United States Department of Agriculture

Economic Research Service | Situation and Outlook Report

VGS-368 | April 29, 2022

Next release is December 16, 2022

Vegetables and Pulses Outlook: April 2022

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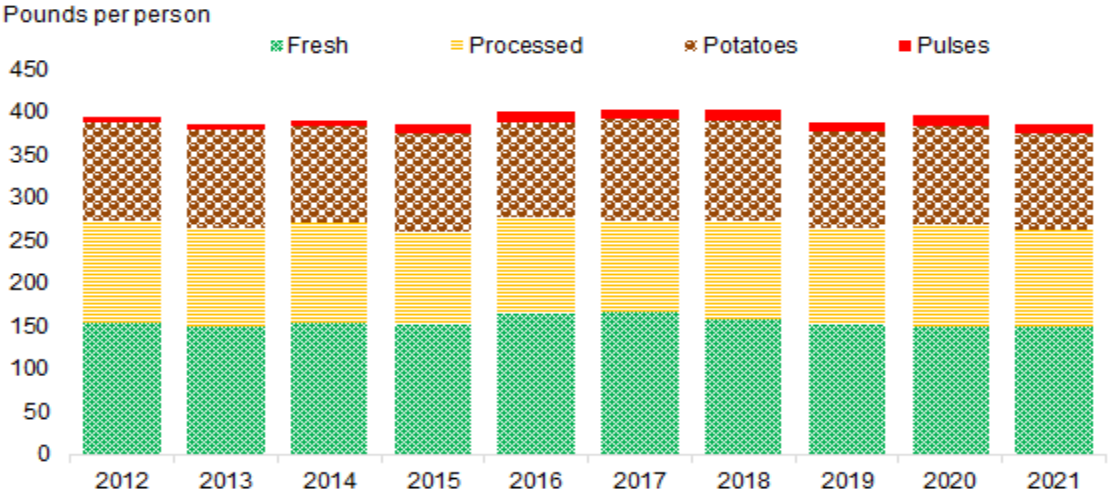
In this report:

Per Capita Availability Slips

In 2021, total U.S. per capita vegetable availability (a consumption proxy) declined 3 percent to 384 pounds. All major categories realized reductions in per capita availability. Availability of pulse crops dropped 24 percent as pinto and navy bean output slipped. Potato availability declined for both table stock and processing products by 3 percent. Fresh-market availability slipped by less than 1 percent while processing vegetable availability declined by 3 percent in 2021.

U.S. vegetables and pulses: Per capita use, 2012–21 [1,2]



[1]Calendar year annual domestic availability per person. [2]Fresh and processed includes mushrooms.
Source: Computed by USDA, Economic Research Service.

Industry Overview

Domestic Output Declines in 2021

Since peaking in 2017, aggregate volume of fresh-market vegetable supply has declined annually. Despite a 6 percent increase in import volume, preliminary data indicate that total national supply of fresh-market vegetables declined 1 percent in 2021. Domestic production (largely field-grown), which accounts for nearly two-thirds of fresh-market supply, declined 4 percent in 2021. The extreme heat negatively affected crop yields for potatoes, tomatoes, and pulse crops, whereas shortages of irrigation water (particularly in California) caused growers to reduce acreage for crops such as processing tomatoes.

Despite lower available supplies of fresh-market vegetables, the 2021 index of prices received by vegetable growers fell 6 percent to 118.1 from the previous year. Prices averaged lower for 11 of the 12 vegetables in the index. This was the largest year-to-year decline since 2012 and likely reflected pandemic-era uncertainty as the various fresh vegetable subsectors searched for equilibrium during the rocky recovery.

On the retail side, the Consumer Price Index for fresh-market vegetables averaged 4.4 percent above a year earlier during the first (winter) quarter of 2022. This was well below the 9 percent increase in the 2022 first quarter overall food-at-home price index experienced in comparison to the previous first quarter. In general, higher consumer prices reflect increased trucking (diesel fuel prices) and handling (wage rates) costs as well as rising farm prices for key crops such as potatoes, onions, lettuce, and broccoli.

The supply chain issues affecting parts of agriculture and the rest of the economy have not been as severe for fresh vegetables. Since vegetable imports and exports are heavily centered within North American markets, most fresh vegetables move overland via refrigerated trucks. Rising fuel prices, wage rates, pandemic mitigation costs, strong consumer demand, low retail inventories, and driver and truck shortages contributed to rising truck rates over the past 2 years. Recently, despite high fuel costs (which account for about 30 percent of truck carrier costs), truck rates have declined from the highs of 2021 as supply chain volatility and port congestion have begun to show improvement.

Table 1. U.S. vegetable and pulse industry at a glance, 2018-21[1]

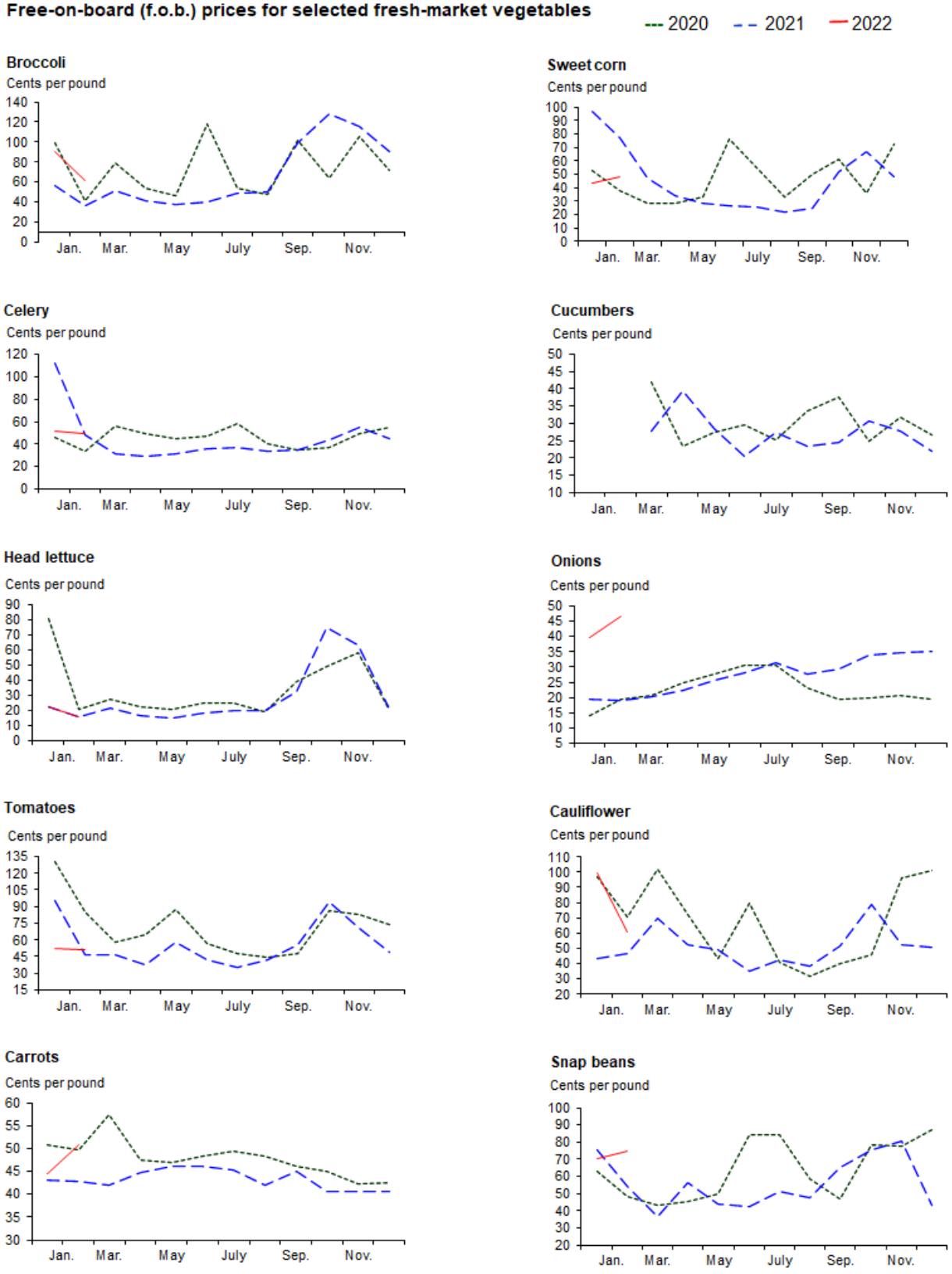
Item	Unit	2018	2019	2020	2021	Percent change 2020-21
Area harvested						
Vegetables, fresh and processed	1,000 acres	2,485	2,357	2,280	2,274	-0.3
Potatoes	1,000 acres	1,015	937	912	936	2.6
Dry beans, peas, and lentils[2]	1,000 acres	3,565	3,050	3,395	3,070	-9.6
Mushrooms[3]	1,000 acres	30	27	*31*	*30*	-3.1
Total	**1,000 acres**	**7,095**	**6,371**	**6,618**	**6,309**	**-4.7**
Production, utilized						
Vegetables fresh	Million cwt	341	313	304	290	-4.5
Vegetables processing[5]	Million cwt	387	352	354	339	-4.2
Potatoes	Million cwt	450	424	420	410	-2.5
Dry beans, peas, and lentils[2]	Million cwt	63	55	66	37	-43.1
Mushrooms[3]	Million cwt	9	8	8	8	-7.2
Total	**Million cwt**	**1,249**	**1,152**	**1,151**	**1,084**	**-5.9**
Crop value						
Vegetables fresh	$ millions	10,695	10,780	11,380	9,890	-13.1
Vegetables processing[5]	$ millions	2,175	1,938	1,857	1,974	6.3
Potatoes	$ millions	4,006	4,217	3,907	4,065	4.0
Dry beans, peas, and lentils[2]	$ millions	1,263	1,087	1,483	1,260	-15.0
Mushrooms[3]	$ millions	1,135	1,115	1,153	1,064	-7.8
Total	**$ millions**	**19,274**	**19,137**	**19,780**	**18,253**	**-7.7**
Unit value[4]						
Vegetables fresh	$/cwt	31.32	34.47	37.47	34.10	-9.0
Vegetables processing	$/cwt	5.63	5.51	5.25	5.83	10.9
Potatoes	$/cwt	8.90	9.94	9.30	9.92	6.7
Dry beans, peas, and lentils[2]	$/cwt	20.17	19.94	22.54	33.65	49.3
Mushrooms[3]	$/cwt	130.57	134.02	141.27	140.35	-0.7
Total	**$/cwt**	**15.43**	**16.61**	**17.18**	**16.85**	**-2.0**
Imports[6]						
Vegetables fresh	$ millions	7,943	8,511	9,526	10,009	5.1
Vegetables processing[5]	$ millions	3,193	3,141	3,535	3,825	8.2
Potatoes (including seed)	$ millions	1,545	1,562	1,768	2,067	16.9
Dry beans, peas, and lentils[2]	$ millions	275	236	315	355	12.7
Mushrooms[3]	$ millions	402	435	479	553	15.4
Total	**$ millions**	**13,358**	**13,885**	**15,624**	**16,810**	**7.6**
Exports[6]						
Vegetables fresh	$ millions	2,312	2,392	2,306	2,384	3.4
Vegetables processing[5]	$ millions	2,236	2,196	2,038	2,251	10.4
Potatoes (including seed)	$ millions	1,787	1,925	1,675	1,882	12.4
Dry beans, peas, and lentils[2]	$ millions	535	620	783	735	-6.1
Mushrooms[3]	$ millions	47	44	42	41	-3.2
Total	**$ millions**	**6,917**	**7,177**	**6,844**	**7,292**	**6.6**
Per-capita availability						
Vegetables fresh	Pounds	154.4	149.2	146.9	146.1	-0.6
Vegetables processing[5]	Pounds	113.8	111.9	116.8	112.9	-3.3
Potatoes	Pounds	117.6	112.6	115.0	111.9	-2.7
Dry beans, peas, and lentils[2]	Pounds	13.1	9.8	12.8	9.7	-24.2
Mushrooms[3]	Pounds	3.7	3.8	3.7	3.7	-0.8
Total	**Pounds**	**402.6**	**387.3**	***395.2***	***384.3***	**-2.8**

