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Vegetables and Pulses Outlook

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Production Declines and Widening Trade Gap Hinder Per Capita Availability

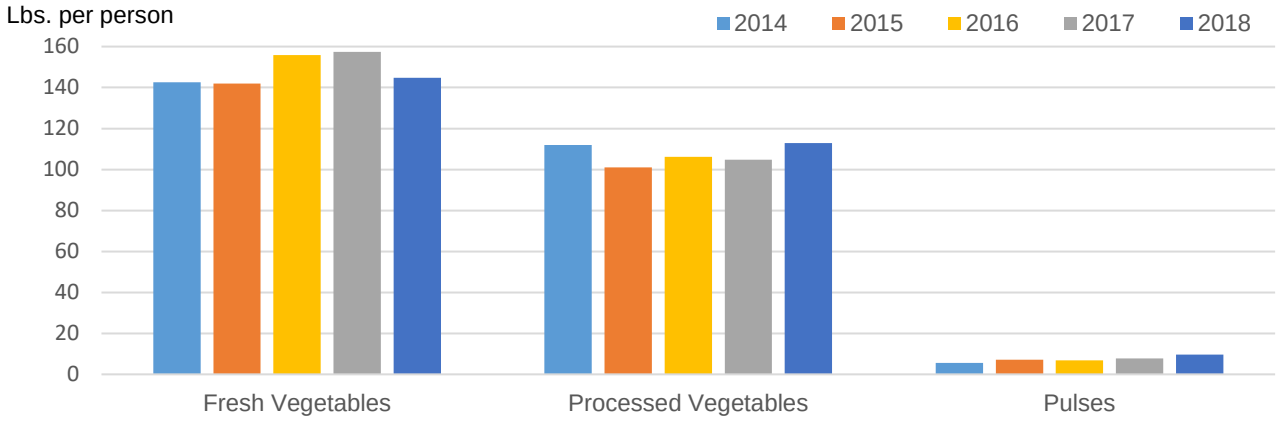
In this report:

Domestic fresh vegetable utilized production fell 10 percent in 2018 from the previous year, while processed-vegetable utilized production was up over 7 percent from 2017 levels. Crop yields were hindered by unfavorable weather conditions, but reduced area in large part contributed to lower 2018 production. Above-average temperatures blanketed most vegetable growing areas during 2018 as yields of major vegetable crops declined from the previous year.

Export volumes fell for total vegetables, but rose slightly for fresh vegetables in 2018, while import levels rose in both the fresh and processed markets. Higher production and stronger imports helped boost per capita availability for processed vegetables. Imports of all vegetables (excluding potatoes) so far in 2019 are below previous years. Exports of fresh vegetables and potatoes seem poised to surpass 2018 levels, while exports of processed vegetables remain depressed.

Per capita availability of pulses continues to climb, supported by growth in chickpeas. Availability of dry beans and peas and lentils both fell in 2018, on lower domestic production and weaker exports

Per capita availability of vegetables and pulses



Source: U.S. Dept. of Agriculture, Economic Research Service, Vegetable and Pulses 2019 Yearbook Data.

Approved by USDA's World Agricultural Outlook Board

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

Item	Unit	2016	2017	2018	Percent change 2017-18	2019f
Area harvested						
Vegetables fresh	1,000 acres	1,662	1,541	1,453	-5.7	1,552
Vegetables processing[4]	1,000 acres	1,235	1,172	1,163	-0.7	1,190
Potatoes	1,000 acres	1,038	1,045	1,023	-2.0	1,035
Dry beans, peas and lentils	1,000 acres	3,794	4,096	3,542	-13.5	3,811
Other[2]	1,000 acres	167	163	148	-9.1	159
Total	**1,000 acres**	**7,895**	**8,016**	**7,329**	**-8.6**	**7,747**
Production						
Vegetables fresh	Million cwt	400	397	359	-9.6	385
Vegetables processing[4]	Million cwt	372	333	357	7.4	354
Potatoes	Million cwt	450	451	454	0.8	457
Dry beans, peas and lentils	Million cwt	69.3	57.6	61.8	7.3	62.9
Other[2]	Million cwt	41	45	37	-18.1	40.8
Total	**Million cwt**	**1,332**	**1,283**	**1,269**	**-1.1**	**1,299**
Crop value						
Vegetables fresh	$ millions	10,809	11,951	10,072	-15.7	10,944
Vegetables processing[4]	$ millions	1,903	1,694	1,734	2.3	1,777
Potatoes	$ millions	4,089	4,135	3,853	-6.8	3,950
Dry beans, peas and lentils	$ millions	1,535	1,381	1,391	0.8	1,458
Other[2]	$ millions	1,843	1,959	1,888	-3.6	1,897
Total	**$ millions**	**20,179**	**21,120**	**18,938**	**-10.3**	**20,025**
Unit value [3]						
Vegetables fresh	$/cwt	27.05	30.12	28.06	-6.8	28.42
Vegetables processing[4]	$/cwt	5.12	5.09	4.86	-4.7	5.02
Potatoes	$/cwt	9.08	9.17	8.48	-7.5	8.65
Dry beans, peas and lentils	$/cwt	22.16	23.95	22.50	-6.1	23
Other[2]	$/cwt	45.08	43.71	51.45	17.7	46.49
Total	**$/cwt**	**15.15**	**16.46**	**14.93**	**-9.3**	**15.41**
Imports						
Vegetables fresh	$ millions	7,486	7,354	7,684	4.5	7,630
Vegetables processing[4]	$ millions	2,515	2,612	2,806	7.4	2,708
Potatoes	$ millions	1,241	1,365	1,510	10.6	1,565
Dry beans, peas and lentils	$ millions	118	119	142	20.0	126
Other[5]	$ millions	1,588	1,613	1,732	7.4	1,612
Total	**$ millions**	**12,947**	**13,062**	**13,875**	**6.2**	**13,640**
Exports						
Vegetables fresh	$ millions	2,114	2,160	2,195	1.6	2,377
Vegetables processing[4]	$ millions	1,586	1,513	1,433	-5.3	1,371
Potatoes	$ millions	1,737	1,814	1,784	-1.6	1,924
Dry beans, peas and lentils	$ millions	586	560	375	-33.0	492
Other[5]	$ millions	823	819	756	-7.7	919
Total	**$ millions**	**6,846**	**6,866**	**6,543**	**-4.7**	**7,083**
Per-capita availability						
Vegetables fresh	Pounds	155.9	157.4	144.8	-8.0	150.4
Vegetables processing[4]	Pounds	106.2	104.7	112.8	7.8	109.5
Potatoes	Pounds	110.1	117.4	113.8	-3.0	112.0
Dry beans, peas and lentils	Pounds	10.8	11.2	14.1	26.4	12.0
Other[2]	Pounds	11.2	11.9	9.5	-20.3	10.88
Total	**Pounds**	**394.2**	**402.6**	**395.1**	**-1.9**	**397.29**

f = forecast. [1]Total values rounded. [2]Includes sweet potatoes and mushrooms. [3]Ratio of total value to total production. [4]Includes canned, frozen, and dried. 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.
Sources: USDA, Economic Research Service, using data from USDA, National Agricultural Statistics Service, and U.S. trade data from U.S. Department of Commerce, Census Bureau.

U.S. Vegetable Production

The United States produced 120.7 billion pounds of commercial vegetables (including mushrooms and potatoes) during 2018, down almost 2 percent from 2017, with a value of over $17.5 billion and harvested area of about 3.8 million acres (table 1). The three leading crops, including fresh and processed, were potatoes (45 billion pounds), tomatoes (28 billion pounds), and lettuce (8 billion pounds), which combined accounted for 68 percent of total fresh and processed production volume. Production value fell 12 percent from a year earlier due to lower production volumes and falling prices for most fresh-market vegetables. California leads the country in total vegetable output, accounting for 60 percent of total annual utilized production of all vegetables in the United States.

All-tomatoes, head lettuce, and romaine lettuce claimed the highest values of utilized production in 2018, generating $1.9 billion, $1.2 billion, and $0.9 billion of farm value, respectively. The value of tomatoes increased over 10 percent in 2018 despite a declining price level. Head and romaine lettuce values declined by 31 and 45 percent respectively in 2018 amid two *foodborne illness* outbreaks during the first and second half of the year (See special article: “Seasonality in Romaine Outbreaks and Regional Shipments” on page 36). The farm value of total U.S. utilized production fell 12 percent to $12.9 billion in 2018 due to lower production and prices for numerous fresh and processed vegetables. California claimed the top State position for total value of vegetable utilized production during 2018, which declined from the previous year despite a 4-percent volume increase.

Fresh-market vegetables sink to record low production

Excluding potatoes, sweet potatoes, and mushrooms, the United States produced 35.9 billion pounds of fresh vegetables in 2018—down over 9 percent from a year earlier. The production decline from last year coincides with a drop in both area harvested and yields of most fresh-market vegetables. The 2018 production also marks the lowest fresh production in the past 19 years, largely the result of diminishing harvested area. The change from 2017 to 2018 production levels represents the largest annual fresh-market decline over the period.

The four largest fresh-market crops in 2018, in terms of volume, were onions, head lettuce, romaine lettuce, and tomatoes, which combined accounted for 46 percent of the total production (table 2). These four crops also led the decline of total fresh-market production in 2018 as they represented 70 percent of the total 3.7-billion-pound reduction from the previous year. The production fall was preceded by a contraction of U.S. 2018 planted area of onions, head lettuce, and romaine lettuce to their lowest levels in 17 years. Onion area fell 13 percent from last year, iceberg lettuce fell 15 percent, and romaine lettuce area fell 4 percent. U.S. fresh-market vegetable production increases in 2018 were realized for artichokes, snap beans, carrots, cauliflower, celery, cucumbers, garlic, and spinach.

Onion plantings nationally during the first 4 months of 2019 have been at their slowest pace in 3 years. As a result, average onion plantings and emergence percentages during mid-April, which have been observed as two variables influencing onion production, are indicating lower final 2019 production. The downward production potential is likely based on the decline of normal monthly precipitation and a rise in monthly normal temperatures during the critical development period for onions in the major growing regions. Shipping-point and retail onion prices have been rising since the end of 2018 through April 2019. Average retail yellow onion prices January 2019 through April 2019 are $1.06 per pound—the highest in 8 years for the period. Current 2019 onion shipments are slower than last year, and suggest lower total annual shipments. The prospects of both lower shipments, and 2019 production, indicate support for higher average onion prices throughout 2019.

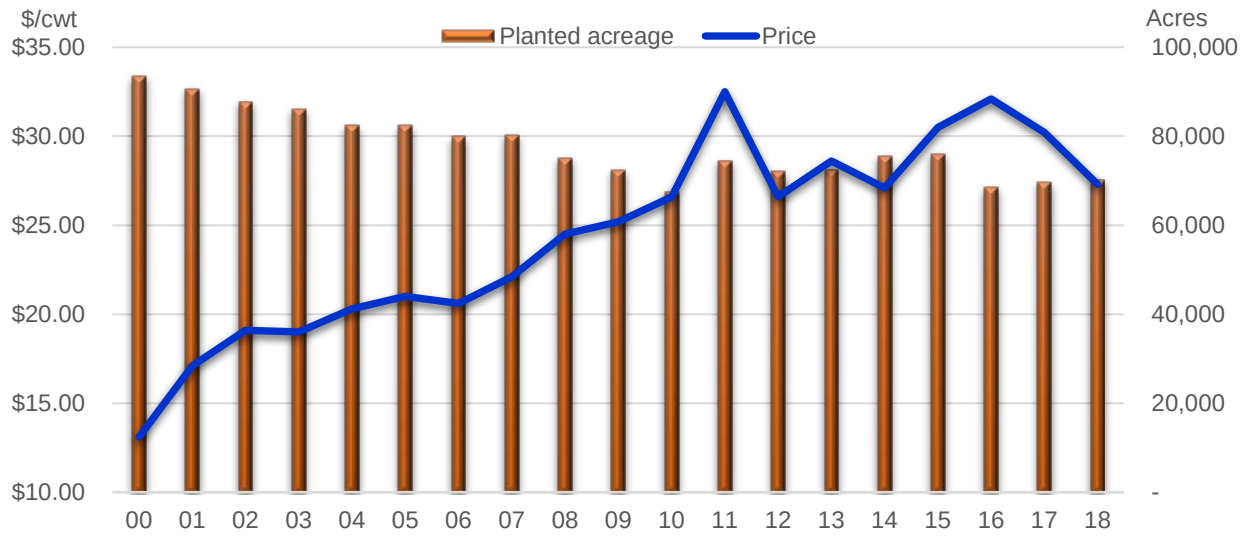
Table 2. Annual U.S. utilized production of selected fresh-market vegetables

Commodity	2016	2017	2018	Change 2017-18
	Million pounds			*Percent*
Artichokes[1]	98.6	93.6	100.1	7
Asparagus	64.9	65.3	61.8	-5
Beans, snap	421.0	377.1	402.5	7
Broccoli	2,154.8	1,990.8	1,677.8	-16
Cabbage[2]	1,891.8	1,976.5	1,739.1	-12
Carrots	2,224.8	2,085.7	2,459.2	18
Cauliflower	728.3	869.0	909.9	5
Celery[1]	1,769.4	1,628.4	1,744.4	7
Corn, sweet	2,303.7	2,361.3	2,236.8	-5
Cucumbers	728.3	502.9	559.6	11
Garlic[1]	451.5	511.5	574.0	12
Lettuce				
Head	5,384.1	4,939.6	4,056.1	-18
Leaf	1,548.6	1,367.5	1,127.7	-18
Romaine	3,389.4	3,630.8	2,902.9	-20
Onions[1]	7,443.8	7,666.2	6,244.5	-19
Peppers, bell[1]	1,469.9	1,439.0	1,289.5	-10
Peppers, chile[1]	417.7	333.6	266.5	-20
Pumpkins[2]	2,489.8	2,305.6	2,179.2	-5
Spinach	696.4	663.4	689.8	4
Squash[1]	815.6	800.9	739.3	-8
Tomatoes	2,812.2	2,897.7	2,828.2	-2
Selected fresh subtotal	**39,304.7**	**38,506.2**	**34,788.7**	**-10**
Mushrooms	848.5	838.4	839.1	0
Potatoes	10,856.6	11,274.6	10,148.4	-10
Sweet Potatoes[1]	3,154.6	3,564.6	2,737.8	-23
Total	**54,164.4**	**54,183.7**	**48,514.0**	**-10**

p = preliminary. [1]All uses. [2]Beginning in 2016 National Agricultural Statistics Service (NASS).
reports fresh and processed separately.
Source: USDA, Economic Research Service using data from USDA, NASS.

