lettuces other than the familiar head or iceberg lettuce have supplanted iceberg as the leading consumer choice for base salad greens

in the United States and Canada. Thus, while exports of head lettuce have declined over the past decade, these lettuce types have risen 33 percent, gaining $100 million in export value.

Given Canada's year-round appetite for most fresh vegetables, Detroit is the leading port for exports of non-head lettuce, with 26 percent of the total. Although Detroit remains the top port for other lettuce, export value has trended lower over the past decade with shippers moving product through other ports such as Port Huron, MI. Port Huron, the third leading export port for romaine/leaf lettuce, has experienced steady gains, with port share for non-head lettuce rising to 15 percent powered by a 108 percent surge in export value since 2007−09.

The second leading port is not an actual physical port but rather an aggregate of numerous small shipments termed "Low Value Port" (see discussion in the port section of the paper). This "port" accounted for 19 percent ($77 million) of non-head lettuce export value in 2017−19–up from a 13 percent share in 2007−09. All of these small shipments entered Canada but the actual ports of entry could be any (using any transport mode from ground to air) of the 328 U.S. ports. It is possible that some of these shipments could represent small daily/weekly cross-border deliveries to establishments (e.g., schools, hotels, restaurants, etc.) in cities proximate to the border (Toronto, Montreal, Vancouver, Ottawa, etc.) or cross-border attractions (Niagara Falls). Wherever they are heading, these small shipments are evidently a growing and important part of the lettuce market. Impressive growth has been seen, with value up 93 percent in the past decade.

D. Tomato Ketchup & Sauces

The fourth leading vegetable export commodity was tomato ketchup and tomato sauces. This category consists of non-organic tomato sauces (54 percent), ketchup (38 percent), and organic tomato sauces (8 percent). These processed tomato products accounted for $337 million of total export value during 2017−19, 4 percent of the U.S. total (re-exports averaged $2 million/year). This tomato product category has grown 63 percent over the past decade—the third strongest growth among the top 10 vegetable product categories.

Ketchup exports (not including sauces) to Canada accounted for 16 percent of U.S. ketchup export value in 2007−09. However, in 2014, Kraft-Heinz, which commands about three-fourths of the Canadian ketchup market, discontinued producing ketchup in Ontario in favor of sourcing product from their U.S. facilities. As a result, U.S. exports of ketchup jumped in late 2014 onward. By 2017−19, Canada accounted for 50 percent of U.S. ketchup export value. Despite the sudden leap in exports in 2014/15, U.S. ketchup exports to Canada have been trending

lower due to stiff new competition from Canadian-produced ketchup and a 10 percent tariff imposed on U.S. ketchup (among other products) by Canada.

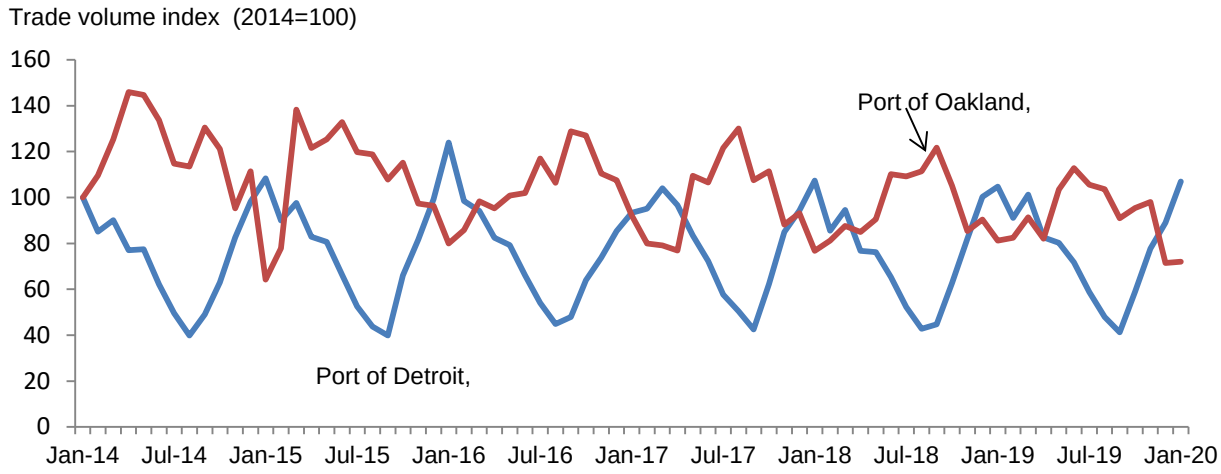
As it has for many years, Detroit remains the leading port for U.S. exports of ketchup and tomato sauces, with 29 percent of total value. Although Detroit remains the top port, export value has trended lower over the last several years because of competition in the Canadian ketchup market. This has also affected export value for the port at Buffalo-Niagara Falls, which was second with 10 percent of the total. The port at Oakland, California accounted for 8 percent of ketchup and tomato sauce export value. Oakland has experienced growth of 148 percent in these exports since 2007−09 due mostly to increased movement to Japan (up 422 percent). Japan accounted for 46 percent of tomato ketchup/sauce export value shipped through Oakland during 2017−19.