Note: Hundredweight (cwt) = 100 pounds. [1]Total values rounded. Area and production prior to 2019 includes several states no longer in the annual NASS estmates program. [2]Includes Austrian winter and wrinkle seed peas where applicable. [3]Mushroom area equal total fillings (multiple crops). [4]Ratio of total value to total production. [5]Includes canned, frozen, and dried. Excludes potatoes, pulses, and mushrooms. [6]All international trade data are expressed on a calendar year basis.

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

Figure 1

Free-on-board (f.o.b.) prices for selected fresh-market vegetables



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

Input Prices

Fertilizer and Energy Lead Input Price Surge

Prices for fertilizer, energy, and other energy-based inputs are up sharply in early 2022 due to a combination of post-pandemic demand surge, continued sluggishness in supply chains, transportation delays, import duties on fertilizer, low crude oil inventories, and the Russia-Ukraine conflict. With a lull in COVID-19 spread and active cases in the United States, strong consumer demand for both durable and nondurable goods in the face of continued struggles in the supply chain had already resulted in widespread price pressure across the global economy prior to the Russia-Ukraine conflict. Energy and energy-based manufactured inputs account for about one-fourth of the production expenses of specialized vegetable farms. With energy costs up substantially, the vegetable production sector paid at least 16 percent more for the inputs required to produce, pack, and ship vegetables in the first quarter of 2022 (table 2).

Table 2. Selected U.S. indices of prices paid by farmers, 2016–22

Input	Annual average						First quarter (Jan.–Mar.)		
	2016	2017	2018	2019	2020	2021	2021	2022f	Change [1]
	Index, 2011 = 100								*Percent*
Seeds and plants	121.4	119.9	118.5	116.0	113.4	113.1	113.0	118.0	4.4
Fertilizer, nitrogen	71.6	66.5	66.5	71.4	69.2	87.4	68.8	145.0	110.8
Fertilizer, potash/phosphate	70.5	64.4	62.9	63.0	62.5	82.7	64.4	110.0	70.8
Chemicals, insecticides	107.7	103.1	100.9	99.2	93.4	96.4	92.2	106.0	15.0
Chemicals, herbicides	109.7	106.4	101.7	101.8	99.4	99.9	95.7	110.0	14.9
Chemicals, fungicides/other	98.7	95.1	95.7	99.5	98.8	98.1	94.2	112.0	18.9
Fuels, diesel	51.8	57.6	67.4	71.5	56.4	55.0	49.9	100.0	100.4
Fuels, gasoline	59.0	64.5	70.9	75.1	60.6	64.0	56.0	110.0	96.4
Farm machinery	115.4	117.7	120.0	124.1	123.1	131.8	123.8	145.0	17.1
Farm supplies	106.3	107.6	111.6	115.5	117.4	127.5	120.4	135.0	12.1
Custom services	111.6	114.3	113.3	118.4	119.6	114.7	114.7	126.0	9.9
Buliding materials	107.6	110.4	116.1	118.1	120.8	140.5	129.0	157.0	21.7
Cash rent	130.4	130.4	126.0	123.0	124.5	124.5	124.5	126.0	1.2
Interest	103.9	108.3	114.7	115.1	110.9	111.4	111.4	115.0	3.2
Taxes	110.7	115.5	117.1	120.4	126.8	130.0	130.0	135.0	3.8
Wage rates	115.9	119.1	126.3	133.2	138.2	146.1	144.9	152.0	4.9
Crop sector [2]	106.6	108.0	110.2	111.7	111.3	116.0	112.1	127.0	13.3
Vegetable sector [3]	106.1	107.2	109.8	113.1	113.2	118.4	114.6	132.3	15.5

Note: f = forecast. 1/ First quarter (January–March) change from 2021–22. 2/ Input items common to crop production. 3/ Input items common to vegetable production weighted by 2006 vegetable farm expenses derived from the 2006 Agricultural Resource Management Survey.
Source: USDA, National Agricultural Statistics Service except first quarter 2022 projections by USDA, Economic Research Service.

Although there is considerable uncertainty regarding global fossil fuel supply and pricing trends in 2022, weighted average prices for energy-based inputs used in vegetable production have already risen substantially in 2022. Some input-specific detail follows:

- According to the U.S. Energy Information Administration (EIA) short-term forecast in early March, strengthened consumer activity coupled with low oil inventories (global oil inventories

have trended lower since mid-2020) was steadily pushing global oil markets higher into early 2022. The Russia-Ukraine conflict has added considerable uncertainty to the global energy outlook with international economic sanctions on Russia raising prospects for potential oil market disruptions.

- Uncertainty now reigns in the global oil market outlook. Even with an assumed reduction in Russian supplies, EIA's basic outlook suggests building crude inventories later this year leading to the possibility of lower average crude oil prices in 2023. Much depends on how much Russian oil enters the global market, how major oil producers respond to high oil prices, and how the global economy responds to the elevated energy market.
- According to EIA, retail diesel prices averaged $4.03 per gallon in February—the highest average nominal dollar price since March 2013 and continued rising into early April. Given the current situation, West Texas Intermediate (WTI) crude oil is forecast to average above $100/barrel in 2022—up from $68.21 in 2021 and $39.17 in 2020. Since diesel (and gasoline) prices are correlated with the price of crude oil, growers and truckers can expect 2022 retail diesel prices to continue well above the $3.29 per gallon average of 2021.
- According to The Food and Agriculture Organization of the United Nations (FAOStat), the United States applies about 11 percent of global fertilizer nutrients. The U.S. produces most of its nitrogen and phosphate requirements but relies on imports for most of its potash.
- The U.S. accounts for about one-fifth of all global potash import volume with most sourced from Canada—the global leader with one-third of export volume. However, Russia and Belarus accounted for 37 percent of global potash exports in 2019 and sanctions on their movement could impact the potash market going forward.
- Driven by strong post-pandemic demand, higher natural gas prices, and supply-chain bottlenecks, nitrogen fertilizer prices in 2022 are expected to reach or exceed twice the average of the previous five years (2017–21). The USDA, NASS phosphate and potash price index is expected to be up about two-thirds from the 2017–21 average on strong demand and rising transport and mining costs.
- Agricultural chemical prices are expected to rise in 2022 (led by fungicides) as high crop prices lead to higher chemical demand. Together with supply issues due to low product inventories, high transport costs and tight labor markets will result in the largest price increases (10 percent or more) in almost a decade. Agricultural chemical prices trended downward from 2014 to 2021 (falling about 10 percent) as the industry shed burdensome stocks during a sustained period of pre-COVID-19 market doldrums.
- Demand for building supplies remains strong across the economy, which contributed to a 16 percent price hike in 2021 and is well on its way to another double-digit gain in 2022. The

March Producer Price Index (PPI) for steel mill products declined for the third consecutive month but was still 43 percent above a year earlier while concrete products such as blocks and bricks rose 10 percent. Softwood lumber was up 23 percent from a year ago but is now 90 percent above the previous 5-year average.