A notable increase in 2018 carrot production resulted from gains in area harvested and yield for the year. California comprises almost 80 percent of total U.S. fresh-market carrot production. U.S carrot production surged 18 percent in 2018 after area planted expanded by just under 1 percent and yields by over 1 percent. Fresh-market carrot domestic availability was boosted 16 percent over 2017 despite strong fresh carrot export growth. The fresh-market carrot price received has reacted to changes in planted acreage over the years, and in 2018 the price received fell to $27.30 per cwt from 2017 after carrot planted area increased less than 1 percent (fig. 1).

Figure 1
U.S. fresh-market carrot planted acreage and price received, 2000-18



Note: Hundredweight (cwt)=100 pounds.
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

The USDA, Agricultural Marketing Service (AMS) indicates that fresh carrot shipments through March 2019 from central California are at their fastest pace in 20 years. Concurrently, shipping-point prices began to fall in early 2018 and have sustained the downward trend through 2019. (For more discussion of changes in U.S. vegetable acreage over time, see the special article: “2017 Census of Agriculture Reveals Long-term Trends for Vegetables and Pulses” on page 40.)

Processing-market vegetables recover from last year

Production of vegetables for the processing market (excluding potatoes and mushrooms) totaled 34.2 billion pounds in 2018—up 9 percent from 2017. The majority of individual processing crops reported volume declines, including sweet corn, which declined only 1.8 percent in 2018 and constituted just 15 percent of total processing vegetables and had the second-largest production behind tomatoes (table 3). However tomatoes, which account for three- quarters of total processing volume in 2018, increased

17 percent to 25.6 billion pounds, leading the overall increase of the sector. The rebound of the 2018 tomato volume was primarily due to exceptionally low volume in 2017 caused by lower planted tomato acreage due to California drought concerns and high tomato stocks. Rebounding tomato production, coupled with growing imports and falling exports for 2018, has boosted total domestic availability and per capita availability for total processing vegetables. California tomato processors are expecting lower processed tomato production for the 2019 State total due to lower area planted, despite expectation of improved yields over last year.

Table 3. Annual U.S. utilized production of selected processing vegetables

Item	2016	2017	2018	Change 2017-18
	---------- *Million pounds* ----------			Percent
Beans, lima	74.4	66.5	67.1	1
Beans, snap	1,579.1	928.6	881.2	-5
Carrots	949.1	1,013.9	834.4	-18
Corn, sweet	4,960.0	5,175.6	5,083.3	-2
Cucumbers	1,003.8	1,385.8	982.5	-29
Peas, green[1]	606.6	591.2	505.8	-14
Spinach	161.6	145.7	158.2	9
Tomatoes	26,341.6	21,908.5	25,585.3	17
Dual uses:				
Asparagus	18.3	18.6	15.7	-16
Broccoli	91.8	47.6	49.5	4
Cauliflower	17.8	36.1	17.9	-50
Selected processing subtotal	**35,804.2**	**31,318.2**	**34,181.0**	**9**
Mushrooms	94.9	95.0	78.2	-18
Potatoes	26,698.2	28,355.2	27,564.8	-3
Total	**62,597.3**	**59,768.4**	**61,824.0**	**3**

p = preliminary. [1]All uses.
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

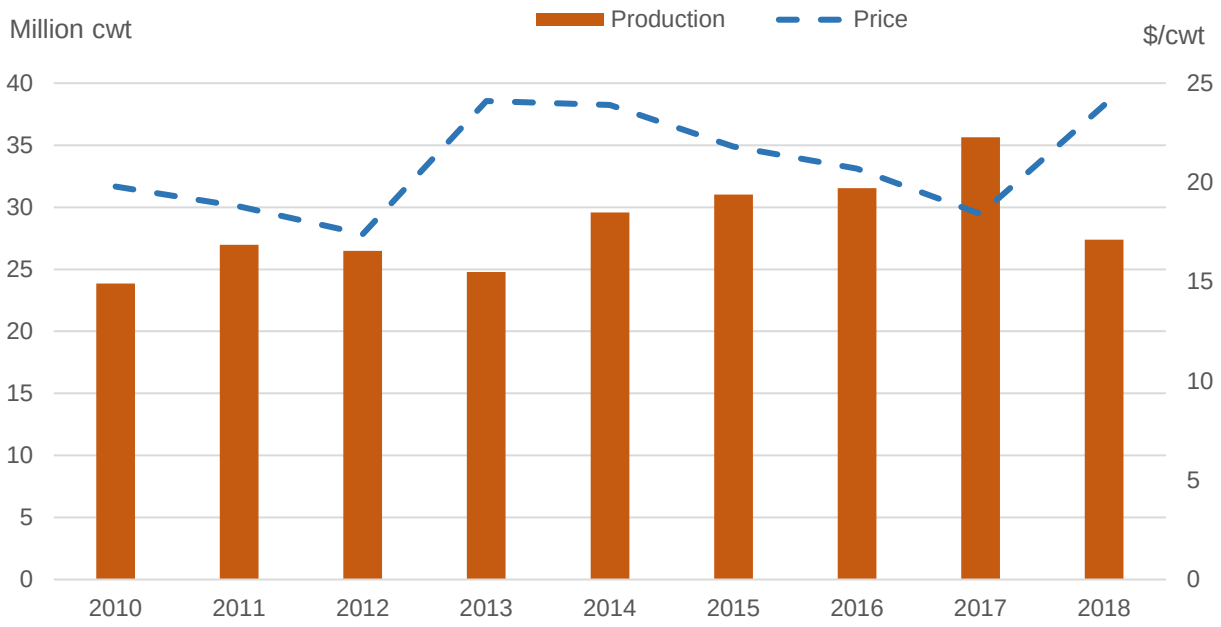
Market Highlights

Sweet potato price spikes as production falls

U.S. 2018 sweet potato production fell 23 percent to 2.7 billion pounds. Following a record-high production year in 2017, Hurricane Florence slamming into the North Carolina sweet potato growing region in September 2018 contributed to the largest annual U.S. production fall in 48 years. During 2015-17, North Carolina averaged 54 percent of total U.S. sweet potato production, and in 2018 this fell to 40 percent. Other major reporting States all gained production market share in 2018, exceeding their 3-year average. Average price-received in 2018 for sweet potatoes reacted to the change in supply and

surged by the second-largest annual increase in 27 years to $23.90 per cwt, tying for the second-highest price on record (fig. 2).

Figure 2
U.S. sweet potato production and price, 2010-18

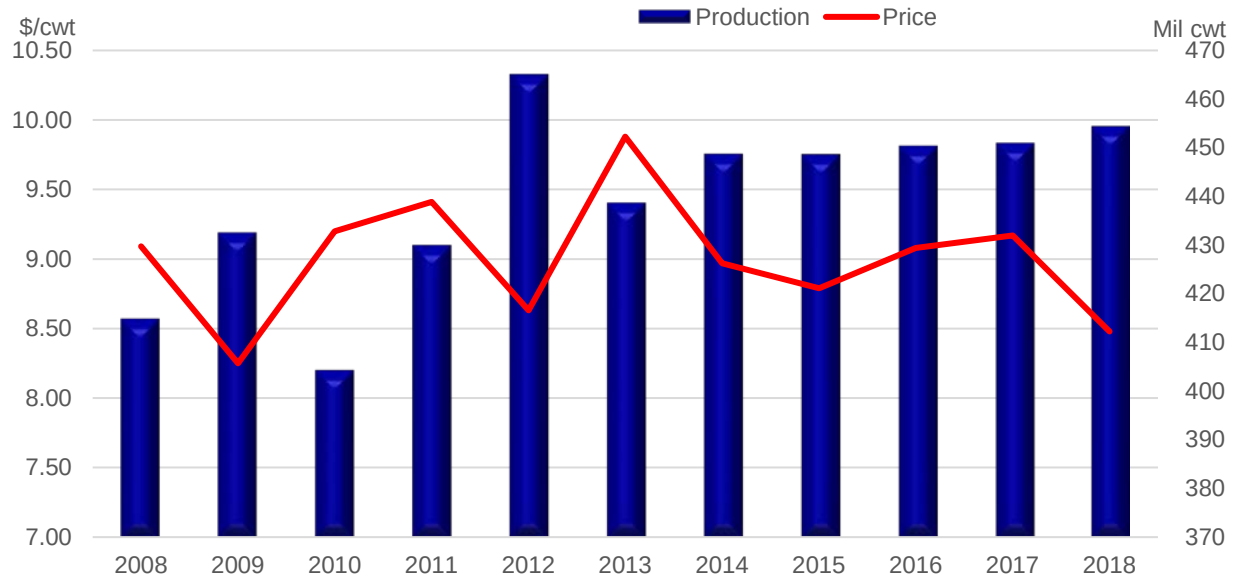


Note: cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Sustained potato production places downward pressure on price

Total potato production in 2018 grew less than 1 percent from the previous year to 45 billion pounds (fig. 3). Over the past 6 years, total production has sustained a climb not observed since 2002-04, despite a decrease in harvested acres over the same period. This production level has been supported by rising yields that grew to 444 cwt per acre in 2018—a 3-percent increase over the previous year, and the highest average U.S. yield ever attained. Idaho (accounting for 30 percent of volume), and Washington (23 percent) remained the top producing States, increased their yields 2 and 6 percent respectively. Potato production value in 2018 fell 7 percent, due to an 8-percent decrease in the national average price received to $8.48 per cwt. The 2018 decline in the average U.S. price was broad-based across the potato-producing States.

Figure 3
Production and price of all potatoes, 2008-18



Note: Hundredweight (cwt)=100 pounds.
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

U.S. Vegetable Trade

During 2018, a record 23.3 billion pounds of total U.S. vegetables (excluding potatoes and mushrooms) were imported—the highest in almost 30 years— while 11.4 billion pounds of total vegetables were exported. The United States has experienced an increasing trade volume deficit in total vegetables since 2001. In 2018, the United States exported $6.5 billion in vegetable products and imported $13.9 billion. Based on early trade data (year-to-date), 2019 seems poised to fall behind 2018 vegetable trade levels for imports and to lead 2017 exports.

Fresh-market vegetable imports value and volume up

In terms of value, the U.S. fresh-market vegetable trade deficit expanded further in 2018 as the value of both fresh-vegetable imports and exports increased. During 2018, imports of fresh-market vegetables grew 4 percent from 2017 to $7.7 billion. Mexico accounted for 74 percent of the fresh-vegetable import value, followed by Canada (14 percent), Peru (4 percent), and Guatemala (2 percent).

The value of fresh-market vegetable exports from the United States increased 2 percent to $2.2 billion in 2018, largely due to expanding exports to Japan, United Kingdom, Netherlands, and Taiwan. Fresh vegetable exports to Japan increased by almost 22 percent, made up mainly of gains in asparagus exports (26 percent), broccoli (15 percent), and cauliflower (73 percent). The value of exports to the United Kingdom rose by almost 5 percent over 2017 and accounted for 4 percent of U.S. fresh-

vegetable export value, largely driven by fresh-market asparagus, onion, and okra, which together represented 20 percent of total exports to United Kingdom.

In terms of trade volume, fresh-vegetable imports rose less than 1 percent in 2018 to 15.1 billion pounds (table 4), buoyed by increases in bell peppers, cucumbers, and tomatoes, which together accounted for 57 percent of the total 2018 fresh-market vegetable imports. Mexico led in the supply of bell peppers, accounting for 86 percent. Mexico and Canada led in cucumbers, accounting for 96 percent, and Mexico supplied 91 percent of fresh tomatoes imported to the U.S.