E. Edible Brassicas

Rounding out the top five vegetable export categories during 2017−19 was fresh-market brassica crops. Brassicas are plants belonging to the mustard family and include vegetables such as cabbage, kale, broccoli, cauliflower, kohlrabi, mustard, and turnips. The HS trade system classifies brassicas into several categories, with this group comprising kohlrabi, broccoli, and cabbage. Based on 2017−19 data, this HS 6-digit category breaks down into kohlrabi (41 percent), broccoli (34 percent), and cabbage (25 percent). Exports of these 3 fresh brassica crops have grown 66 percent over the past decade and totaled $318 million (nearly 4 percent) of U.S. vegetable total export value (re-exports of this group averaged $22 million annually). Although U.S. export value for fresh broccoli has declined 22 percent since 2007−09, export value for cabbage (up 281 percent) and kohlrabi (up 238 percent) have shown impressive growth.

Powered by demand from Canada, Low-Value Port (24 percent of edible brassica total), Detroit (21 percent), and Port Huron (13 percent) were the leading ports for exports of edible brassicas, with 58 percent of the brassica total. In fact, each of the top 5 brassica export ports is a gateway into Canada, which remains the top destination for brassicas (87 percent of the total) and many other fresh vegetables. Among the top 5 ports, Port Huron (up 238 percent) has shown the greatest growth in brassica exports over the past decade followed by Blaine, Washington (up 192 percent) and Sweetgrass, Montana (up 148 percent).

Figure 6
Seasonality of U.S. vegetable exports: Comparing Ports of Detroit and Oakland



Source: USDA, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census, USATrade Online.

Seasonality and Export Port

Given the seasonal nature of vegetable production in most states, one might assume that exports would follow a similar pattern. In fact, a definite seasonal effect is seen in total vegetable export value with a defined high point reached in early spring (around April) and a trough experienced in early fall (around September-October). Since these are value data, it is likely that seasonal price impacts for fresh vegetables may be a driving force. Fresh prices tend to be lowest during times of high shipments such as late summer and early fall. Conversely, fresh vegetable prices are usually seasonally high during times of lower seasonal supplies as during early spring when shippers are making a transition from winter growing areas to spring/summer regions. The Port of Detroit and Port Huron, which are each heavily involved in shipping fresh-market vegetables to Canada, closely followed this fall-spring pattern with regularity over the past 5 years (figure 6).

The Port of Oakland presents a contrasting seasonal pattern in vegetable exports. While ports that ship to Canada tend to exhibit the high spring value-low fall value pattern, Oakland shows the reverse, with export values peaking in fall and hitting seasonal lows in spring. This reflects Oakland's mix of products and countries. About two-thirds of Oakland's vegetable exports move to Asian nations such as China and Japan, which largely require a relatively steady volume of shipments via sea-going vessel transport. Though Oakland ships broccoli and other fresh products, the port's vegetable mainstays are processed tomato products such as paste, ketchup, and sauces. Because processed product prices tend to be lowest as the new crop is

being processed in the late summer and fall, in most years export prices and values can be expected to wane in the fall (assuming relatively constant shipment volume). As processed inventories decline into the spring, processors tend to raise prices to ration supplies. This leads to export values moving upward, as indicated by the regularity of Oakland's seasonal pattern.