- In the past, price increases for custom services have usually mirrored the general inflation rate but this year the cost of custom services may exceed that rate reflecting increased demand for these services due to increased crop acreage, rising labor costs, and price surges in machinery items, including spare parts.
- Labor availability and expense has been a critical issue for most commercial vegetable growers for decades. Wage rates rose nearly 6 percent in 2021 and are projected to rise again in 2022 as skilled farm labor remains at a premium and alternative opportunities outside of agriculture abound.
- Reflecting similar cost and supply-chain issues faced by automobile manufacturers, farm machinery prices are expected to rise 10 percent or more this year after rising 7 percent in 2021.

Fresh Market Vegetables

Supplies Down in 2021 on Lower Domestic Output

Production of the top 5 fresh vegetables, excluding potatoes, declined 4 percent (table 3). Production was lower for most of the principal fresh-market vegetables in 2021 as weather and limited irrigation water reduced per-acre yields. For example, lower production for spinach, broccoli, cauliflower, all lettuce, onions, and celery outweighed production gains for pumpkins, cucumbers, garlic, carrots, and tomatoes.

Table 3. Annual U.S. production of top 5 fresh-market vegetables, 2018–21

Commodity	2018	2019	2020	2021p	Change 2020-21
	Million pounds				*Percent*
Lettuce, all	8,052	8,188	8,438	7,486	-11.3
Lettuce, head	4,056	4,201	3,845	3,514	-8.6
Lettuce, leaf	1,073	1,247	1,564	1,248	-20.2
Lettuce, romaine	2,923	2,741	3,029	2,723	-10.1
Onions, bulb 1/	6,283	6,134	6,422	5,890	-8.3
Carrots	3,662	2,432	2,416	2,489	3.0
Pumpkins 1/	1,910	1,750	1,723	2,186	26.9
Tomatoes 2/	2,710	2,172	2,109	2,137	1.3
Top 5 fresh total	**22,617**	**20,676**	**21,108**	**20,188**	**-4.4**

1/ USDA, Economic Research Service (ERS) projection of fresh production. 2/ Includes USDA, ERS projection of fresh greenhouse production.

Source: USDA, Economic Research Service calculations using USDA, National Agricultural Statistics Service (NASS) annual estimates, USDA, NASS Census, and NASS, California County Agricultural Commissioners' data.

Despite a 6 percent increase in import volume, preliminary data indicate that total national supply of fresh-market vegetables declined 1 percent in 2021. Domestic production (largely field-grown), which accounts for nearly two-thirds of fresh-market supply, declined 4 percent in 2021 (table A1 in the fresh vegetable appendix). Since peaking in 2017, aggregate volume of fresh-market vegetable supply has declined annually. USDA, ERS estimates based on USDA, NASS data indicate U.S. producers harvested slightly more area for fresh market utilization in 2021. Area was up for onions, romaine lettuce, broccoli, cauliflower, carrots, pumpkins, and garlic but was lower for tomatoes, sweet potatoes, iceberg and leaf lettuce, celery, sweet corn, spinach, bell peppers, asparagus, and artichokes. Total field-grown production of all lettuce dropped 11 percent in 2021 to about 75 million hundredweight (cwt.) (table 3). Output was lower for all lettuce types including leaf (down 20 percent), romaine (down 10 percent), and iceberg (down 9 percent). The commercial field-grown lettuce market has been relatively weak since

last peaking in 2016 reflecting competition with other field-grown salad greens, loss of market share to protected-culture greens not currently enumerated, combined with several food safety outbreaks related to romaine and other leafy greens since late 2018.

Bulb onions: Bulb onion production destined primarily for fresh use declined 8 percent in 2021, with most of the reduction due to the impact on yield from unusually hot, dry weather in the Pacific Northwest. For example, after hitting a record high in 2020, bulb onion yields in Washington plummeted 30 percent—by far the sharpest year-to-year decline in bulb onion yield for the State on record.

Cauliflower: Fresh-market cauliflower production declined 12 percent in 2021 as bouts with cooler than usual weather in coastal California slowed growth and limited head sizing (table A1 in the fresh vegetable appendix). As a result, 2021 national cauliflower yield, which was a record high 223 cwt. per acre in 2019, dropped 14 percent from a year earlier to 182 cwt. per acre. Since the pandemic, cauliflower's upswing in production and consumer interest appears to have cooled.

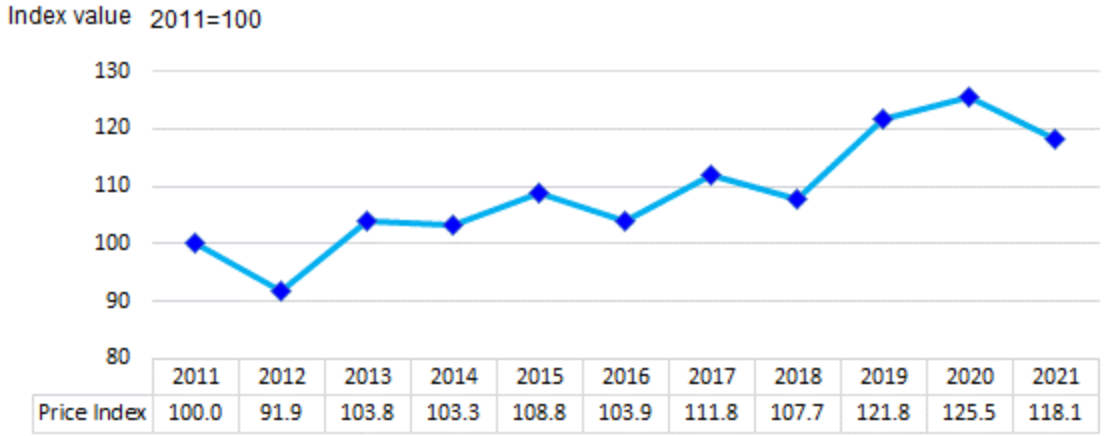
Winter 2022 Prices Rise After Decline in 2021

During the January–March winter quarter of 2022, the index of average nominal (unadjusted for inflation) prices received by vegetable growers (including potatoes) jumped 22 percent, led by onions and potatoes. Shipping-point prices were up for most vegetables in the index, except for tomatoes, sweet corn, and celery. During the first quarter of 2022, fresh bulb onion shipping-point prices were up 119 percent from a year earlier to $43.15 per cwt.—the highest nominal price during any quarter. Extreme heat in the Pacific Northwest reduced storage onion yields and sizing in 2021 and rising demand from a recovering foodservice industry resulted in higher pricing going into 2022. The start of Mexican imports, spring onions in Texas (delayed by cool weather), and the start of the Georgia onion season helped ease prices somewhat going into the spring quarter.

Despite lower available supplies of fresh-market vegetables, the 2021 index of prices received by vegetable growers fell 6 percent to 118.1 from the previous year (figure 2). Prices averaged lower for 11 of the 12 vegetables in the index. This was the largest year-to-year decline since 2012 and likely reflected pandemic-era uncertainty as the various fresh vegetable subsectors searched for equilibrium during the rocky recovery.

Figure 2

Annual vegetable price index, 2011–21



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Price Index	100.0	91.9	103.8	103.3	108.8	103.9	111.8	107.7	121.8	125.5	118.1

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

On the retail side, the Consumer Price Index for fresh-market vegetables averaged 4.4 percent above a year earlier during the first (winter) quarter of 2022 (table 4). This was well below the 9 percent increase in the overall food-at-home price index experienced this winter in comparison to the previous first quarter. In general, higher consumer prices reflect increased trucking (diesel fuel prices) and handling (wage rates) costs as well as rising farm prices for key crops such as potatoes, onions, lettuce, and broccoli.

Table 4. Fresh vegetables: U.S. consumer and producer price indices, 2020–22

	2020		2021		2022	Change 2021/22 1/
Price Indices - Items	1st Q	2nd Q	1st Q	2nd Q	1st Qp	1st Q
	Index					*Percent*
Consumer Price Indices (CPI, 1982–84 = 100)						
Food at home	244.2	253.3	252.8	255.6	274.8	8.7
Food away from home	289.7	291.9	300.6	303.6	320.7	6.7
Fresh vegetables	340.0	346.3	344.7	347.9	359.7	4.4
Lettuce, all	328.4	323.5	345.5	339.1	375.5	8.7
Potatoes	374.1	389.3	374.1	380.8	385.7	3.1
Prepared salads	131.6	129.8	132.4	139.9	140.5	6.1
Tomatoes	350.2	355.4	352.4	342.7	345.0	-2.1
Producer Price Indices for selected fresh-market vegetables (PPI, 1982 = 100)						
Fresh vegetables 2/	253.8	226.2	233.4	181.6	302.4	29.6
Cabbage	183.4	273.2	348.0	262.1	277.9	-20.1
Carrots	191.5	182.7	189.3	202.9	232.1	22.6
Lettuce	274.4	200.5	212.7	173.6	454.3	113.6
Onions, dry bulb	136.4	158.4	146.1	147.3	289.5	98.1
Potatoes	139.7	123.2	100.9	140.1	141.3	40.1
Sweet corn	192.5	187.1	135.9	194.7	194.7	43.2
Tomatoes	468.5	382.6	275.7	269.2	248.1	-10.0

Note: Q = calendar quarter. p = preliminary.

1/ Percent change in actual first quarter and forecasted second quarter 2022 from the previous year. 2/ Excluding potatoes.

Source: USDA, Economic Research Service calculations using U.S. Department of Labor, Bureau of Labor Statistics data.

In 2021, consumer prices for fresh-market vegetables (not seasonally adjusted) increased 5.3 percent from a year earlier. On average, the farm price accounts for about 25 percent of the retail price for all fresh vegetables. Within the remaining marketing costs that make up the retail price, the cost of transporting fresh farm products from the farm to the point of consumer purchase has been the most conspicuous.