Table 4. Selected fresh-market vegetable trade[1]

	2016	2017	2018	Change 2017-18
	------ Million pounds ---------			*Percent*
Imports, fresh:				
Peppers, bell	1,422	1,457	1,535	5
Cabbage	216	169	254	50
Carrots	475	459	495	8
Squash[2]	1,067	1,077	735	-32
Celery	114	153	132	-13
Cucumbers	1,924	1,944	2,081	7
Okra	129	117	160	37
Tomatoes	3,938	3,944	4,093	4
Other	5,332	5,699	5,594	-2
Subtotal	**14,617**	**15,019**	**15,079**	**0**
Mushrooms	849	838	839	0
Potatoes	1,093	1,106	1,073	-3
Sweet Potatoes[1]	34	30	35	14
Total	**16,593**	**16,994**	**17,025**	**0**
Exports, fresh:				
Tomatoes, all	187	188	183	-3
Carrots	172	153	164	7
Cauliflower	274	249	284	14
Cucumbers	29	31	27	-12
Onions, dry bulb	672	682	733	8
Peppers, bell	102	107	103	-3
Garlic	123	66	31	-53
Asparagus	33	41	55	32
Other	1,696	1,572	1,557	-1
Subtotal	**3,286**	**3,089**	**3,137**	**2**
Mushrooms	13	11	17	55
Potatoes	1,078	1,204	1,057	-12
Sweet Potatoes[1]	528	650	667	3
Total	**4,905**	**4,954**	**4,878**	**-2**

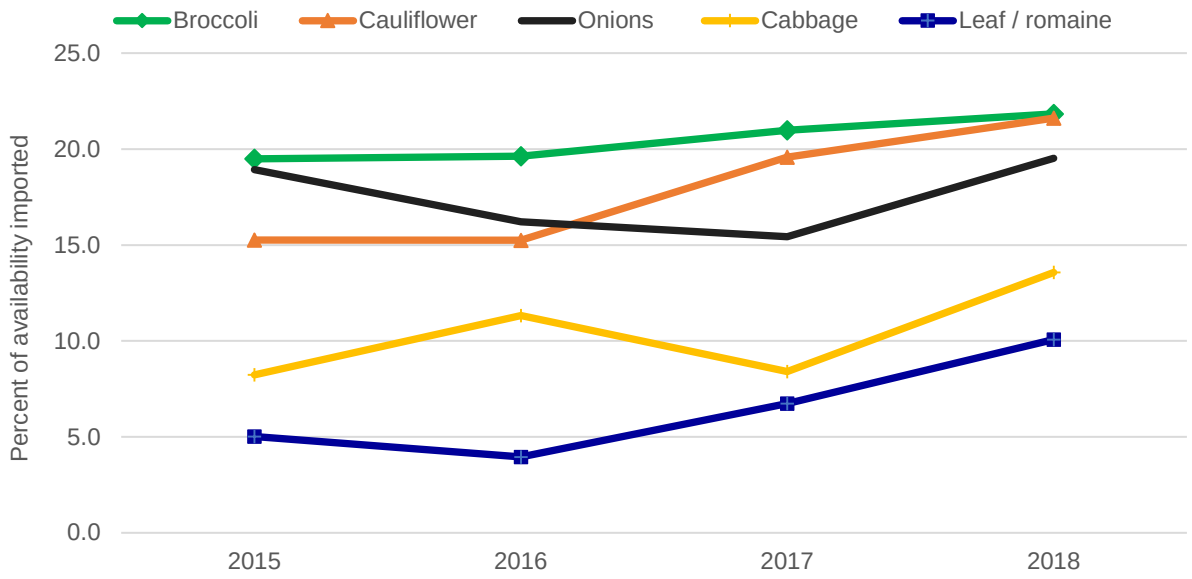
[1]Excludes melons, dry pulses. [2]Excludes chayote.
Source: USDA, Economic Research Service based on data from U.S. Department of Commerce, Census Bureau.

Despite waning exports of U.S. fresh vegetables to Canada and Mexico, total U.S. fresh-market vegetable export volume gained 2 percent in 2018 to 3.1 billion pounds and the two markets combined still made up 83 percent of total U.S. fresh-market exports. The drop in 2018 exports to Canada and Mexico was led by lettuce and onions. Exports to markets in Taiwan and Japan balanced the decline from North American partners, increased in 2018 by 7 and 20 percent respectively.

Overall, fresh imports as a percentage of domestic availability increased to 31.8 percent in 2018 from 29.3 percent in 2017. This modest overall climb was driven by a variety of fresh commodities continuing the trend of increasing import levels. This upward trend is supported largely by increases in tomatoes, bell peppers, cucumbers, and onions over the past decade, primarily from Mexico. These four commodities together comprised 60 percent of total fresh-market imports in 2018. Cabbage, leaf/romaine lettuce, and onions all increased imports as a percentage of availability by more than 25 percent from 2017 to 2018 (fig. 4). Only one fresh-market commodity, head lettuce, has experienced decreasing imports as a percentage of domestic availability for the last 3 years. Of the commodities featured in figure 4, only onions are behind pace so far in 2019 compared to the past 3 years.

Figure 4

Imports as a percentage of domestic availability for selected fresh vegetables, 2015-18



Source: USDA, Economic Research Service.

Processing-market vegetable exports slow while imports climb

The United States continues to be a net importer of canned, frozen, and dried vegetables (excluding mushrooms and potatoes) in terms of value. Import value, which totaled $4.1 billion in 2018, exceeded export value by $2.0 billion. The gain in import value continues to be driven by canned and frozen vegetables. In 2018, over 58 percent of processing vegetables available in the United States were imported, compared with 24 percent in the 1990s and 40 percent in the 2000s. Processing-vegetable imports by volume increased 5 percent in 2018 due to gains in canned and frozen imports (table 5). Imports grew to 8.2 billion pounds in 2018, with a notable increase in tomatoes to 1.6 billion pounds, 19 percent of total imported processed vegetables. The United States continued to import more canned and frozen vegetables during 2018, but growth was at a slower pace than the previous 4 years.

Table 5. Selected processed vegetable trade volume, 2016-18

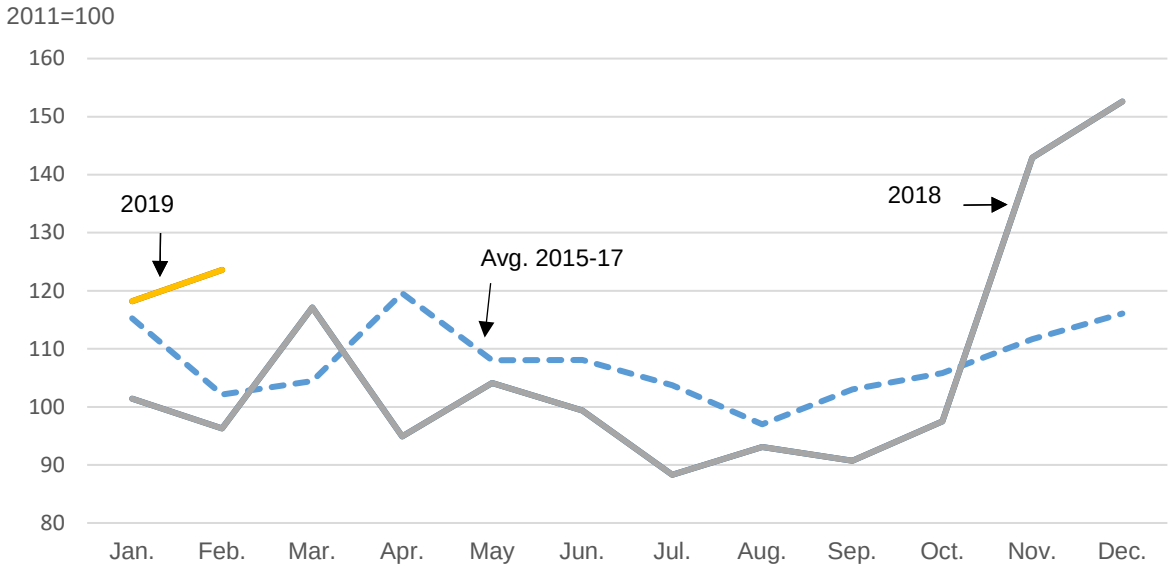
	2016	2017	2018	Change 2017-18
	---------- Million pounds ----------			*Percent*
Imports				
Canned vegetables	4,885	5,009	5,182	3
Cucumbers	88	93	93	0
Sweet corn	56	50	69	38
Tomatoes	1,437	1,503	1,576	5
Frozen vegetables	2,737	2,836	3,065	8
Peas, green	67	60	79	32
Sweet corn	210	229	229	0
Beans, snap	128	130	130	0
Other processing	5,635	5,780	6,071	5
Subtotal	**7,622**	**7,845**	**8,247**	**5**
Mushrooms for processing	260	255	263	3
Potatoes for processing	4,528	5,100	5,438	7
Total processed	**12,410**	**13,200**	**13,948**	**6**
Exports				
Canned vegetables	9,018	7,729	7,249	-6
Cucumbers	102	109	107	-2
Sweet corn	493	517	497	-4
Tomatoes	7,947	6,630	6,201	-6
Frozen vegetables	1,210	1,185	1,055	-11
Peas, green	47	37	37	-1
Sweet corn	721	703	607	-14
Beans, snap	28	31	30	-2
Other processing	24,768	26,502	26,021	-2
Subtotal	**10,228**	**8,914**	**8,305**	**-7**
Mushrooms for processing	20	20	19	-3
Potatoes for processing	23,858	25,595	25,176	-2
Total processed	**34,106**	**34,528**	**33,500**	**-3**

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

U.S. Vegetable Prices

Vegetable grower prices in 2019 began the year strong. At 123.6 (2011=100), the February grower price index for total vegetables was up from the February 2018 index of 96.3 and the 3-year average February 2015-17 index of 102.1 (fig. 5). This improved early-year index follows substantially higher prices received across many vegetables in the last 2 months of 2018. Price increases from November 2018 through February 2019 can largely be attributed to tighter supplies due to lower domestic production and increased consumer demand during the winter months.

Figure 5
Index of prices received by growers for vegetables



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

Fresh vegetable prices lower in 2018, despite late surge

The overall season-average price for fresh vegetables was down approximately 5 percent in 2018 from the previous year (table 6), but still slightly above those 2 years earlier in 2016. The season-average price was dragged down by some very significant decreases in the price of lettuces, spinach, artichokes, carrots, and squash. Two foodborne illness outbreaks occurred in 2018, substantially slowing the market for fresh leafy greens. Although prices for some fresh commodities rose from 2017 to 2018 (sweet potatoes, celery, cabbage, and tomatoes), the rising prices were not enough to offset the drops in other fresh commodities. These lower prices for fresh vegetables were in spite of lower domestic supply and slightly rising exports, which should put upward pressure on the price, suggesting a strong buyer taste and preference component in the price dips.

Table 6: Season-average price for selected fresh vegetables

	2016	2017	2018p	% Change 2017-18
		$/cwt		*Percent*
Artichokes	78.80	70.00	63.00	-10
Asparagus	117.00	132.00	122.00	-8
Broccoli	38.20	46.00	43.10	-6
Cabbage	21.70	19.80	22.90	16
Carrots	32.10	30.20	27.30	-10
Sweet Potatoes	20.70	18.40	23.90	30
Celery[1]	18.50	20.50	25.90	26
Beans, snap	60.10	57.10	59.80	5
Lettuce, leaf	46.20	60.90	51.90	-15
Garlic[1]	74.00	76.30	78.90	3
Lettuce, head	26.70	35.90	30.10	-16
Lettuce, romaine	30.40	44.80	31.00	-31
Onions	16.50	14.40	13.50	-6
Peppers, bell[1]	33.10	44.10	41.50	-6
Spinach	52.50	68.80	59.00	-14
Squash[1]	24.50	29.60	26.60	-10
Tomatoes	42.30	36.80	41.50	13
Average	**43.14**	**47.39**	**44.82**	**-5.4**

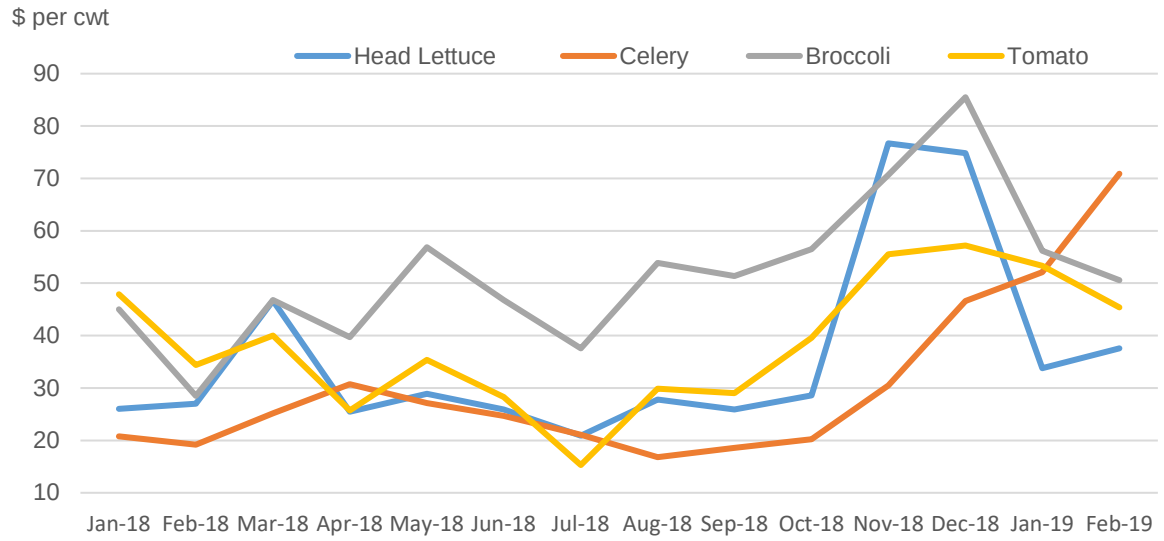
[1]All uses.
Note: Hundredweight (cwt)=100 pounds.
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Surge in 2018 winter market prices

Although overall 2018 prices for fresh market vegetables were down, there was a surge in grower prices received beginning in November 2018. The most dramatic increase was in head lettuce, which rose 168 percent between October and November. This climb was also seen across many other crops, with single-month price growth of lettuce, celery, broccoli, and tomatoes averaging about 71 percent (fig. 6).