U.S. Vegetable Port Exports by Destination

Because of proximity, the United States counts its North American neighbors as chief destinations for vegetable exports. During 2017−19, North America (Canada and Mexico) accounted for 57 percent of U.S. vegetable export value. Asia, led by Japan, South Korea, China, and Taiwan, was the second most important region for U.S. vegetable export value, taking 24 percent of value. Europe was a distant third at 8 percent, while the South/Central America region was fourth at 7 percent. (figure 7)

By country, Canada easily remained the top vegetable export market for the United States, averaging 46 percent of export value annually. Mexico (11 percent) and Japan (8 percent) followed Canada distantly. Given the location of the top 3 export markets, it is not surprising that the leading export ports to these areas are on the northern (Canada) and southern (Mexico) borders and the West coast (Japan) since cost, convenience, and the custom arrangements of freight-forwarding firms (when such services are used) largely dictate prime exit points.

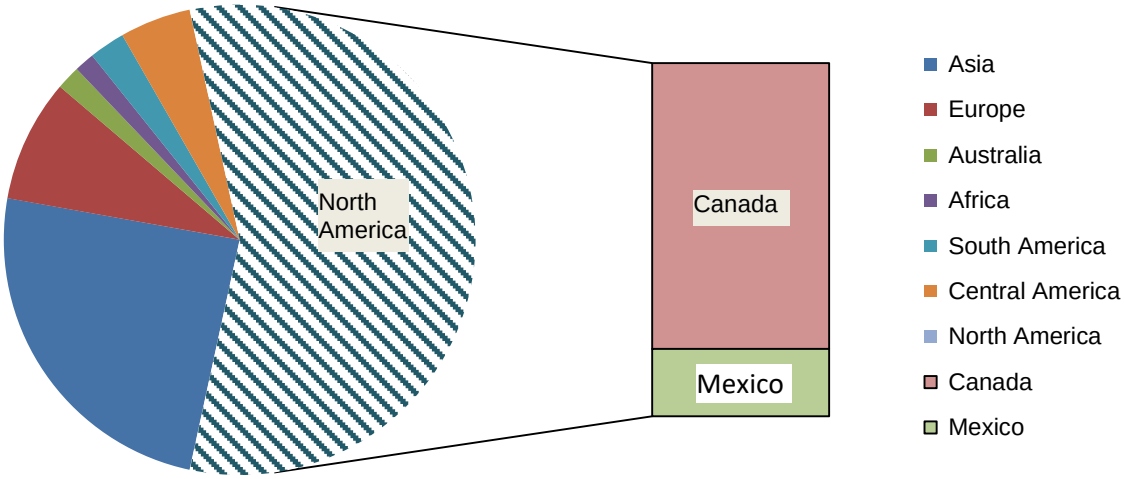
For each of the major U.S. vegetable export destinations (country or region), the following summarizes the top five U.S. export ports serving that destination. Also indicated is the associated share of U.S. vegetable export value during the 2017−19 period:

Canada: Canada received 46 percent of U.S. vegetable export value during 2017−19, with the top 5 U.S. ports handling more than three-fourths of these shipments. These ports were Detroit, MI (29 percent), Low-Value Port 4/ (15 percent), Port Huron, MI (14 percent), Blaine, WA (12 percent), and Sweetgrass, MT (8 percent). Ground transport through ports along the border accounted for the overwhelming share (99 percent) of U.S. vegetable exports into Canada.

Mexico: The leading 5 U.S. ports for exports of vegetables to Mexico accounted for 86 percent of value. These were Laredo, TX (34 percent), Otay Mesa, CA (17 percent), Nogales, AZ (15 percent), Calexico-East, CA (13 percent), and El Paso, TX (8 percent). As with Canada, ground transport via border ports was the primary (95 percent) mode of moving vegetables into Mexico. About 4 percent of the value of vegetable exports to Mexico moved via air freight, with less than 1 percent moving by ocean-going vessels. Nearly 11 percent of U.S. vegetable export value went to Mexico during 2017−19.

Figure 7

U.S. Vegetable Export Value by Region, 2017−19



Source: USDA, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census, USATrade Online.

Asia: About 86 percent of vegetable export value to this region was shipped via five ports. These five included Tacoma, WA (38 percent), Seattle, WA (23 percent), Oakland, CA (16 percent), Los Angeles, CA (5 percent), and Los Angeles International Airport, CA (4 percent). More than three-fourths of vegetable exports to Asia went via ocean freight (with ocean freight offering the lowest cost per mile) and was best illustrated by movement to Japan (87 percent) and China (93 percent). Air freight was used for high-value products such as planting seed and time-sensitive perishable fresh products such as asparagus, broccoli, and spinach. Nearly one-fourth of U.S. vegetable exports went to this region during 2017−19.