Most fresh vegetables move overland via refrigerated trucks. According to USDA, Agricultural Marketing Service (USDA, AMS) data, the cost to transport a load of lettuce, for example, from Salinas to New York averaged $11,450 in mid-July of 2021. Assuming each (non-tandem) 48–foot trailer holds 900 24–count (50 pound) boxes of head lettuce, the ride from the farm to the store alone accounted for roughly 53 cents of the advertised retail price of $1.12 per head in mid-July of 2021. Rising fuel prices, wage rates, pandemic mitigation costs, strong consumer demand, low retail inventories, and driver and truck shortages contributed to rising truck rates over the past 2 years. Recently, despite high fuel costs (which account for about 30 percent of truck carrier costs), truck rates have declined from the highs of 2021 as supply chain volatility and port congestion have begun to show improvement. In mid-April of 2022, the average USDA, AMS truck rate for a load of lettuce from California to New York was down 24 percent to $8,700 (about 40 cents per head).

Given reduced production and lower prices, the preliminary estimate of the value of utilized production of 23 U.S. fresh-market vegetables (excluding potatoes and mushrooms) declined 13 percent in 2021 to $9.9 billion. The top 3 fresh vegetables accounted for 29 percent of fresh vegetable crop value in 2021 and included romaine lettuce (down 28 percent), head lettuce (down 21 percent), and onions (up 10 percent).

Fresh Vegetable Trade Volume Up in 2021

In calendar year 2021, the United States remained a net importer of fresh-market vegetables (excluding potatoes) in both volume and value terms.

- Value of imports rose 5 percent to $10.4 billion while the value of exports increased 3 percent to $2.4 billion. Over the past decade (2012–21), import value grew 81 percent while the value of fresh exports rose 24 percent.
- Mexico and Canada remained the top two foreign suppliers of fresh-market vegetables to the U.S. market in 2021 as Mexico accounted for 79 percent of fresh vegetable import volume, while Canada garnered 11 percent. Rounding out the top 5 import sources in 2021

were Peru (3 percent of total), Guatemala (1 percent, consisting mostly of tropical vegetables), and China (1 percent).

- Over the past decade, about two-thirds of fresh volume from China consisted of fresh garlic. However, in 2021 garlic's share of China's fresh sales dropped to 50 percent due to a surge in fresh/dried sweet potato shipments. Sweet potatoes usually account for a small share of China's volume annually but surged to one-third of the fresh vegetable volume shipped to the United States in 2021.
- Volume of fresh vegetable imports increased 8 percent in 2021 reflecting greater volume for crops such as greenhouse tomatoes (up 9 percent), onions (up 19 percent), sweet corn (up 21 percent), and leaf/romaine lettuce (up 19 percent). Import volume of greenhouse tomatoes accounted for 58 percent of all fresh tomato imports in 2021—up from 49 percent a decade earlier (table A2 in the fresh vegetable appendix).
- Volume of imported fresh tomatoes identified as greenhouse-grown was up 50 percent between 2012 and 2021. Over the same period, field-grown fresh tomato imports were up just 4 percent. Most field-grown import growth came from grape tomatoes (up 57 percent), cherry tomatoes (up 21 percent), and roma tomatoes (up 14 percent), with round/other tomatoes import volume declining 41 percent since 2012.

On the export side of fresh vegetable trade, steady average unit values in 2021 combined with a 3 percent increase in volume to leave the value of fresh-market vegetable exports up 3 percent from a year earlier at $2.4 billion.

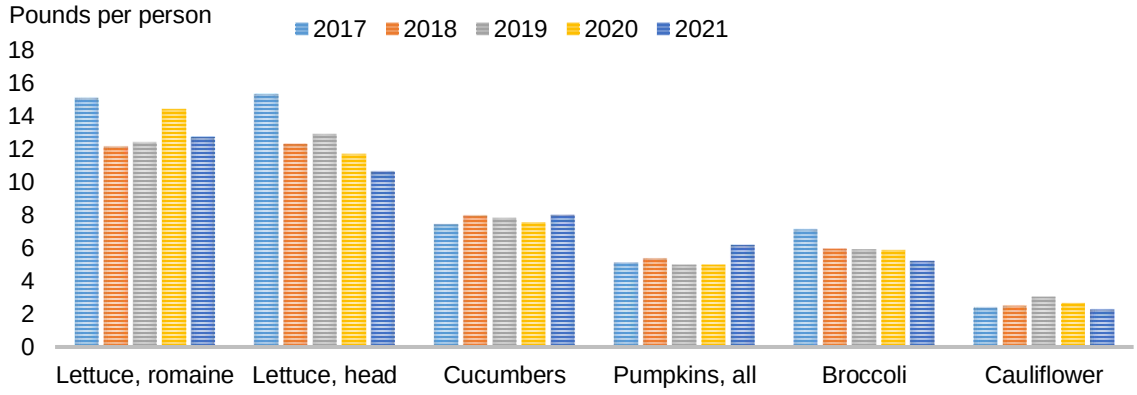
- Canada easily remained the leading foreign destination for U.S. fresh-market vegetable exports, taking 78 percent of total value, followed distantly by Mexico (7 percent), the Netherlands (3 percent), the United Kingdom (3 percent), and Japan (2 percent). Export volume transported to Canada were up 7 percent and the Netherlands up 12 percent but declined for Mexico (down 16 percent) and the United Kingdom (down 8 percent) in 2021.
- At $530 million, all lettuce was the leading fresh vegetable export by value in 2021, accounting for 22 percent of total value with leaf/romaine representing the major share of volume. In terms of ordinal export importance, lettuce was followed by onions, cauliflower, spinach, and tomatoes.

Per Capita Availability Declines in 2021

Preliminary data indicate that per capita availability (a consumption proxy) of fresh market vegetables (excluding potatoes and mushrooms) slipped 1 percent to 146.1 pounds during 2021

(table A3 in the fresh vegetable appendix and figure 3). Most of the reduction came from leafy vegetables and brassicas.

Figure 3
Fresh market vegetables: Per capita availability, 2017-21 1/



1/ Calendar year annual domestic availability per person.
Source: Computed by USDA, Economic Research Service.

- Among the major brassicas, per capita availability was lower in 2021 for cauliflower (down 14 percent), broccoli (11 percent), and cabbage (3 percent). Fresh-market cauliflower use has declined each year since peaking in 2019 at 3 pounds per person, while per capita availability of fresh broccoli declined for the fifth consecutive year to the lowest since 1998.
- Per capita use of lettuce (defined as field-grown leaf, romaine, and iceberg) dropped 10 percent to 23.4 pounds in 2021. As consumers turned to romaine, leaf, and other leafy greens with greater nutritional value, per capita availability of iceberg (head) trended lower over the past 3 decades, dropping 9 percent to a record low 10.7 pounds in 2021.
- Despite heat-reduced yields pulling domestic fresh-market production down to the lowest since 1996, greater imports and reduced exports were about offsetting, leaving per capita fresh bulb onion availability up slightly from a year earlier to 20.5 pounds. Given strong steady demand for onions, the resulting record-high prices for the 2021/22 crop are expected to spur a modest recovery in production and increased availability in 2022/23.
- In 2021, per capita availability increased from a year earlier for several crops including pumpkins (up 24 percent), garlic (11 percent), cucumbers (6 percent), carrots (4 percent), tomatoes (3 percent), and sweet peppers (5 percent).
- Given strong employment and disposable incomes, fresh-market asparagus continues to trend higher from its 1979 low, reaching a high of 2.0 pounds in 2021. With domestic production about equal to export volume, nearly all the fresh asparagus consumed in the United States is now imported—primarily from Mexico and Peru.

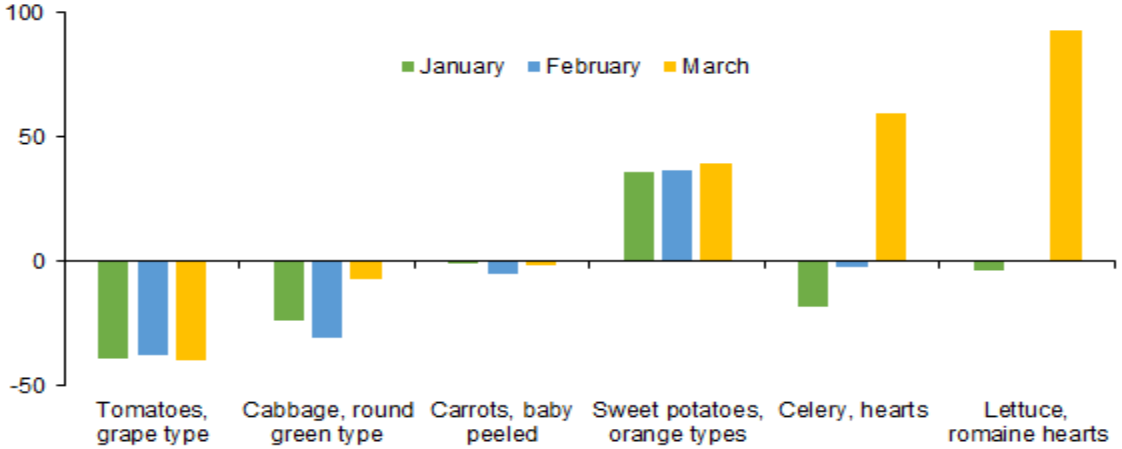
- Per capita availability of sweet corn which peaked in 2010 at 9.3 pounds, rose 4 percent in 2021. Although consumption trended lower recently, the indicated level is now roughly one-fourth below the actual market trend level because of the elimination of 8 reporting States from the USDA, NASS annual estimates program in 2019. The combined production of these States accounted for the equivalent of about 1.8 pounds of per capita availability. See the special article below for more information.