AMS weekly shipment data report that these four commodities and numerous other fresh vegetable shipments were running at or near season-ago levels during October through December, suggesting no serious disruption to domestic supplies. While many commodities returned to within historical levels by January 2019, the price for celery continued to climb through February 2019.

Figure 6
Selected grower prices for fresh vegetables in the United States, 2018-19



Note: Hundredweight (cwt)=100 pounds.
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Processed vegetable prices up from previous year

The season-average price for processed vegetables in 2018 rose approximately 11 percent from a year ago; however, it remains down 7 percent from 2016 prices (table 7). This is despite increased domestic supply and slowing export volume, which should put downward pressure on the price of many processed vegetables. Ending stocks of processed vegetables in 2018 were down 4 percent and possibly supporting the higher prices. Although numerous processed vegetables prices rose—including broccoli and cauliflower, up 64 and 31 percent relative to year-ago levels—most processed vegetable prices remained steady at 2017 levels. Only tomatoes showed a drop in the 2018 price, falling just 1 percent from year-ago levels.

Table 7: Season-average price for selected processed vegetables

	2016	2017	2018p	% Change 2017-18
	---------- $/cwt ---------			
Asparagus	1,623.31	1,503.77	1,497.56	0
Broccoli	490.00	388.00	636.00	64
Cabbage	74.10	74.11	73.99	0
Cauliflower	990.00	494.00	646.00	31
Carrots[1]	151.00	133.00	143.00	8
Corn, sweet[1]	86.50	77.75	78.85	1
Cucumbers	313.00	352.00	352.00	0
Peas, green[1,2]	256.00	252.50	253.00	0
Spinach[1]	143.00	175.50	176.00	0
Tomatoes	87.30	82.70	81.50	-1
Average	**421.42**	**353.33**	**393.79**	**11**

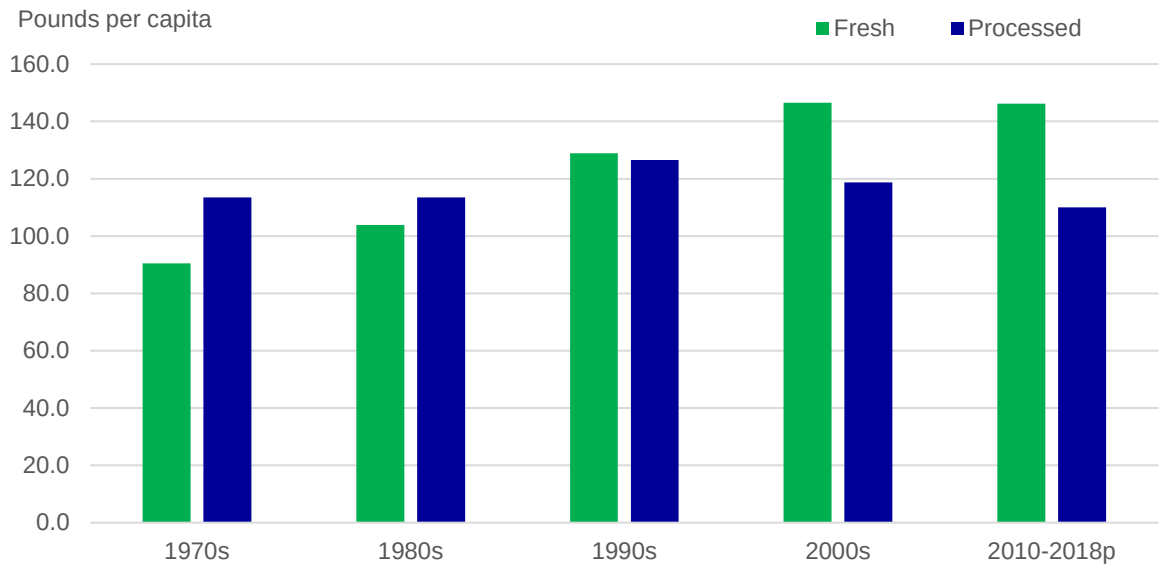
cwt = hundredweight, a measure of weight equal to 100 pounds.
[1]Average price for both frozen and canned. [2]All uses.
Source: USDA, Economic Research Services using data from USDA, National Agricultural Statistics Service.

U.S. Per Capita Availability

Despite the slight increase of total vegetable imports led by frozen imports and the decrease in vegetable exports led by canned exports, domestic availability declined 1.3 percent in 2018, due in part to the drop in total U.S. domestic vegetable production. Fresh vegetable production accounted for the majority of the decrease in total domestic vegetable availability, pulled down largely by declining harvested area of many fresh-market crops. Per capita availability (previously called disappearance or use) of vegetables and pulses in the United States was 395 pounds in 2018, down less than 2 percent from 2017 but still above an 18-year downward trend from the 2000 peak of 423 pounds. On average, fresh and processed vegetable per capita availability has declined slightly from the prior decade to 146 and 110 pounds per person, respectively (fig 7).

Availability measures supplies of commodities moving through production and trade channels for domestic use. The data do not directly measure food intake, but they serve as useful indicators for understanding trends over time. In addition, the data are not adjusted for spoilage and other losses. Thus, when used in this manner, the data provide an upper bound on the amount of food available for domestic use and consumption.

Figure 7
Average per capita availability of fresh and processed vegetables, 1970s-2010s[1]



[1]Excludes potatoes, sweet potatoes, mushrooms, and dehydrated products. p = preliminary.
Source: USDA, Economic Research Service, *Vegetables and Pulses Yearbook* (April 2019).

Fresh-market vegetable per capita availability stumbles

Total per capita availability of fresh vegetables (including potatoes, sweet potatoes, and mushrooms) totaled 184 pounds in 2018—down 9 percent from 2017, and the largest annual decline on record. Per capita use increased for many fresh-market crops— asparagus, carrots, cauliflower, celery, celery, cucumbers, eggplants, snap beans, spinach, tomatoes, and mushrooms. In contrast, availability of artichokes, bell peppers, broccoli, cabbage, cabbage, garlic, leafy greens, head lettuce, romaine/ leaf lettuce, onions, squash, sweet corn, potatoes, and sweet potatoes declined (table 8).

Table 8. Fresh-market vegetables: per capita availability[1]

Selected items	2016	2017	2018p	Change 2017-18
	-------Pounds per capita-------			*Percent*
Artichokes, all	1.39	1.43	1.35	-5
Asparagus	1.56	1.62	1.76	9
Bell pepper	11.08	11.31	11.16	-1
Broccoli	7.46	7.12	5.93	-17
Cabbage	5.91	6.20	5.71	-8
Carrots	7.82	7.36	8.53	16
Cauliflower	1.66	2.37	2.44	3
Celery	5.04	4.74	4.98	5
Cucumbers	8.12	7.43	7.99	8
Eggplants	0.86	0.86	0.90	4
Garlic, all	2.95	3.02	2.52	-16
Leafy greens[2]	2.09	3.22	2.89	-10
Head lettuce	16.87	15.31	12.33	-19
Romaine/ leaf lettuce	14.54	15.08	12.29	-19
Onions, bulb	22.75	25.07	20.39	-19
Snap beans	1.70	1.55	1.68	8
Spinach	1.97	1.86	1.92	3
Squash	5.73	5.69	4.43	-22
Sweet corn	7.10	7.22	6.75	-7
Tomatoes[3]	20.32	20.46	20.60	1
Others[4]	8.45	7.97	7.69	-4
Subtotal	**155.39**	**156.88**	**144.24**	**-8**
Mushrooms	2.96	2.93	2.94	0
Potatoes	33.65	34.37	31.07	-10
Sweet potatoes, all	7.23	8.01	5.56	-31
Total	**199.22**	**202.20**	**183.80**	**-9**

p = preliminary. [1]Availability is an imperfect 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, lima beans, and pumpkins.
Source: USDA, Economic Research Service, *Vegetables and Pulses Yearbook* (April 2019).

Increased vegetable production from California during 2018 was not sufficient to offset broad-based production declines in other reporting States, resulting in the total fresh-market production decline. This decline was the driver of the record annual decline of 2018 domestic availability of fresh-market vegetables. All-lettuce, onions, and, tomatoes accounted for about 49 percent of 2018 fresh-market vegetables available for consumption (excluding potatoes), largely unchanged from previous years.

Processing-market vegetable per capita availability surges

In 2018, total per capita processed-vegetable availability (potatoes and mushrooms included) totaled 199 pounds—up 5 percent from 2017 (table 9). Further, per capita availability of processed vegetables (excluding mushrooms, onions, and potatoes) increased to 8 percent from the previous year to 113 pounds. Canning vegetables, particularly the decline in processing tomato exports to Canada, accounted for the majority of the increase in domestic availability. Gains in production and imports to record levels in 2018 facilitated the third-highest level of processed vegetable domestic availability in almost 50 years.

Table 9. Vegetables for processing: per capita availability[1]

Selected items	2016	2017	2018p	Change 2017-18
	Pounds per capita			*Percent*
Canning				
Asparagus	0.08	0.07	0.06	-13
Beets	0.53	0.53	0.52	-1
Cabbage	1.04	1.31	0.77	-41
Carrots	1.06	1.12	0.94	-16
Chile peppers, all	7.64	7.49	7.22	-4
Cucumbers[2]	2.99	3.66	3.33	-9
Green peas	0.76	0.65	0.61	-7
Snap beans	3.19	3.12	2.89	-7
Spinach	0.16	0.14	0.15	8
Sweet corn	5.02	5.05	5.18	3
Tomatoes	61.16	57.90	65.61	13
Other canning	2.3	2.3	2.7	18
Canning subtotal	85.99	83.31	89.96	8
Freezing				
Asparagus	0.16	0.14	0.09	-37
Broccoli	2.64	2.37	2.50	6
Carrots	1.90	2.43	2.19	-10
Cauliflower	0.41	0.53	0.58	10
Green peas	1.00	1.30	1.28	-2
Snap beans	1.99	1.90	1.89	-1
Spinach	0.70	0.70	0.81	16
Sweet corn	7.45	8.06	7.92	-2
Other freezing	3.9	4.0	5.6	42
Freezing subtotal	20.16	21.40	22.88	7
Subtotal processing	**106.15**	**104.71**	**112.84**	**8**
Mushrooms for processing	1.05	1.02	0.99	-3
Onions for dehydrating	1.52	0.29	1.92	554
Potatoes for processing[3]	76.47	83.00	82.73	0
Total	**185.2**	**189.0**	**198.5**	**5**

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, Vegetables and Pulses Yearbook (April 2019).

Per capita availability of potatoes for the processing market decreased by under 1 percent, to 83 pounds in 2017, part of a longer term gradual decline since the 1996 peak of 95 pounds. The decline is largely driven by downward trends in freezing, which make up over 60 percent of processing potatoes, but has been stabilizing in recent years relative to the 23-year trend.

Dry Edible Beans

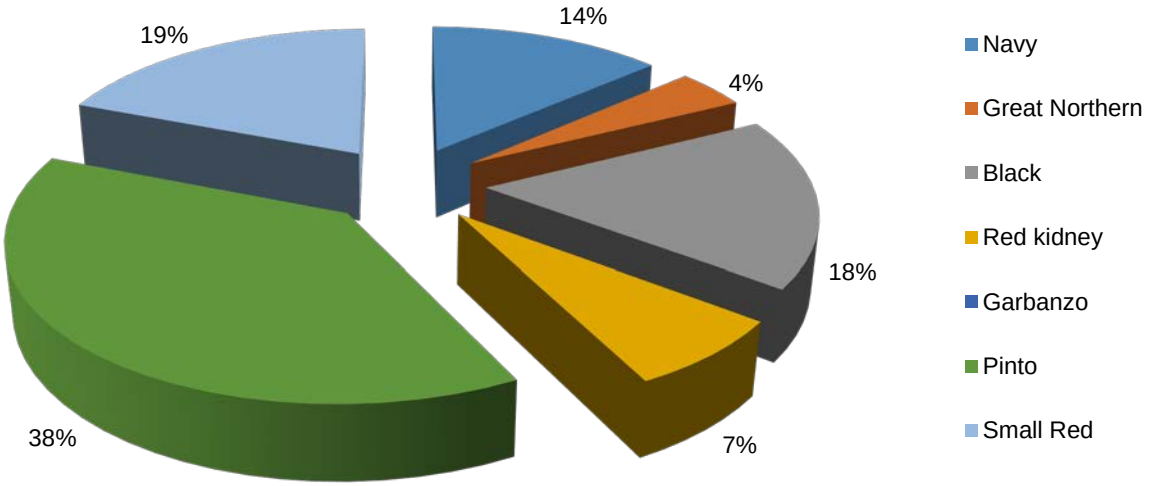
Dry bean (excluding chickpeas) area planted up slightly for 2019

Area planted to dry beans (exclusive of chickpeas/garbanzo beans) fell slightly in 2018 but is expected to rise by about 16,000 acres in 2019. Acreage gains are largest in North Dakota (up 79,000 acres) and Michigan (up 5,000), where weakness in spring wheat and soybean prices are likely to have encouraged increased dry bean plantings. After a significant cut in U.S. pinto bean planted area in 2018, it is now likely that North Dakota acreage gains in 2019 are principally of this variety. Gains in North Dakota and Michigan offset declines in Nebraska (down 32,000 acres) and smaller losses in California, Idaho, and Washington. Winter wheat plantings in Nebraska surged for the 2019/20 crop year, rising 170,000 acres and likely displacing some dry bean acres. In 2018, the drop in Nebraska dry bean sowings was due to a sharp decline in pinto bean plantings and a more modest decline for great northern bean area planted.