Europe: By value, the top 5 ports shipped a little more than half of U.S. vegetables destined for this region. These five were Norfolk-Newport News, VA (16 percent), Oakland, CA (13 percent), Los Angeles International Airport (10 percent), Seattle, WA (10 percent), and Tacoma, WA (5 percent). About two-thirds of vegetables exported to Europe were conveyed via ocean freight. This was the mode of transport for each of the top 5 ports, with the obvious exception of Los Angeles International Airport (LAX). Transport mode shares varied by country based on their unique export commodity mix. For example, vegetable exports to Hungary had a high share of ocean freight transport (91 percent during 2017−19) reflecting purchases of lower-value crops such as dry beans and peas. On the other hand, firms exporting to Germany relied on ocean freight for just 56 percent of transport, with air freight making up the rest, driven by higher-valued crops such as planting seed, fresh asparagus, and dried vegetables.

Central America/Caribbean: Only 52 percent of vegetable export value moved through the leading 5 ports−the lowest concentration among the major global regions. The top 5 ports to this region included Miami, FL (12 percent), Port Everglades, FL (12 percent), Seattle, WA (10 percent), Houston, TX (9 percent), and New York, NY (8 percent). More than 95 percent of vegetable exports move by sea freight to the various Caribbean islands and Central America. Florida ports, New York, and Houston are key suppliers to the Caribbean, driven in large part by demand from foodservice venues in the region's many vacation destinations. Various California and Washington ports are key suppliers to Central American nations. About 5 percent of U.S. vegetable export value was sent to this region during 2017−19.

South America: The top 5 ports accounted for 65 percent of U.S. vegetable export value to this region and include; Seattle, WA (34 percent), Miami International Airport, FL (12 percent), Oakland, CA (7 percent), Los Angeles International Airport, CA (7 percent), and Tacoma, WA (5 percent). With two airports among the top 5 ports, air shipments accounted for more than a quarter (27 percent) of vegetable export value to South America. This was the highest air share among the major world regions and reflects strong demand for vegetable planting seed by Argentina, Brazil, Chile, and Peru.

Africa: More than three-fourths (78 percent) of U.S. vegetable export value to Africa moved through five ports. These ports included Houston, TX (53 percent), Oakland, CA (8 percent), Long Beach, CA (6 percent), Los Angeles International Airport, CA (6 percent), and Seattle, WA (5 percent). U.S. vegetable sales to African nations were the lowest ($90 million) among major global regions during 2017−19 reflecting competition from nearby vegetable-producing nations such as Morocco and Turkey. Vegetable seeds accounted for 20 percent of export value, and since most seeds are shipped by air, this boosted air share of exports to 16 percent. The remainder of vegetable products moved via ocean-going vessels, with a majority of this product consisting of dried pulse crops.

Australia/Oceana: The leading 5 ports accounted for 89 percent of U.S. vegetable export value to this region. This was the highest 5-port concentration among regions and is partly explained by the distance and cost of shipping to this region. Reflecting this, the top five ports were all on the West Coast and included Seattle, WA (27 percent), Oakland, CA (22 percent), Long Beach, CA (16 percent), Los Angeles International Airport, CA (14 percent), and Tacoma, WA (10 percent). Air freight accounted for 17 percent of 2017−19 export value with 90 percent of these shipments consisting of fresh asparagus and planting seed. Various frozen/prepared potato products were transported via ocean vessel and these products accounted for one-third of total U.S. vegetable export value to this region.

Summary

Ports of entry and exit within the U.S. trade system are crucial facilitators of U.S. economic activity. Along with over $11 billion in imports, more than $8 billion of vegetable and pulse products are exported (or re-exported) through these gateways to the global economy. Exports of vegetable and pulse crops through U.S. ports tend to be concentrated in terms of port usage, with just 10 of the 328 ports accounting for about two-thirds of vegetable export value. The port of Detroit is the leader serving U.S. vegetable trade with 13 percent of export value flowing through it. Most of the vegetables going through Detroit cross into Canada via truck, with Canada accounting for nearly half of all U.S. vegetable and pulse crop exports during the 2017−19 period. Frozen potatoes (mostly french fries) were the top vegetable export, with about three-fourths shipped from ports in Tacoma and Seattle which largely serve trade partners in Asia.

Suggested Citation

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