Organic Vegetable Prices Up in 2022

Average shipping point prices reported by USDA, AMS for select organic vegetables in the first 3 months of 2022 are listed in table A4 in the fresh vegetable appendix. Below are highlights from the table:

- January and February 2022 saw a mix of higher and lower price changes for organic shipping point prices compared to the same months last year (figure 4).
- March 2022 shipping point prices jumped higher for most organic vegetables compared to 2021. Due in part to cold weather in the West, prices for organic romaine lettuce and organic celery jumped more than 50 percent. Organic sweet potatoes (orange, red, and white) price changes ranged from 39 to 47 percent compared to March 2021, reflecting tighter supplies from decreased production in California during the 2021 growing season.
- Organic cabbage (round green type), organic baby carrots, and organic grape tomatoes recorded lower shipping point prices in each month of the first quarter of 2022 compared to the same months in 2021.

Figure 4
Change in monthly shipping point prices for organic vegetables, 2021–22
Percent



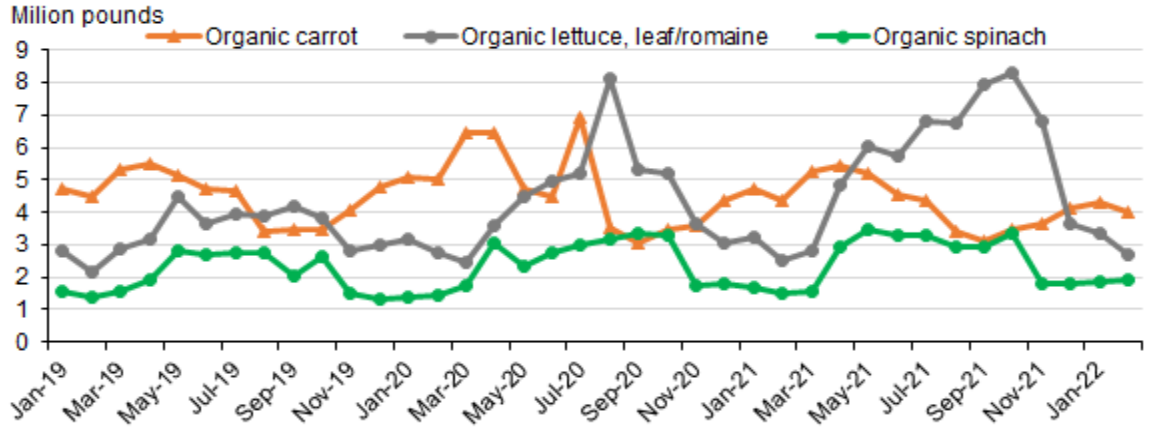
Source: USDA, Agricultural Marketing Service, *Market News* data.

Organic Imports and Exports Up in 2021

The U.S. Department of Commerce, Bureau of the Census reports organic and greenhouse trade for some fresh vegetable and pulses (table A5 in the fresh vegetable appendix).

- U.S. import volume continued to increase for all greenhouse vegetable trade codes in 2021 compared to the prior year. For 2021, year-over-year percentage changes ranged from 5 percent (greenhouse cucumbers) to 33 percent (greenhouse chile peppers).
- Imports of organic bell pepper and squash, primarily from Mexico, increased 20 percent and 2 percent, respectively, in 2021 from the previous year.
- Imports of organic dried yellow peas fell 97 percent in the first 2 months of 2022 compared to the previous year as import volume from Russia dropped. In 2021, Russia accounted for 85 percent of the 44.7 million pounds of organic dried yellow peas imported into the United States.
- In 2021, 11 of the 17 fresh organic vegetable export categories increased in volume compared to the previous year. The main export destination for organic vegetables included Canada, Mexico, Japan, and Taiwan. Exports of fresh organic vegetables increased for commodities like green peas (up 139 percent), potatoes (up 45 percent), and tomatoes (up 36 percent) while decreasing for commodities like head lettuce (down 48 percent), cherry tomatoes (down 16 percent), and carrots (down 10 percent).
- For 2021, the top 3 organic vegetables by U.S. export volume were lettuce (leaf/romaine) (65.5 million pounds), carrots (51.6 million pounds), and spinach (30.5 million pounds) (figure 5). While export volume for organic carrots and organic spinach remained steady, organic lettuce (leaf/romaine) increased by 61 percent from 2019 to 2021.

Figure 5
U.S. export volume for select organic vegetables, 2019–22



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

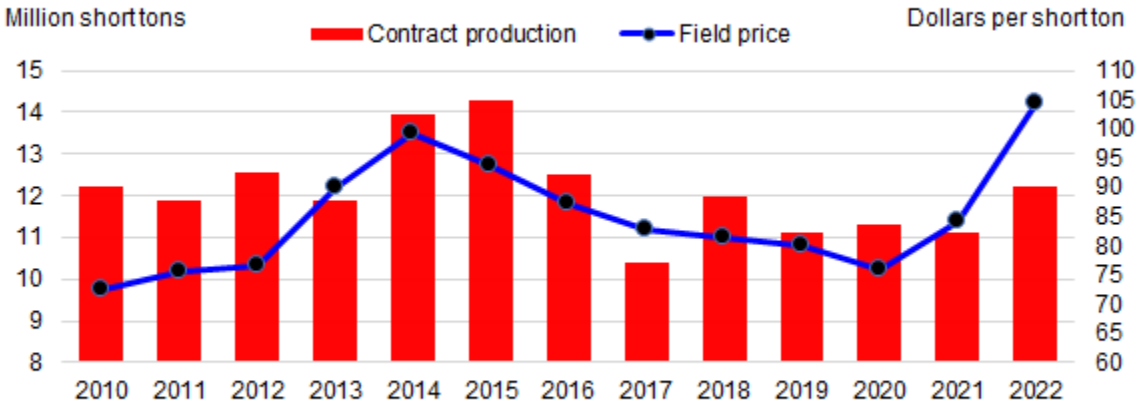
Processing Vegetables

Processing Tomato Output Expected To Rise

California tomato processors again intend to contract for 12.2 million tons of tomatoes for processing into canned, frozen, and dried tomato products—up 12 percent from the 10.8 million tons produced a year earlier. Although no longer estimated annually by USDA, NASS, production in other States (led by Indiana, Ohio, Michigan, Pennsylvania, and New Jersey) averages about 0.5 million tons combined each year. An update to the early January intentions report will be released by the USDA, NASS California office on May 31.

- A year ago, the early California intentions report indicated a total of 12.1 million tons of tomatoes were planned by processors, but periods of extreme heat, continued drought, and water restrictions reduced the final tally. It appears the industry faces similar challenges again this season in addition to soaring input costs and strong revenue-based competition for available acreage from alternative crops.
- Although 12.2 million tons would be above the average of the previous 5 years, it basically kicks a critical supply problem down the road until next year. Tomato paste carryover into the 2022/23 season will be at minimum levels. Given current domestic and export demand and the conservative size of the intended crop, industry stocks (especially for paste) may be very low by the end of the marketing year. Thus, if this year's crop falls below intentions, imports will continue to rise and/or exports will decline.

Figure 6
California processing tomato contract production and field price, 2010–22



Note: One short ton is equal to 2,000 pounds.
Source: USDA, Economic Research Service calculations using USDA, National Agricultural Statistics Service and California Tomato Growers data.

Early Agreement Again on Tomato Price

- For the second consecutive year, the California Tomato Growers Association (CTGA) and all processors agreed before the start of the planting season on a base contract price for raw tomatoes at the point of first delivery. The agreed upon conventionally grown price of $105 per ton is up 24 percent from 2021's $84.50 (figure 6). The base price for organic processing tomatoes was set at $165 per ton—up from $136 in 2021.
- In a more severe replay of last year, a combination of much higher prices for energy-based inputs, labor, and water, and sharply higher prices for the field crops competing with tomatoes for acreage (and water), and uncomfortably tight inventories of paste and other finished products likely contributed to early price agreement within the industry.
- As processed tomato product inventories continue to tighten seasonally, wholesale tomato paste prices have risen since the advent of the 2021/22 season. The average spot price for bulk 31-percent natural tomato soluble solids (NTSS) tomato paste, the key raw ingredient used in the manufacture of tomato products like sauces, soups, ketchup, and juice, was more than 50 percent above a year earlier during the first calendar quarter of 2022.
- According to industry data, the manufacturer price for bulk (55-gallon drum) tomato paste is approaching 80 cents per pound. Over the past 40 years, nominal dollar tomato paste prices ranged from 28 to 68 cents per pound. Rising paste prices reflect a tightening of the California processed tomato stock situation. According to the California League of Food Processors, the March 1 inventory of processed tomato products (converted to a fresh-equivalent basis) was about 5 percent below a year ago, with monthly disappearance running around 14 percent below a year earlier.