Much of the high plains and southern regions of the United States were experiencing very dry conditions near planting time in 2018. In contrast, this year a wet and cold winter—along with a late-arriving spring—have recharged soil moisture levels while also delaying planting for a variety of early-spring-planted crops. The most recent USDA, NASS crop conditions report indicates that spring wheat planting in the Northern Plains, a key location for navy, pinto, and black bean production, is significantly delayed. As of the week ending April 21, just 5 percent of the spring wheat crop had been sown, compared to the 5-year average of 22 percent. At this point in the planting season, it is too early to assess the effects of a late start on field work on the ultimate number of dry bean acres sown. However, the additional soil moisture is expected to support a return to trend dry bean yields in 2018. The increase in planted area (exclusive of chickpeas) and trend yields combine to lift production by about 15 percent to 2,890 million pounds.

Shifts in projected production by class (fig. 8) are fairly slight in 2019. On rising planted area in North Dakota, navy, black, and pinto bean production shares are expected to increase slightly from 2018 levels, up 1, 2, and 2 percent, respectively. Primarily due to falling acres in Nebraska, where more than 80 percent of the 2018 crop was sown, the great northern beans share is projected to decline to just 4 percent of total dry bean production (excluding chickpeas).

Figure 8
Projected 2019 dry bean production, by class[1]



[1]Excludes garbanzo bean production.
Sources: USDA, National Agricultural Statistics Service, *Crop Production* and USDA, Economic Research Service Projections.

Exports contract from previous year

Exports for calendar year 2018 were down 15 percent from the previous year, based, in part, on generally higher prices, which reflected largely improving season-average farm prices in the United States. In spring of 2018, several countries, including China, the European Union (EU), Turkey, India, Canada, and Mexico, imposed retaliatory tariffs on a range of U.S. agricultural products in response to the Trump Administration efforts to protect U.S. steel and aluminum producers (Congressional Research Report #R45448). Crops and food products affected by the new tariffs vary widely by country, and only the EU and India levied tariffs on U.S. pulse crops. With respect to dry beans, the EU imposed a 25-percent tariff on imports of U.S.-grown navy and kidney beans. The EU has historically been a key market for U.S. dry beans: the United Kingdom is the top export destination for navy beans, France ranks second for great northern beans and fourth for kidney beans, and Italy is the top destination for kidney beans and the third for navy beans, all based on 2017/18 marketing-year data. The imposition of tariffs on U.S. dry bean exports to these markets contributed to the year-to-year decline in exports. Most notably, U.S. navy bean exports were down 39 percent in 2018 compared to 2017. In part due to tariffs, exports of kidney beans to the EU were down year-to-year. However dry conditions in Argentina created alternative marketing opportunities for U.S. producers in South America, especially in Brazil, which ultimately helped to lift kidney bean export sales in 2018 (table 10).

Table 10. U.S. dry bean calendar-year export volume[1]

Bean class	Jan.-Dec. 2017	Jan.-Dec. 2018	Jan.-Feb 2018	Jan.-Feb 2019	Percent Change
	1,000 cwt (bags)				---%---
Navy	2,005.60	1,242.10	208.4	248.5	19.2
Black	1,274.70	1,138.50	207.2	166.6	-19.6
Dark-red kidney	999.2	1,116.90	216.2	299	38.3
Pinto	1,123.40	1,105.80	243.2	126.9	-47.8
Light-red kidney	200	354.5	57.5	42.4	-26.3
Small Red	182.1	249.4	31.3	42.9	37.1
Great Northern	275.7	201.6	35.1	140	298.9
Other	1,300.90	851.7	149.9	165.9	10.7
Total	**7,361.60**	**6,260.40**	**1,148.80**	**1,232.20**	**7.3**

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

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

In 2018, U.S. dry bean exports to Mexico, largely black beans, recovered to near-2017 levels, though they faced headwinds from competitors in South America (table 11). Through 2018 and into 2019, the U.S. dollar appreciated relative to other countries' currencies, making it more expensive to purchase U.S. dry beans, including black beans.

Table 11. U.S. dry bean calendar-year export volume, by selected destination [1]

Destination	Jan.-Dec. 2017	Jan.-Dec. 2018	Jan.-Feb. 2018	Jan.-Feb. 2019	Change 2018-2019
	1,000 cwt (bags)				*Percent*
Mexico	2,256.0	2,163.0	466.5	267.1	-43
Canada	1,575.3	961.4	125.8	191.8	52
Italy	1,038.0	857.1	158.2	206.9	31
United Kingdom	838.3	622.2	87.1	106.3	22
Dominican Republic	430.1	500.9	76.7	28.1	-63
Colombia	129.2	215.1	21.3	27.6	30
Haiti	236.1	173.9	42.8	38.0	-11
Japan	154.2	168.4	40.0	43.4	9
Other	715.6	249.8	322.3	420.9	31
Total[2]	**7,372.7**	**6260.4**	**1,341.0**	**1,330.1**	-1

[1]Includes commercial sales and movement under food aid programs such as P.L.480. [2]Excludes garbanzo bean volume and includes seed. cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Census Bureau.

While sales of U.S. black beans to Mexico did recover some in 2018, sales of pinto beans to the country have yet to fully recover and are behind the pace set in 2018 for the first 2 months of 2019.

Canadian imports of U.S. dry beans in 2018 were down 39 percent from the previous year, due in part to that country's increased production of dry beans in the 2018/19 marketing year. Expectation of growth in Canadian dry bean production for the 2019/20 dry bean marketing year is likely to limit the recovery of U.S. dry bean sales to that country. In early 2018, the United States announced plans to leave the North American Free Trade Agreement, advocating instead for implementation of the yet-to-be-officially approved United States-Mexico-Canada Trade Agreement. The effects of the emergent agreement on dry bean trade will be monitored.

U.S. exports of dry beans at the end of 2018 and through the first months of 2019 have been boosted by food aid shipments. The U.S. Government has purchased more than 10,000 metric tons of dry beans to be funneled into aid programs in various countries, including Yemen. Dry beans intended as food aid for Venezuela have been shipped via Columbia, helping to lift 2018 shipments to Columbia.

For 2019, U.S. dry bean exports are forecast to recover much of the ground lost in 2018 and rise to just over 1,050 million pounds. Generally lower dry bean prices in 2019 are expected to aid in the recovery, as are improvements in trade relations with key trade partners in the EU and North America. Trade in the first months of 2019 indicate navy and dark red kidney bean exports are trending ahead of last year's pace for the same period. This contributes to an overall increase in the volume of U.S. dry beans shipped in the first 2 months of the new year.

Table 12. U.S. dry bean calendar-year import volume[1]

Bean class	2016	2017	2018p	2019f
		1,000 cwt (bags)		
Black	440.5	327.7	316.2	318.0
Pinto	163.2	161.1	162.1	162.1
Small red	120.9	126.2	131.3	126.1
Navy	58.3	57.7	56.4	57.5
Dark-red kidney	62.8	53.5	57.3	57.9
Light-red kidney	187.8	158.3	160.4	168.8
Other	1,423.8	1,446.7	1,570.9	1,524.0
Total	**2,457.3**	**2,331.3**	**2,454.6**	**2,414.4**

[1]Excludes garbanzo beans. cwt = hundredweight, a unit of measure equal to 100 pounds. Projected="p", forecast="f".

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

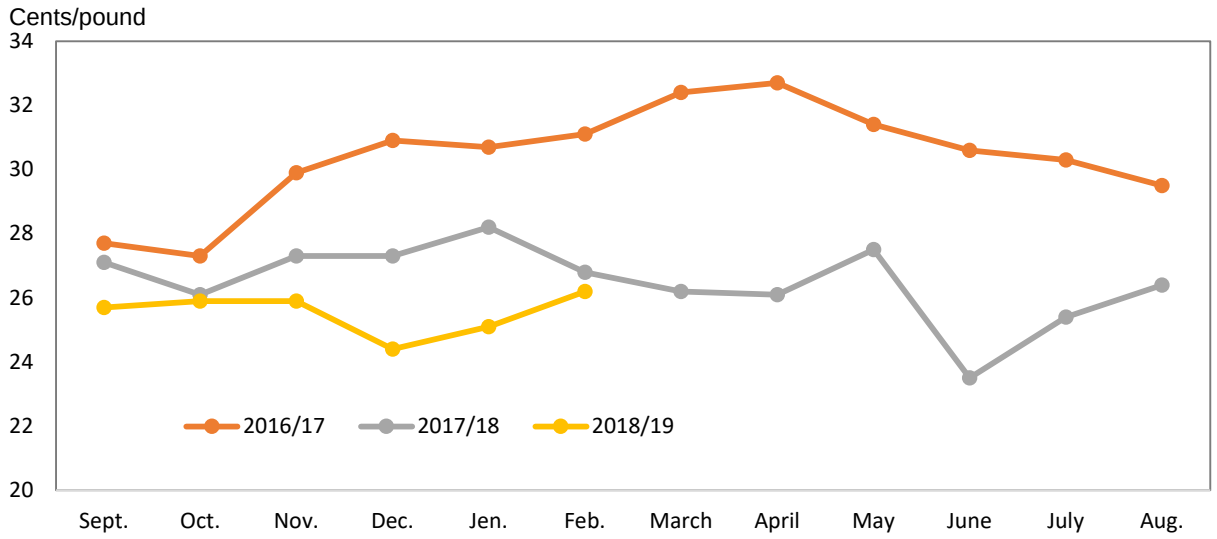
In 2018, U.S. dry bean imports rose slightly, despite larger U.S. production. Imports of the major classes of beans were not up markedly year-to-year; rather, imports of minor classes, including blackeyed pea beans, cranberry beans, and other beans, are the primary source of import gains. For 2019, imports (excluding chickpeas) are projected to decline slightly, down about 4 million pounds,

based on larger domestic production for most classes of dry beans. Imports of minor bean classes, including blackeyed peas and cranberries, are expected to return to average levels in 2019 (table 12).

Monthly grower prices generally lower in 2018/19

Average monthly grower prices for dry beans in the 2018/19 marketing year have generally underperformed relative to the previous marketing year (figure 9). In 2018, sizable carryin from the 2017 crop augmented 2018 supplies and inhibited a significant price recovery, despite generally rising agricultural prices. For the outyear, the current all-dry-bean price forecast for 2019 is approximately $28 per hundredweight (cwt), down about 14 cents from the USDA, NASS reported 2018 season-average farm price. The direction of price change for dry beans in 2019 is consistent with the outlook for lower wheat and corn prices.

Figure 9
U.S. dry edible beans: Average monthly grower price



Sources: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, *Agricultural Prices.*

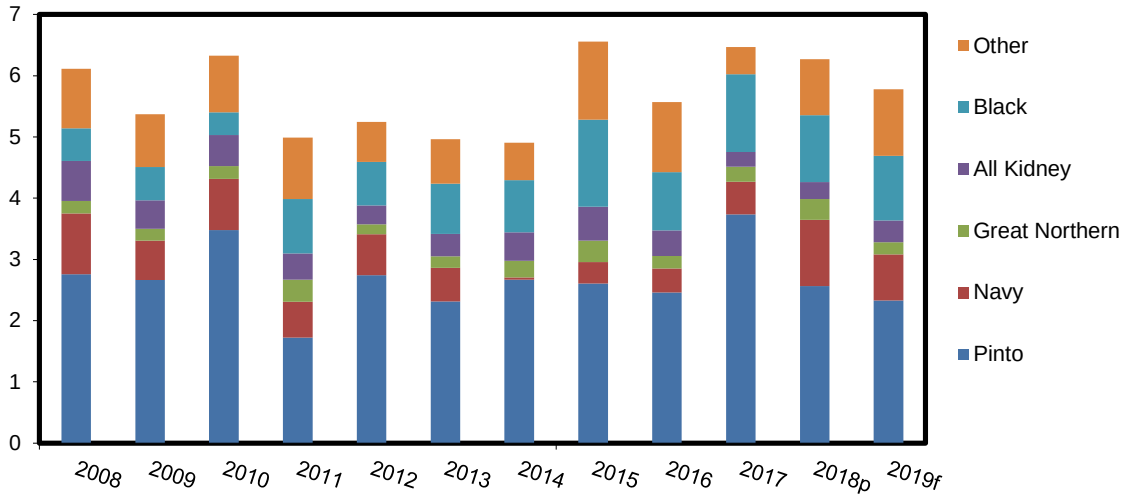
Per capita availability predicted down slightly in 2019

All dry bean per capita availability (less chickpeas) for 2019 is projected at about 5.9 pounds per person, down from the 6.47 pounds per person estimated for 2018 (fig. 10). Reduced per capita availability is based on expectations of both greater export sales and sizable carryout for the new year. After falling from 3.74 pounds per person to 2.56 pounds per person in 2018, pinto bean per capita availability is projected to rise slightly in 2019 to 2.33, largely based on improved prospects for production. Growth in kidney bean production and availability partially offsets forecast declines in great northern production and resulting reduced availability for white bea.

Figure 10

Dry bean (less garbanzo beans) per capita availaibility

(pounds per capita)



Source: USDA, Economic Research Service calculations.