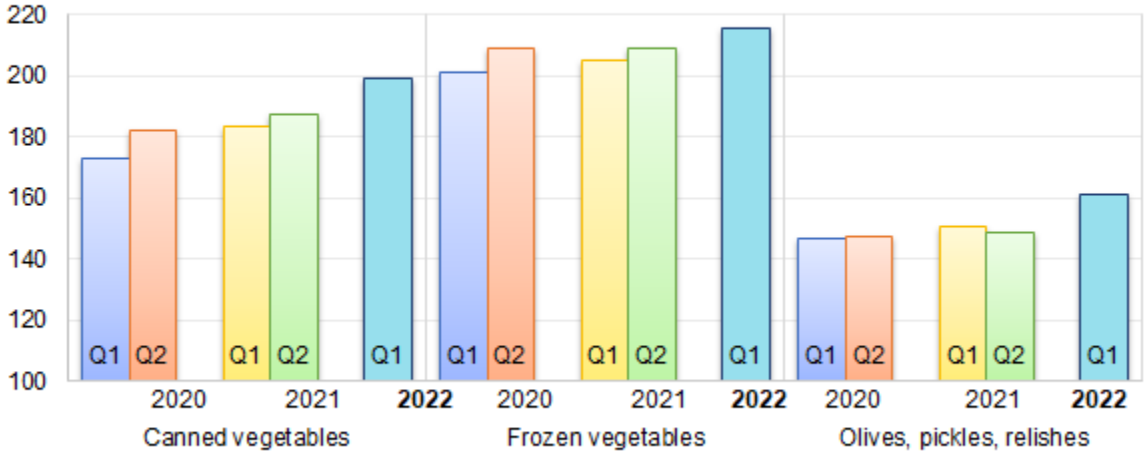
Processed Vegetable Prices Rising

As with most agricultural prices, wholesale and retail prices for processed vegetables are on the rise although increases over the past year have averaged below gains for most other agricultural products (e.g., meat, poultry, food grains). Wholesale prices for processed vegetables were up about 7 percent from a year earlier during the first quarter (see table B1 in the processed vegetables appendix). Much of this gain was driven by canned tomato products (up 8 percent), pickled vegetables (up 13 percent), and frozen vegetables other than potatoes (up 9 percent). Smaller gains were noted for frozen potatoes, canned beans, and dehydrated products. Most wholesale price gains for processed vegetables have been concentrated over the past 6–9 months and generally reflect the impact on 2021/22 processing costs and 2022/23

contract prices caused by soaring input costs and escalation in field crop prices (which compete with vegetables on a net revenue basis for limited farm acreage).

- The canned vegetable Producer Price Index (PPI), a measure of prices paid to domestic producers for their output, rose 7 percent from a year earlier during the first quarter of 2022. Much of the gain reflects higher prices for tomato products and pickled vegetables with moderate gains for other canned vegetables (table B1 in the processed vegetables appendix).
- First quarter wholesale prices were up 8 percent for catsup and tomato-based sauces reflecting tighter stocks, higher input costs over the past year, and continued drought in California.
- Thanks to relatively stable prices for potato products, wholesale prices for all frozen vegetables were up 4 percent from a year earlier during the first quarter. While potato products were little changed, the PPI for all other frozen vegetables was up 9 percent.
- On the retail side, first quarter 2022 price increases for processed vegetables have averaged below the gains experienced for all food. Prices for food-at-home (up 9 percent) rose faster than away-from-home prices (up 7 percent) during the first quarter.
- The Consumer Price Index (CPI) for processed vegetables (including fruit) was up 8 percent from a year earlier during the first quarter of 2022. Canned vegetables again led the way with a 9 percent rise, while frozen vegetables were up 5 percent during the January–March period from the same months a year earlier (figure 7).

Figure 7
Processed vegetables: U.S. Consumer Price Index (CPI), 2021–22 for Q1 and Q2



Note: Q1 = quarter 1 for months January–March, Q2 = quarter 2 for months April–June.
Source: USDA, Economic Research Service using data from U.S. Department of Labor, Bureau of Labor Statistics.

Processed Exports and Imports Up in 2021

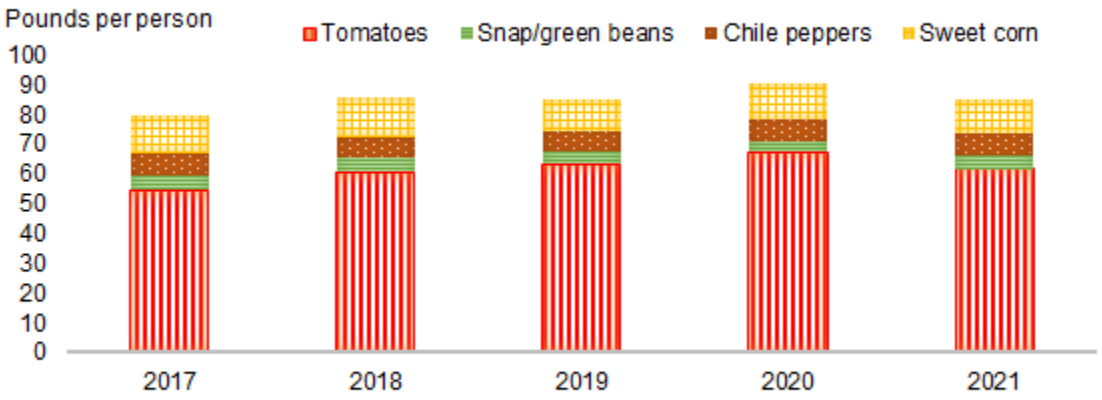
- Although improved from the pandemic-related conditions of 2020, international trade markets remain hindered by port congestion, internal shipping delays, container availability, and trade route delays stemming from the Russia-Ukraine conflict.
- In 2021, the value of processed vegetable (including potatoes and mushrooms) exports rose 11 percent to nearly $3.9 billion (see table B1 in the processed vegetables appendix). Canada (up 4 percent to $1.02 billion), Mexico (up 43 percent to $0.67 billion), and Japan (up 3 percent to $0.54 billion) remained the leading foreign buyers in 2021.
- As with 2020, processed vegetable import value was up 12 percent to $5.8 billion and is currently running 14 percent above a year ago in early 2022. Import volume was up nearly a tenth in 2021 while unit value (a price proxy) rose about 3 percent.
- The fresh-weight equivalent volume of processed tomato exports rose 2 percent to 5.8 billion pounds. Tomato export volume was driven by whole tomatoes, purees, and juice, while the key products (paste, sauces, and ketchup) were up less than 1 percent.
- The fresh-weight equivalent import volume increased 7 percent from last year's record high to 2.4 billion pounds. If processing tomato production fails to approach intended levels in 2022, import volume will likely set another record high.
- Exports of processed tomatoes accounted for nearly 15 percent of 2021 processed tomato supply while imports satisfied a record 12 percent of domestic availability.
- The fresh-weight equivalent volume of processed (canned and frozen) sweet corn exports rose 1 percent to 918 million pounds—the second lowest since 1989 and 13 percent of processed sweet corn supply. Frozen corn export volume (accounts for 80 percent of processed sweet corn exports) was up 6 percent, while canned sweet corn exports fell 7 percent.
- Despite adequate industry stocks, processed sweet corn import volume jumped 34 percent to 473 million pounds in 2021. This follows a 24 percent rise in 2020 with imports now fulfilling a record-high 13 percent of domestic processing sweet corn availability (more than twice the 2010–19 average).
- The fresh-weight volume of pickling cucumber imports fell 7 percent to 133 million pounds after jumping 46 percent a year earlier to a pandemic-influenced record high. Since the pandemic began, import volume has been elevated with most additional volume coming from top supplier India (and to a lesser extent Mexico and Canada). Imports now satisfy 12 percent of domestic availability, up from less than 10 percent over the past 2 decades.

- Pickling cucumber exports recovered from their pandemic lows, rising 37 percent to 109 million pounds. In terms of ordinal value, Canada, followed distantly by Brazil and Mexico, were the leading foreign markets in 2021.
- The fresh-weight volume of dehydrated (dried, powdered, flour) onion exports rose 2 percent to 541 million pounds, while import volume surged 78 percent higher from the 2020 low to 177 million pounds—the second highest on record. Exports accounted for 47 percent of 2021 supply while imports satisfied 30 percent of domestic availability.

Per Capita Availability Declines in 2021

Preliminary data indicate that per capita availability of all processing vegetables (excluding potatoes, sweet potatoes, and mushrooms) totaled 113 pounds in 2021, down 3 percent from a year earlier (table B2 in the processed vegetables appendix and figure 8). Reduced availability of tomatoes, sweet corn, and cabbage outweighed gains for snap beans, chile peppers, pickling cucumbers, and miscellaneous vegetables.

Figure 8
Processing vegetables: Per capita availability, 2017-21 1/



1/ Calendar year annual domestic availability per person.
Source: Computed by USDA, Economic Research Service.

The outlook for 2022 processed vegetable consumption will depend in-part on:

- adjustments in consumer behavior to an unfamiliar inflationary environment (e.g., rely more heavily on processed vegetables and at-home meal preparation);
- continued recovery of the foodservice industry (e.g., gains in away-from-home meals);
- regaining efficiencies within the supply chain (e.g., reduce port delays and improve product availability within the marketing chain); and

- domestic production issues (e.g., drought/water availability and revenue (and risk)-based competition with field crops for acreage.

In 2021, fewer pandemic-related restrictions helped the away-from-home dining sector recover a portion of sales lost since 2019. The National Restaurant Association (NRA) expects industry sales to continue recovering from pandemic-related losses in 2022, although real sales are still expected to remain 12 percent below 2019 levels.

Since canned and frozen vegetable consumption relies heavily on at-home meal preparation, in theory recovering away-from-home dining could create a drag on consumption of processing vegetables. Alternatively, if rising prices within the economy begin to pressure disposable income, consumers could pull back from away-from-home dining and higher-end retail products. USDA, ERS expects a small reduction in processing vegetable per capita availability in 2022.

A few of the key changes in 2021 per capita availability estimates include:

- **Tomatoes:** Annual per capita availability of processing tomatoes was estimated at 61.6 pounds in 2021, down 9 percent from the previous year (table B2 in the processed vegetables appendix). Despite record-high imports, a short crop and low carryover stocks pulled total domestic supply down to 40.8 billion pounds—the lowest of the past 15 years. In 2022, despite very low beginning stocks, continued strong imports, prospects for a slightly larger crop, and reduced exports should support a small gain in per capita domestic availability.
- **Sweet corn:** One of the smallest crops in 4 decades combined with reduced at-home meal preparation (due to pent-up demand for restaurants as pandemic restrictions eased) pulled annual per capita availability of canning and freezing sweet corn down 6 percent to 11.4 pounds in 2021.
- **Snap/green beans:** With record-high imports and a recovery of domestic production from 2020's 35-year low, per capita availability of processed snap beans (on a fresh basis) rose 15 percent to 4.4 pounds in 2021. Per capita availability, which last peaked in 1973 at 6.6 pounds, has been slowly declining due largely to a shift away from canned vegetables to fresh and frozen.
- **Chile peppers (all uses):** Powered by rising imports (table B3 in the processed vegetables appendix), per capita chile pepper availability totaled a record-high 7.9 pounds in 2021—up 14 percent from a year earlier. Lower cost imports of fresh (up 13 percent), dehydrated (up 16 percent), and canned (up 39 percent) pungent peppers and associated products continued to crowd out domestic production (down 12 percent) in 2021.

Potatoes

Decrease in U.S. Potato Acres Projected for 2022

Domestic potato production in 2021: U.S. potato production was down 2 percent in 2021 compared with the previous year. Despite an increase in national planted acres in 2021 (up 3 percent), production declined in 8 of the 13 USDA, NASS surveyed States.

- In the summer of 2021, the Pacific Northwest experienced drought and excessive heat that negatively impacted potato production; the region accounts for about 60 percent of total U.S. production.
- Lower yields led to production declines in Idaho (down 4 percent), Washington (down 6 percent), and Oregon (down 2 percent) compared to 2020. However, ideal growing conditions in areas of Maine, Michigan, Minnesota, and Canada helped offset some of the production loss in the Pacific Northwest.
- Due in part to decreased U.S. domestic production, preliminary data indicate that per capita availability of potatoes declined slightly in 2021 (down 3 percent).

Key takeaways for the 2021/22 Marketing Year (MY): USDA**,** ERS is forecasting 2022 potato planted acres to decrease about 1 percent (7,500 acres) in the 13 USDA, NASS surveyed States. However, a slight drop in acres would not guarantee a decrease in production if 2022 follows the 30-year national trend yield of 459 cwt. per acre. USDA, ERS forecasts 2022 planted acres in the Pacific Northwest to be similar to last year while other regions of the United States are expected to decrease acreage.

- Dry conditions remain a concern in areas of Idaho as growers make management decisions regarding irrigation water supplies.
- According to industry reports, the contract price for processing potatoes will increase 20 percent in the Pacific Northwest as processors look to secure future supply following last year's smaller crop. The April 2022 USDA, NASS *Potato Stocks* report indicated lower potato stocks in Idaho (4 percent), Oregon (6 percent), and Washington (12 percent) compared with the same month last year.
- While other regions of the United States may not see the same increase in contract price, all potato growers are facing higher costs of production in 2022. The Department of Labor, Bureau of Labor Statistics Producer Price Index for Quarter 1 of 2022 is up for table stock potatoes (41 percent), russet (54 percent), and red potatoes (27 percent) but

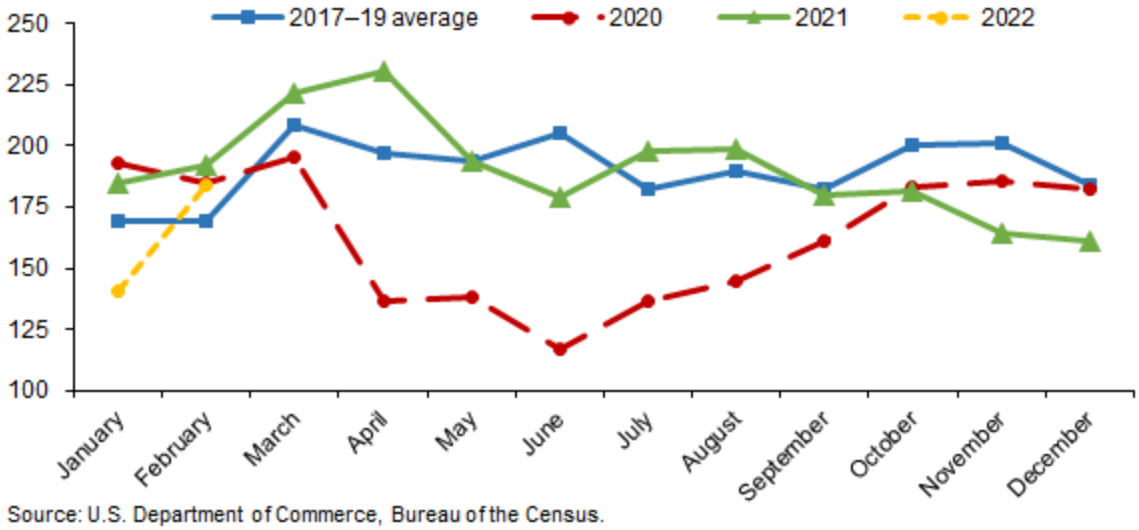
down slightly for round white potatoes (7 percent) compared to the same time last year (table C1 in the potato appendix).

- USDA, NASS reported monthly grower prices for fresh potatoes ranged from $13.10 to $14 per cwt. since the beginning of the 2021/22 MY. Fresh potato prices are expected to remain elevated for the remainder of the 2021/22 MY given tighter domestic supplies.
- USDA, AMS shipping point prices during the first quarter of 2022 varied by variety, with sharp increases for red round and yellow-type potatoes while the price for russets held steady.
- According to AMS *Market News*, organic potato domestic shipment volume was down 11 percent in the first quarter of 2022 compared to the same time last year. On average in the last two years, about 90 percent of organic potato domestic shipment volume originated from Colorado, Northern California, and the Columbia Basin.

Frozen Potato Exports Cool in 2021/22

The first 6 months of the potato marketing year (September–February) saw decreased export volumes for processed potato products including frozen (down 7 percent) and chips (down 10 percent), while fresh potato exports increased by 6 percent (table C2 in potato appendix).

Figure 9
U.S. frozen potato export volume, 2017–22



Source: U.S. Department of Commerce, Bureau of the Census.

- Between November 2021 and January 2022, frozen potato export volume fell 16 percent compared with the same period a year ago (figure 9). Part of the reason for the decline was due to port congestion, prioritization of returning empty containers to Asia, and tight

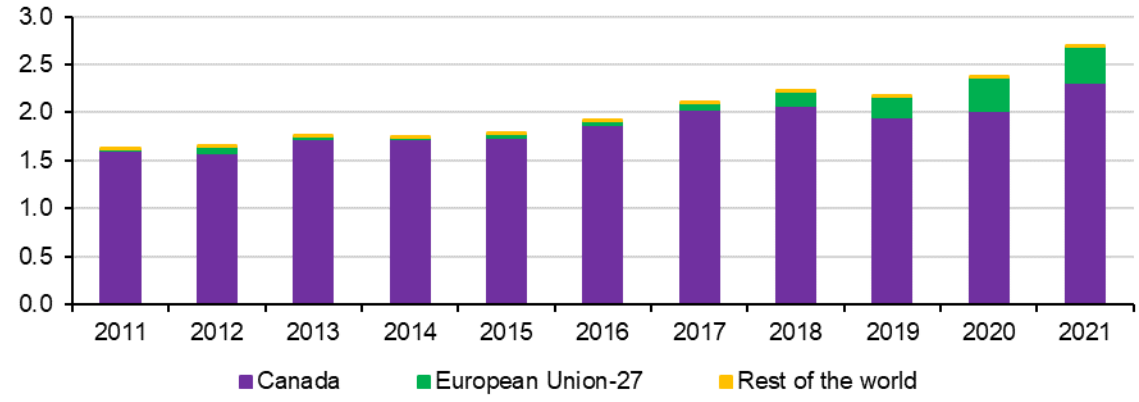
potato processing supplies in the Pacific Northwest. Volumes fell to key export destinations including Japan (down 13 percent), South Korea (down 23 percent), China (down 51 percent), Taiwan (down 35 percent), and Malaysia (down 32 percent).

- February 2022 export volume recovered to previous levels, but total frozen potato product volume for the first 6 months of 2021/22 remained 7 percent below the same period in 2020/21.
- U.S. exports of organic potatoes rose 137 percent during the first 6 months of 2021/22 compared to the previous marketing year. Most of the 8.1 million pounds of exported organic potatoes went to North American trading partners Canada (71 percent) and Mexico (28 percent).

U.S. imports of frozen potato products continued to trend higher, reaching a record 2.7 billion pounds in 2021 (figure 10).

- Canada accounted for 86 percent of U.S. frozen potato import volume with the European Union making up the remaining 14 percent.
- U.S. frozen potato imports from the European Union rose sharply in the past five years with import volumes increasing 431 percent between 2017 to 2021.

Figure 10
U.S. frozen potato import volume, 2011–21



Source: U.S. Department of Commerce, Bureau of the Census.

U.S. fresh potato trade resolution with Canada: On November 21, 2021, a USDA press release stated Canadian Food Inspection Agency (CFAI) suspended all potato certifications from Prince Edward Island (PEI). The move followed CFAI's confirmation of potato wart in October 2021. The suspension halted potato imports to the United States from PEI, the top potato producing Province in Canada. On April 5, 2022, the USDA, Animal Plant Health Inspection Service (APHIS) released an amended announcement stating imports of table stock

potatoes from PEI may resume to the contiguous United States. However, all seed potatoes imports from PEI are banned due to the risk of potato wart.