Chickpeas (Garbanzo Beans)

2019 sowings fall sharply on low prices

The USDA, NASS March 29 *Prospective Plantings* report indicated that farmers intend to sow 40 percent fewer acres of chickpeas (also known as garbanzo beans) in 2019 as compared to 2018 (table 13). Planted area for 2019 is forecast at 519,000 acres and is the lowest since 2016, when planted area totaled just 325,300 acres. Chickpea planted area is expected to be down sharply in the four major producing States: Idaho (-37 percent), Montana (-40 percent), North Dakota (-34 percent), and Washington (-42 percent). Area planted to small (desi) chickpeas is forecast at 137,000 acres, down 39 percent from the previous year. Large (Kabuli) chickpea area is forecast down 40 percent from 2018 to 382,000 acres.[1]

Table 13. Chickpeas (garbanzo beans): Planted area

	2017	2018	2019[1]	Change 2018 to 2019
		----- 1,000 acres -----		*Percent*
Chickpeas, total	**625.5**	**859.6**	**519.0**	-39.6
Small chickpeas	179.5	222.7	137.0	-38.5
Large chickpeas	446.0	636.9	382.0	-40.0

[1]Intended plantings in 2019 as indicated by farmers and published in *Prospective Plantings*.
Source: USDA, National Agricultural Statistics Service.

The dramatic decline in chickpea sowings is attributable to a steep drop in chickpea prices for the 2018 crop. Chickpea prices weakened through the 2018 calendar year with a precipitous drop between August ($33.5/cwt) and September ($23.1/cwt) (fig. 11). In early September, updated forecasts for U.S., Canadian, and Indian chickpea crops were released and revealed that each country was expecting very large harvests. The price-suppressing effect of a much larger-than-expected global supply of chickpeas was further augmented by reduced demand from key trading partners. In particular, India and EU demand for U.S. chickpeas was markedly down in 2018. For calendar year 2018, U.S. chickpea exports were roughly 52 percent of the prior year's volume and contributed to ending stocks that are estimated by USDA, NASS at nearly five times the 2017 volume. Slackness in the U.S. chickpea balance sheet is reflected in the 2018 marketing year price of $21.6/cwt, the lowest price since USDA, NASS began reporting chickpea prices in 2003 ($21.7/cwt). The 2018 all-chickpea price was down $8.4/cwt from the 2017 marketing-year price.

[1] Starting in 2019, USDA, NASS discontinued chickpea estimates in Colorado, Michigan, Minnesota, Nebraska, Texas, and Wyoming. In 2018, these States collectively accounted for less than 2 percent of 2018 production.

U.S. chickpea exports flounder in 2018/19

Markedly higher global supplies in the 2018/19 marketing year have contributed to weak sales through the first 6 months of the marketing year (Sept. to Aug.) (table 14). Key U.S. export markets—Canada and India, where pulse production surged in 2018—showed much lower year-to-year imports of U.S. chickpeas during marketing year 2018/19. Despite the steep fall-off in sales to Canada and India (down 46 percent and 63 percent, respectively), the two countries remain among the top three export destinations for U.S. chickpeas. In spring of 2018, the Government of India announced a proposal to raise the current 60-percent tariff on chickpea imports from the United States to 70 percent and to also raise the tariff on lentil imports from 20 to 30 percent and later up to 40 percent. The proposed increase in tariffs came in response to U.S.-levied tariffs on imports of steel and aluminum from India (Congressional Research Service report #R45448).

Table 14. Chickpeas (garbanzo beans): Export volume

	Sept. – Aug.			Sept. – Feb.		Change
	2016/17	2017/18	2018/19p	2017/18	2018/19p	17/18-18/19
	1,000 cwt					*Percent*
Chickpeas	1,215.3	2,463.2	2,669.3	2,335.1	1,622.2	-31

Projections are indicated with "p". cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: USDA, Economic Research Service using data from Department of Commerce, Census Bureau

Offsetting the fall-off in sales to India, sales to Pakistan have surged in 2018/19 compared to the same period in 2017/18, leading that country to emerge as the top U.S. export destination thus far in the marketing year. A severe drought in Australia curtailed chickpea and other pulse crop production in 2018. This contributed to reduced exportable supplies, leading Pakistan to seek other pulse crop trade partners, including the United States. Australia's reduced export capacity increased opportunities, while limited, for U.S. and Canadian chickpeas sales to India.

A recent USDA, Foreign Agricultural Service (FAS) GAIN report on India grains ((USDA, FAS GAIN report #IN9025) summarized the second advance estimate of Indian crops for the 2018/19 crop year. The weak monsoon in later 2018 resulted in significantly lower production of pulse crops, which are primarily grown on unirrigated land. Reduced production in India potentially opens the door for recovered exports of U.S. chickpeas to the country in 2019. However, in early April, the Indian Ministry of Commerce and Industry publicly released notification on quantitative restrictions on the imports of pulses from all third-country suppliers, including the United States. At this time, duties on imported Desi and Kabuli chickpeas to India remain in place, further inhibiting expanded exports in the new marketing year.

Per capita availability surged in 2018, will remain high in 2019

Expanding domestic and export demand has helped to support prices and encourage chickpea plantings in recent years. U.S. consumer demand for hummus and other chickpea-containing products is estimated to have remained robust in 2018, bolstered in part by lower prices resulting from a sharp increase in available supplies. Record chickpea production and greatly reduced exports combined to increase estimated total domestic disappearance to nearly 860 million pounds, up from 383 million in 2017. On a per capita basis, availability for calendar year 2018 is estimated at 2.63 pounds per person. Lower production in 2019 and an expected pickup in export sales reduced supplies available for domestic consumption. Per capita availability for 2019 is forecast to fall by about one-half pound to 2.12 pounds. While down year-to-year, per capita availability for 2019 is still the second-highest estimate on record and well above the 5-year average of 1.25 pounds per person.

Dry Peas and Lentils

Aggregate dry pea and lentil planted area down again in 2019

In a continuation of last year's movement, aggregate area planted to dry peas and lentils is projected to drop in 2019 (table 15). According to the March 30 USDA, NASS *Prospective Plantings* report, in 2019, U.S farmers collectively intend to plant 13 percent fewer acres to these crops than they did in 2018. A sharp decline in area planted to lentils (down 29 percent) more than offsets a slight, 3-percent gain in dry pea planted area. Starting in 2019, USDA, NASS will no longer publish estimates of Austrian winter peas; thus, area planted to Austrian peas is not included in aggregate area figures.

Table 15. Dry peas and lentils: Planted area[1,2]

Item	2017	2018	2019p[1]	Change 2018-19
	---thousand acres---			*Percent*
Dry peas	1,128.0	856.5	881.0	3
Austrian winter peas	25.5	16.4	--	--
Lentils, all	1,104.0	780.0	555.0	-29
Total	2,257.5	1,652.9	1,436.0	-13

--Indicates data not available. Projection is indicated with a "p".

[1]In 2019, USDA, NASS discontinued data collection for Austrian peas.

[2]Intended plantings in 2019 as indicated by farmers and published in *Prospective Plantings.*

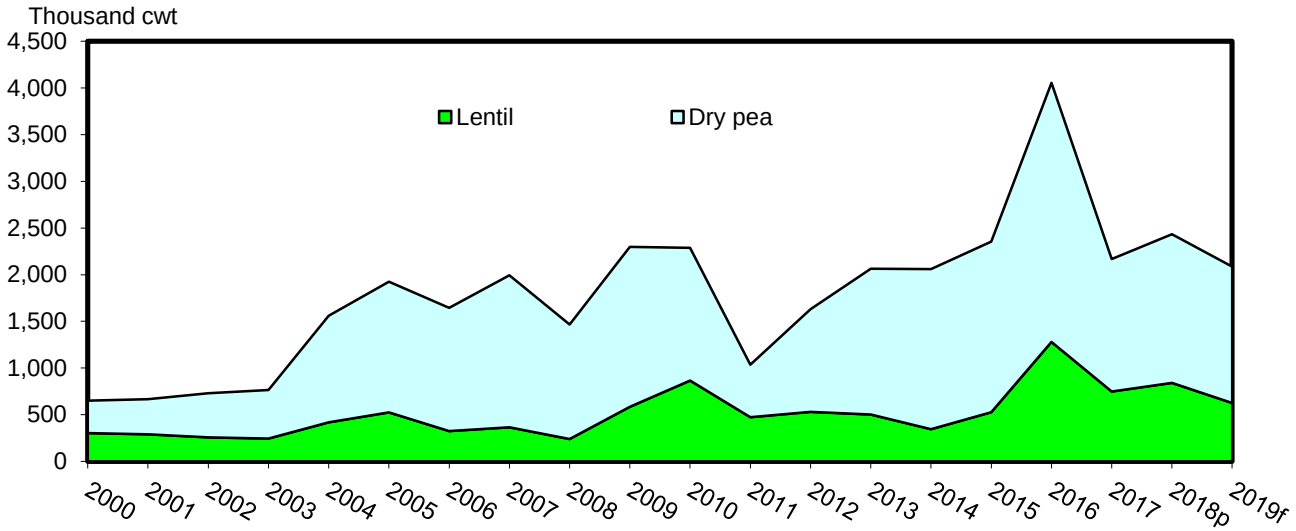
Sources: USDA, National Agricultural Statistics Service, *Crop Production* and *Prospective Plantings.*

Lentil planted area in Idaho and Washington is expected to be on par with 2018 plantings. In Montana, lentil sowings are forecast at about 60 percent of last year's total, a 200,000-acre decline from 2018. Area planted to dry peas in Montana is forecast to increase by 33 percent and 100,000 acres, indicating that some Montana farmers may be shifting production out of lentils and into dry peas. Farmers in North Dakota also report plans to sow fewer lentil acres in 2019, down 14 percent and 25,000 acres. Unlike Montana, growers in North Dakota do report intentions to boost dry pea plantings in the 2019.

Unlike 2017 and 2018, drops in planted area and production of lentils are not related to drought. In these earlier years, large sections of both Montana and North Dakota were affected by exceptionally dry conditions. Rather, in 2019, reduced plantings of lentils are anticipated to be the result of significant declines in U.S. lentil prices. Domestic lentil price declines are linked to the continued imposition of successively larger import tariffs on pulse crops by India. In 2018, India harvested record-large pulse crops, leading to lower prices for local farmers. The Indian Government offers a minimum support price for lentils, which was last raised in October of 2018. Raising the support price had the effect of encouraging plantings of lentils and lessening demand by India for imported supplies (primarily from the United States, Australia, and Canada).

A weaker than average monsoon reduced the outlook for Indian production of lentils and other pulse crops in 2019; however, carryin from the previous year is expected to be sizable and will combine with a smaller—though still significant—volume of new crop production in India. Ultimately, the current outlook for recovered exports to key market India is not optimistic and weighs on U.S. domestic price recovery prospects. Despite lower U.S. production (fig. 13), supplies from the previous year inhibit significant price recovery.

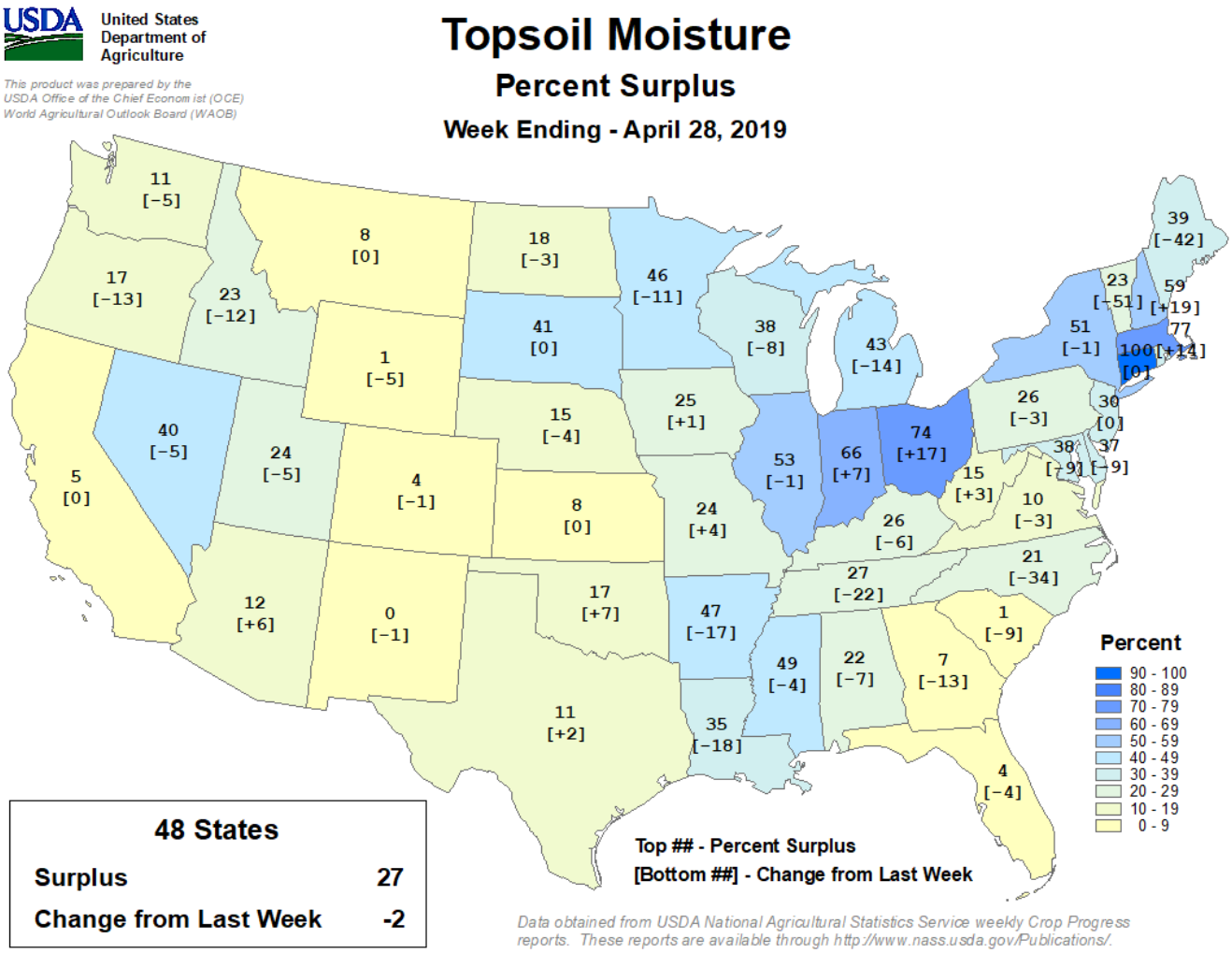
Figure 13
U.S. dry pea and lentil production



Preliminary projection indicated with a "p"; forecast indicated with an "f". cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: USDA, ERS using data from National Agricultural Statistics Service.

In 2018, dry pea and lentil yields returned to average levels following the drought-affected yield plunge in 2017. In contrast to the dry conditions of 2017 and into 2018, at the start of the 2019 planting season a significant proportion of the Northern Plains is experiencing excess soil moisture conditions (fig. 14). A late-arriving spring and cool temperatures in key pulse growing regions of the country have inhibited lentil planting progress. In week 16 (ending April 21) of the 2019 planting season, just 4 percent of intended lentil acres had been planted compared to the 5-year average of 12 percent. Dry pea plantings in Idaho and Washington State are also running slightly behind the 2018 pace. At this early point in the 2019 season, production for 2019 is based on NASS-provided planted area, historical relationships between harvested and planted area, and trend yields. While lentil crop progress, in particular, is running behind average pace, yields are not expected to be affected by the abundant early-season moisture.

Figure 14:
Topsoil Moisture



Source: USDA, Office of the Chief Economist, World Agricultural Outlook Board using USDA, National Agricultural Statistics Service data.

Exports fall across primary markets

Dry pea and lentil exports for the 2018/19 marketing year are down about 6 percent compared to the same time in 2017/18 (table 16). While most classes of dry peas have experienced expanded sales, exports of yellow peas are down sharply (-43 percent). Indian tariffs on yellow and green peas currently stand at 50 percent. In India, prices for green peas are said to be trending quite high, based on expectations of a smaller harvest of rabi season pulse crops in spring of 2019. The high local prices for green peas create incentives, despite a sizable tariff, to import green peas from the United States and other trade partners. U.S. exports of green peas to India are up about 5 percent relative to the same period in 2017/18. Like yellow peas, U.S. lentil exports are also down significantly (-24 percent) through the first 8 months of the current marketing year. Tariffs on U.S. lentil imports into India are currently set

at 40 percent and are a strong deterrent to U.S. exports to India improving to near pre-tariff levels (2016/17).

Table 16. U.S. dry peas, lentils: Export volume by class

Item	July-June			July-February		Year to date change
	2015/16	2016/17	2017/18	2017/18	2018/19	17/18-18/19
	1,000 cwt					*Percent*
Exports:						
Green peas	2,149	4,216	2,419	1,623	1,710	5
Yellow peas	3,512	3,660	592	333	188	-43
Split peas	2,561	1,576	1,497	668	1,138	71
Austrian winter peas	11	24	52	21	26	19
Misc. dry peas	2,294	1,751	593	360	440	22
Lentils, all	4,484	7,495	3,535	2,557	1,951	-24
Planting seed, all	1,025	1,841	857	659	405	-39
Total (without seeds)	**15,011**	**18,722**	**8,687**	**5,562**	**5,454**	-2
Total (with seeds)	**16,035**	**20,562**	**9,544**	**6,221**	**5,859**	-6

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

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

Table 17. U.S. lentil marketing-year export volume, by selected destination

Destination	June-July		July-February		Change
	2016/17	2017/18	2017/18	2018/19	17/18-18/19
	1,000 cwt				*Percent*
Canada	1,951.1	703.1	620.6	271.2	-56.3
Spain	833.3	588.9	407.5	335.2	-17.7
Colombia	504.3	450.7	356.8	105.8	-70.3
Mexico	563.8	305.9	258.8	219.0	-15.4
Sudan	227.4	263.6	16.3	201.1	1130.5
Peru	412.9	257.7	194.0	155.0	-20.1
India	1,545.7	161.3	127.9	248.2	94.0
Italy	182.0	98.6	80.3	42.5	-47.1
China	21.4	91.1	34.8	116.0	233.7
Benin	92.0	80.9	0.0	2.9	
Other	1,160.6	533.0	459.8	254.0	-44.8
Total	**7,494.5**	**3,534.7**	**2,556.9**	**1,951.0**	-23.7

cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: U.S. Department of Commerce, Census Bureau.

Exports to a variety of U.S. lentil trade partners are down in 2018/19 (table 17). Retaliatory tariffs, trade disputes, and sizable production in competitor countries like Canada have reduced opportunities for U.S. pulse crops. In spite of the ongoing imposition of a 40-percent tariff, lentil exports to India are beginning to exhibit some recovery. Starting in December of 2018, U.S. lentil shipments to India began to exceed shipment volumes from the previous year. From December 2018 to February 2019, India

imported more than 6,000 metric tons of U.S. lentils, more than seven times the volume of lentils imported during the same period a year prior.

Table 18. U.S. dry pea marketing-year export volume, by selected destination

	June-July		July-February		Change
Destination	2016/17	2017/18	2017/18	2018/19	17/18-18/19
	1,000 cwt				*Percent*
Yemen	278.6	811.7	552.3	443.6	-19.7
China	1,955.7	576.2	401.7	122.6	-69.5
Ethiopia	708.5	532.1	347.2	427.0	23.0
India	4,037.9	507.6	328.2	132.9	-59.5
Tanzania	223.5	461.9	2.1	224.2	1,057.6
Philippines	369.3	314.8	170.0	232.8	36.9
Peru	298.7	261.1	176.5	302.0	71.2
Kenya	284.2	209.8	83.8	100.3	19.8
Canada	466.6	206.1	167.6	431.7	157.5
Djibouti	586.7	189.7	49.7	197.6	297.2
Other	9,209.6	4,071.1	2,279.0	2,614.8	14.7
Total	**11,227.2**	**5,152.5**	**3,004.9**	**3,502.9**	16.6

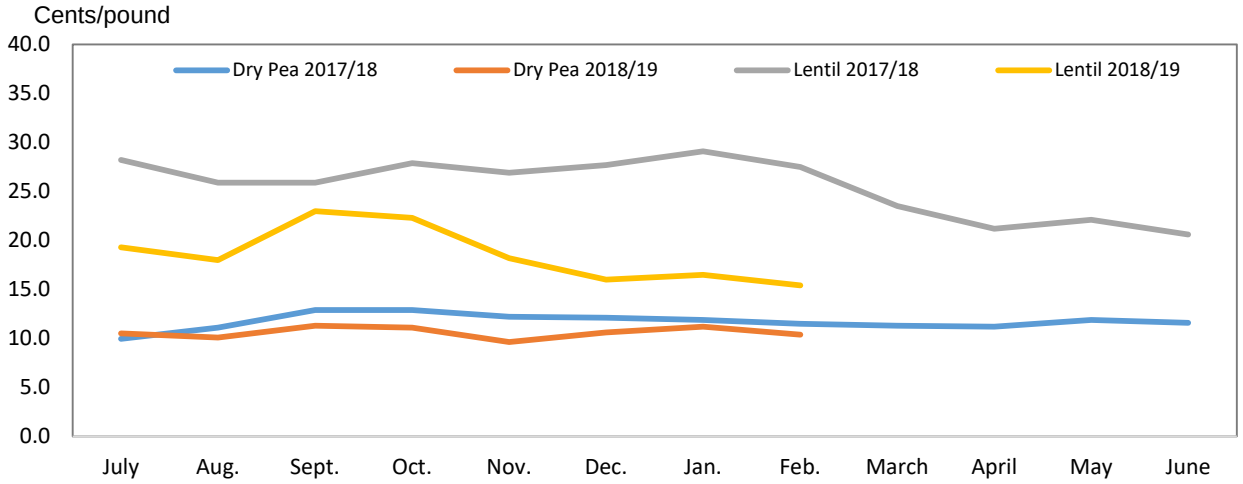
cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: U.S. Department of Commerce, Census Bureau.

Dry pea exports are up thus far in the 2018/19 marketing year, as compared to the same period in 2017/18. Lower dry pea prices have aided the competitive position of U.S. dry pea producers, helping to gain inroads in a number of smaller markets such as Peru and Tanzania, even as sales to larger volume buyers such as Yemen, China, and India decline. Monthly sales of dry green peas to India are showing some recent signs of recovery; however, sales of yellow and split peas are far below estimates for the same period in 2018. Expectations for Canada to export a record amount of dry peas to China during the 2018/19 marketing year cast doubt on a recovery of U.S. dry pea exports to this market in the near future.

Prices for dry peas and lentils forecast down for 2018/19

Significantly weaker export demand for lentils puts downward pressure on the season-average price for 2018/19. ERS estimates the current season-average price for lentils at about $20/cwt, compared to $25.90/cwt in 2017/18. For nearly every month in 2018/19, dry pea prices have been lower than for the same period in 2017/18, resulting in a 75-cent decline in the season-average farm price to $11.05/cwt (fig. 15). Lower dry pea prices in 2018/19 reflect concerns over the ongoing imposition of tariffs by formerly key buyer India.

Figure 15
U.S. dry pea and lentil: Average monthly grower price



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

Lentil per capita availability rises on reduced exports while lower dry pea production cuts per capita availability

For 2018/19, an increase in lentil production combines with reduced export use to raise the volume of lentils available for domestic consumption. Per capita availability of lentils in 2018/19 is projected up more than a pound to 2.21 pounds per person. For dry peas, slightly higher production year-to-year is largely offset by growth in exports. Rising feed, seed, and residual use account for a greater share of utilization in 2018/19 and help to reduce the volume of dry peas available for domestic use. Dry pea per capita availability is forecast to fall slightly in 2018/19 to 2.31 pounds per person.

Suggested Citation

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VGS-362-SA | May 6, 2019

Special Article: Seasonality in Romaine Outbreaks and Regional Shipments

Gregory Astill

After the 2006 outbreak linked to spinach, the leafy greens industry established the California and Arizona Leafy Greens Marketing Agreements (LGMAs) to implement measures like harvest worker training and water testing to address safety concerns (Arizona LGMA, 2018; California LGMA, 2019a). While membership in an LGMA is voluntary, California and Arizona LGMA members produce the vast majority of the U.S.-grown leafy greens. In spite of these preventive measures, the industry still faces challenges with regards to foodborne illness outbreaks and has recently updated safeguards for water application to leafy greens (California LGMA, 2019b). Leafy greens are the sixth most commonly consumed vegetable (ERS, 2018a) and are commonly consumed raw. Since 1988, the amount of leafy greens consumed per capita has quadrupled (ERS, 2018b).

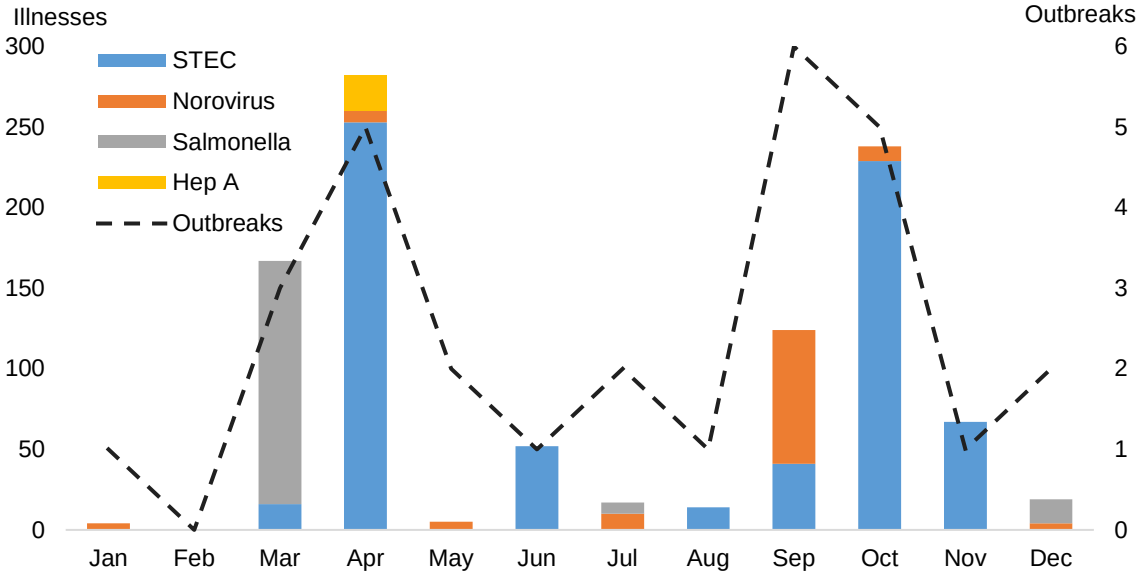
Seasonality in Romaine Outbreaks

While examples of leafy greens being associated with foodborne illness outbreaks go back to 1988 (Rosenblum et al., 1990), reliable data on foodborne illnesses attributable to specific foods goes back to 1998. From 1998 to 2018, foodborne illnesses and outbreaks associated with romaine lettuce occurred most frequently during March, April, September, and October (fig. 1). Illness counts of the bacterium responsible for the three 2017–2018 romaine outbreaks, Shiga toxin-producing *Escherichia coli* (STEC; *E. coli* O157:H7 is included among other strains), peak in April and October. Turner et al. (2019) analyze outbreaks associated with California leafy greens from 1996 to 2016 and find a similar seasonal pattern: outbreaks peak in October.

During 2017 and 2018 in the United States and Canada, there were three multi-State, multi-national foodborne disease outbreaks of STEC O157:H7 associated with the consumption of romaine lettuce

that led to 376 illnesses, 158 hospitalizations, and 7 deaths. The timing identified in these three recent outbreaks fits a seasonal pattern of romaine outbreaks stretching back for two decades.

Figure 1
Foodborne illnesses and outbreaks in romaine lettuce, 1998-2018



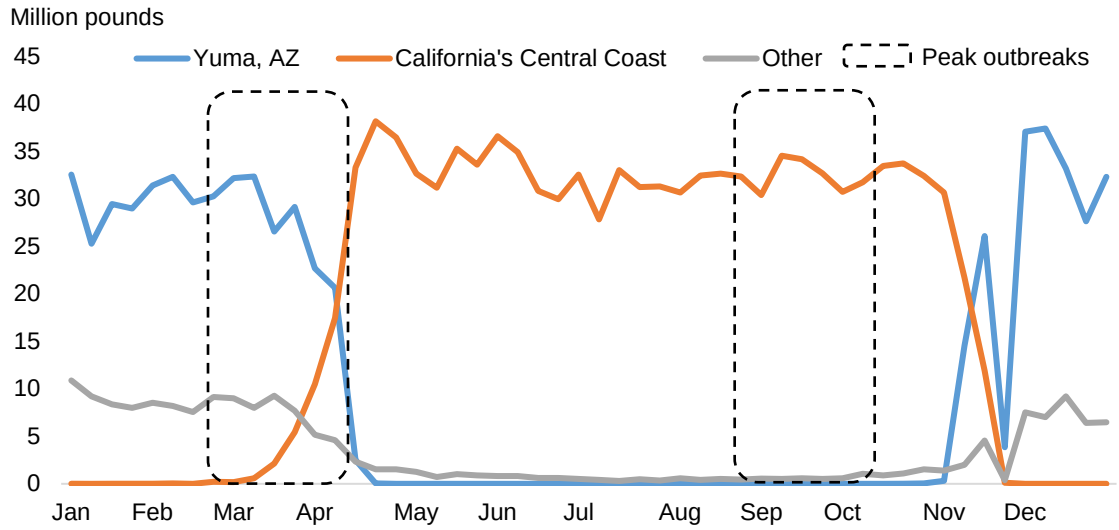
Sources: Author's calculations using data from Centers for Disease Control and Prevention (CDC, 2018a) for 1998–2017 and from CDC (2018b, 2018c, 2019) for 2017 and 2018.
Notes: STEC: Shiga toxin-producing *Escherichia coli.* Hep A: Hepatitis A.

Seasonality in Romaine Shipments

About three-quarters of U.S. romaine shipments come from two regions commonly called California's Central Coast and Yuma, Arizona; the rest come from other areas in the United States, Mexico, and Canada (fig. 2). The temperate climate of California's Central Coast region, which includes the Salinas valley in Monterey County, is amenable to growing delicate lettuces during the summer and fall. Yuma, Arizona is generally hot and dry, but in the winter and spring temperatures are favorable for lettuce production and plentiful irrigation is available from canals fed by the Colorado River.

From about March to October, romaine comes predominantly from California's Central Coast; during that time, no production occurs in Yuma. Production shifts quickly to Yuma in November, when Yuma production serves the market while production in California's Central Coast ends. Another rapid shift back to California's Central Coast begins in March. Outside of the two 1-month transition periods, these two dominant regions make up about 75 percent of shipments. Foodborne illness counts associated with romaine peak in March-April and September-October (fig. 1), prior to the seasonal transitions (fig. 2).

Figure 2
Seasonal variation in romaine shipments, 2018



Sources: Author's calculations using data from U.S. Department of Agriculture, Agricultural Marketing Service (2019).

Looking Forward

Definitive answers as to the cause of seasonality in romaine outbreaks are not provided here. However, the identification of a seasonal relationship between regional romaine production and foodborne illness outbreaks helps to formulate testable hypotheses with the potential to inform future romaine outbreak prevention. Both biophysical and operations management characteristics may vary seasonally in their impact on the likelihood of romaine contamination. Seasonality in the movement of both domestic and wild animals may affect the level of contamination reaching romaine in the field. Changes to management on the farm as romaine production winds down may affect the way food safety activities are carried out. Finally, seasonal temperature may impact both romaine production and bacterial growth. Further research is needed to determine which of these hypotheses impact foodborne illness outbreaks associated with romaine.

Suggested Citation

Astill, Gregory, *Vegetables and Pulses Outlook*, VGS-362, U.S. Department of Agriculture, Economic Research Service, May 6, 2019.

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Special Article: Census of Agriculture Reveals Long-term Trends

Brandon Johnson

Total Value for Vegetables Up, Despite Acreage Decline

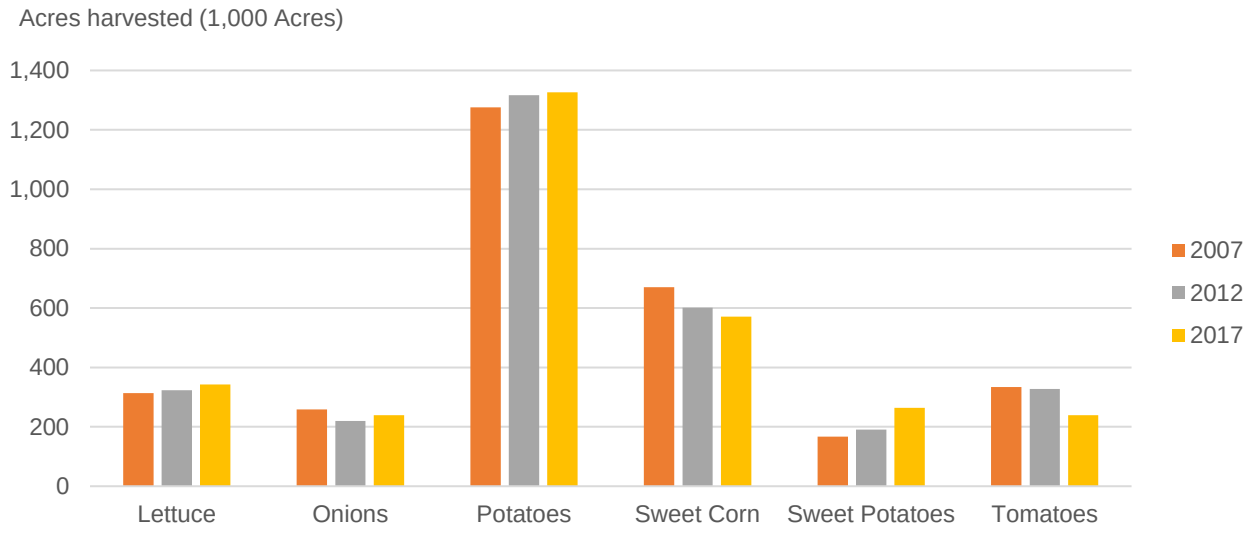
The 2017 Agricultural Census reveals interesting trends for U.S. vegetables at the national level. According to census data, the total value of vegetables grown in the United States had increased by about 16 percent since the 2012 census. This continues the trend of growth in vegetable value, which increased 15 percent between the 2007 and 2012 censuses. Value increased in 2017, even as the total number of acres harvested declined at the national level. Although production has waned, the increased value is explained by a 24-percent increase in total vegetable prices between the 2012 and 2017 censuses. Vegetables with the largest decreases in acres harvested were sweet corn, tomatoes, peas, and green beans. All the commodities decreased by at least 10 percent: sweet corn decreased 722,369 acres harvested, tomatoes decreased 596,409, peas decreased 422,092, and green beans decreased 330,463. The decrease for peas is especially surprising, since the 2012 census reported a 200-percent increase in acres harvested for that commodity from 2007. Broccoli and turnips fell by 13.2 and 14.3 percent, respectively; though their decrease in acres harvested pales in comparison to that of the previous four commodities. Despite some vegetable acreage decreasing, acreage increased for the majority of commodities. Artichokes, brussel sprouts, okra, and pumpkins all rose by 100 percent or more from 2012 in recorded acres. Spinach and garlic reported the

greatest increases, at around 200 percent over the 5-year period. These trends are more evident after separating the fresh and processing markets.

Fresh Vegetable Acres Wane

Acreage harvested for the fresh market is dominated by six main commodities: potatoes, lettuce, tomatoes, onions, sweet corn, and sweet potatoes. Potatoes make up 29.8 percent of the fresh market, but acres harvested for potatoes only increased about 9,600, or 0.7 percent from the 2012 census (figure 1). Idaho produced around 55 percent of potatoes in 2017 and 2012, but the State's production has steadily decreased since 2007. In contrast, lettuce production has been on the rise, likely due to consumer interest in fresh commodities and healthier diets. No State has been affected more than California, whose farms account for 70 percent of U.S. lettuce production. California lettuce production has been growing since the 2007 census. California also leads in the production of sweet corn, followed by Florida and New York. Fresh sweet corn production in California has increased by 11.9 percent since 2012, from 83,122 to 93,005 acres harvested. Despite increasing production in California, national sweet corn production has fallen in every census since 2007. Field-grown tomatoes are another commodity on a downward trend. The 2012 census showed that acreage of fresh field-grown tomatoes decreased by 2.2 percent from 2007 to 2012, then by 27 percent from 2012 to 2017. Greenhouse tomato production, however, has risen steadily since 2007, recording a 25.6-percent increase between 2007 and 2012 and a 15.7-percent increase between 2012 and 2017.

Figure 1
Selected fresh vegetable acres, 2007-17

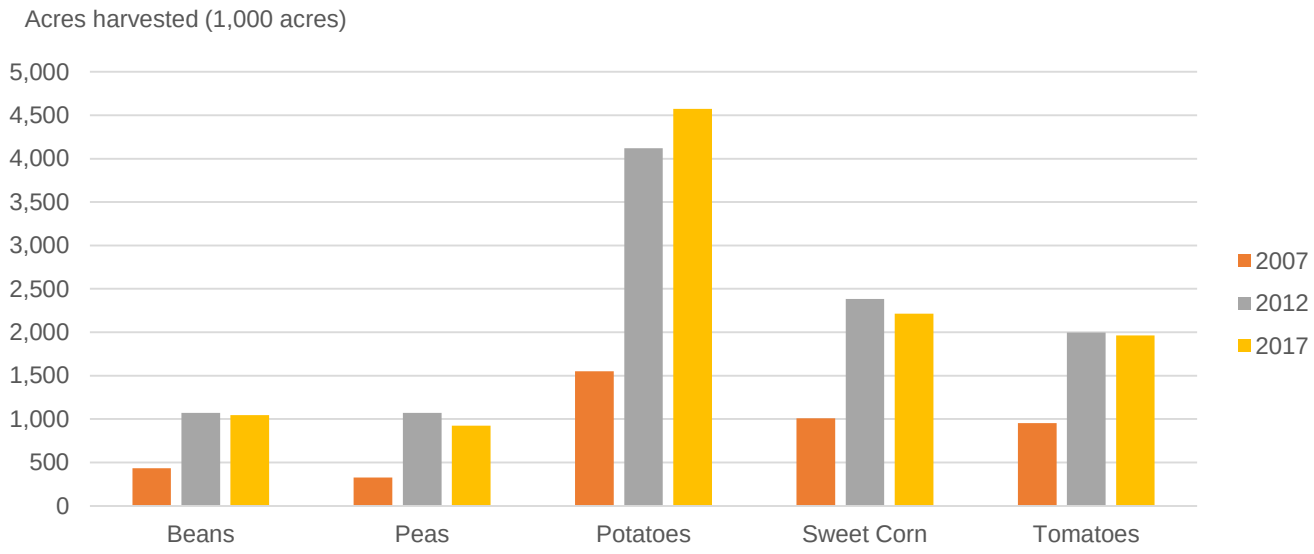


Source: Prepared by USDA, Economic Research Service, using data from the USDA, National Agriculture Statistics Service, 2017 Census of Agriculture.

Processed Vegetable Acres Trending Down

The processed vegetable market has also seen acreage declines according to the 2017 Agricultural Census. The census reported the largest losses in processing market acres for broccoli, peppers, and asparagus. Broccoli suffered the most, decreasing from 22,371 to 3,506 acres harvested, or 84.3 percent since 2012. Tomatoes and sweet corn acres harvested decreased by a lower percentage, 7.2 percent and 1.8 percent, respectively; together, these two commodities account for 37.7 percent of the processing market. California dominates the processed tomato market, responsible for 95 percent of the production, compared to only 35 percent of fresh field-grown tomato production. Cucumbers, onions, potatoes, and spinach were the only commodities whose production increased between the 2012 and 2017 censuses. Cucumbers increased the most at 20.0 after having decreased significantly between 2007 and 2012. However, cucumbers make up less than 2 percent of the processed vegetable market, and their increase amounts to an additional 26,000 acres harvested in 2017. As shown in figure 2, potatoes have the highest harvested acreage in the processing market, making the other commodities in the top five appear small by comparison. The top five consist of beans, peas, potatoes, sweet corn, and tomatoes; however, processing potatoes are the only commodity that increased in acreage when compared to the previous census. Potatoes increased by 11.0 percent, while peas lost the most acreage, decreasing by 13.8 percent.

Figure 2
Selected processed vegetable acres, 2007-17



Prepared by USDA, Economic Research Service, using data from the USDA, National Agriculture Statistics Service, 2017 Census of Agriculture.

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