- On average, U.S. imports from Canada account for 10 percent of domestic supply for table stock potatoes.
- Due in part to record potato production in other Canadian Provinces, U.S. imports of fresh potatoes from Canada fell just 0.4 percent below the 3-year average in the first three months following the ban (December 2021–February 2022).
- The ban on seed potatoes from PEI will have a limited impact on U.S. potato growers because of the large amount of seed potatoes produced domestically. In 2021, Canada accounted for only 6.5 percent of seed potato shipment volume reported by AMS *Market News*. In the 2020/21 MY, the top 3 Canadian Provinces (Alberta, Manitoba, and New Brunswick) in seed potato exports accounted for 77 percent of Canadian export volume with PEI ranked fourth at 9 percent (Statistics Canada).

U.S. fresh potato exports to Mexico in 2021/22: U.S. potato producers anticipate expanded market access for U.S. fresh potatoes in Mexico following nearly 20 years of negotiations. On April 5, 2022, the USDA announced it expected to finalize expanded access for U.S. table stock and chipping potatoes to the entire Mexican market no later than May 15, 2022.

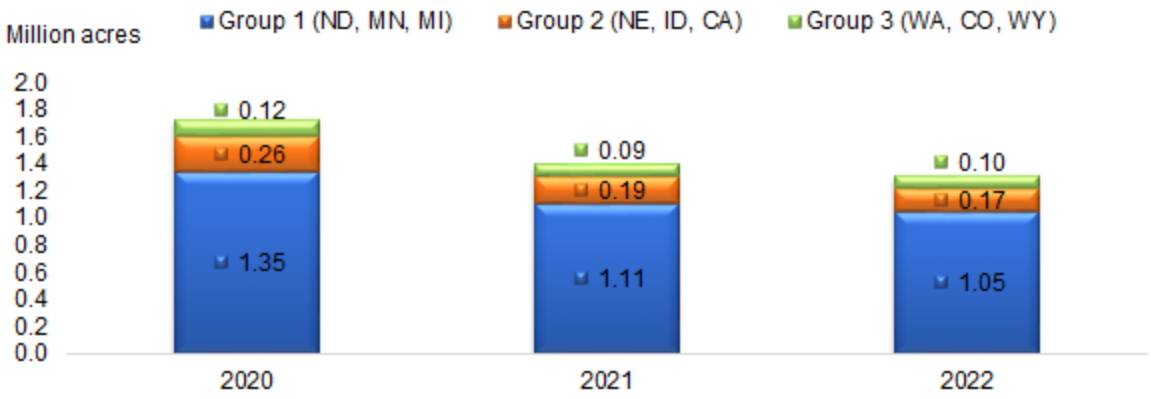
- On average, the U.S. exports about one-tenth of its annual potato crop earmarked for fresh (table) utilization. Mexico ranks second behind Canada in U.S. fresh potato export volume, despite being limited to fresh potato sales within a 26 kilometer-area of the U.S.-Mexico border.
- Mexico accounted for 21 percent of U.S. fresh potato export volume in 2021 (274 million pounds), up 69 percent from a decade ago.
- In 2021, U.S. export value for potato products to Mexico reached $397 million with the 2 largest categories being frozen products (67 percent) and fresh potatoes (15 percent). According to industry estimates, increased access could lead to a rise in U.S. fresh potato exports to Mexico over the next 5 years.

Dry Edible Beans

Prospective Area Declines Continue into 2022

Spring weather is an important factor and continues to pose threats again this year with dry conditions across several key dry bean growing regions (figure 11). April 2022 marks the seventh month of the 2021/22 dry bean marketing year which began in September 2021 and ends in August 2022. Generally, most planting decisions have already been made but a variety of factors can influence the final crop mix well into the spring.

Figure 11
U.S. dry bean planted acres declining by State group, 2020–22



Source: USDA, Economic Research Service calculations using USDA, National Agricultural Statistics Service, *Prospective Plantings*.

Recent reports and statistics from USDA, NASS provide the basis for outlook acreage analysis. A few acreage takeaways of note are provided:

- In addition to dry spring weather, key economic factors affecting reduced dry bean area are surging input costs (especially for fuel and fertilizer) and elevated prices for competing crops such as corn, wheat, and soybeans. Forecasting crop expectations is especially challenging with the Russia-Ukraine conflict contributing considerable uncertainty and more volatility in 2022.
- USDA, NASS prospective planted area for dry edible beans (excluding chickpeas) is expected to decline 6 percent to 1.31 million acres in 2022 following a 19 percent drop in planted acreage the previous year.
- The top 3 States in 2022 are North Dakota, Minnesota, and Michigan representing 80 percent of U.S. prospective planted acres. Six of the nine reported States in 2022 are expected to register declining acreage from the previous year except for Washington (up 13 percent), Wyoming (up 12 percent), and Colorado (no change).

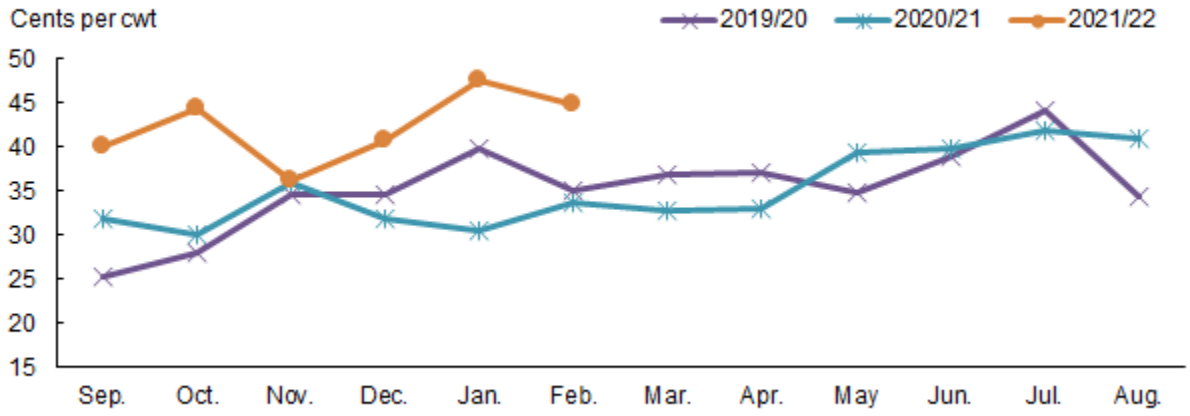
- Reductions range from 2 percent in North Dakota to 19 percent in Idaho. North Dakota, Minnesota, and Michigan are all expected to reduce acreage by 2, 17, and 5 percent from the previous year, respectively.

Dry Bean Prices Up, Stocks, Production, and Value Down

Recent reports and statistics provided by USDA, NASS, and the Upper Great Plains Transportation Institute (UGPTI) at North Dakota State University provide the basis for price, stock, production, and value analysis. Takeaways of note are provided:

- USDA, NASS preliminary 2021 estimates for the U.S. aggregate grower price for all dry beans, excluding chickpeas in 2021, increased 26 percent over the previous year at $39.20 per cwt. This price increase is influenced by low supplies with combined lower production (down 30 percent) and imports (down 8 percent). Despite higher prices, the low production levels dropped the 2021 value of production by 15 percent to a reported $893 million from the previous crop year.
- The 2021/22 U.S. aggregate grower price for all dry beans is averaging 30 percent above the previous 2 years during the initial 6 months of the marketing year which runs September 2021 through February 2022 (figure 12). During this same period, corn, all wheat, and soybean prices were up 20, 45, and 20 percent respectively.

Figure 12
U.S. dry edible beans: Average monthly grower price



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

- The top three dry bean classes continue to be pinto, navy, and black representing over 60 percent of U.S. dry bean production. On December 31, 2021, UGPTI reported stocks for navy, pinto, and black beans all down by 12, 33, and 32 percent respectively. USDA,

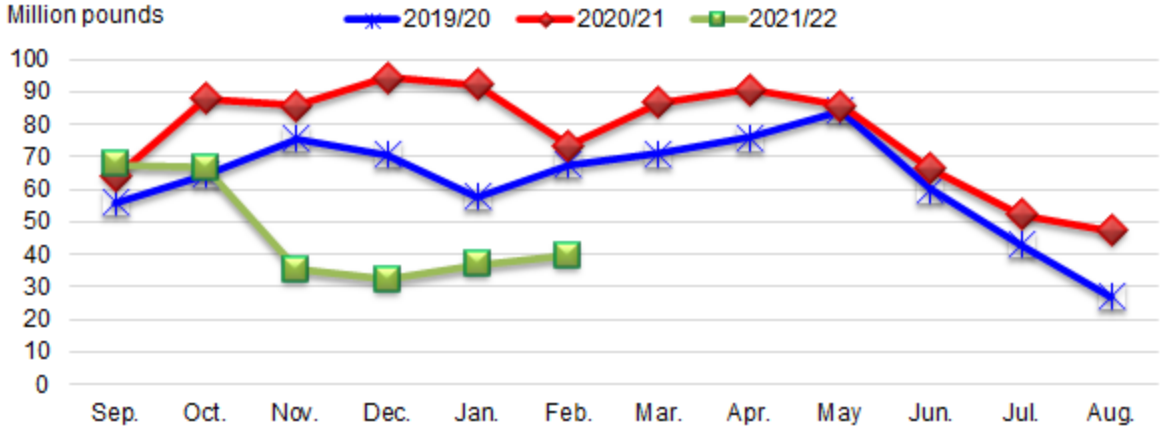
ERS uses USDA, NASS reported production by class and monthly marketing percentages to derive stock estimates that are not provided by UGPTI. Overall beginning dry bean stocks for all classes in 2022 are expected to be down from the previous year.

- Table D1 in the dry bean appendix is available for a comprehensive listing of USDA, NASS reported estimates of dry bean area, yield, production, price, and crop value for 2015–22.

Dry Bean Exports Drop 44 Percent, Imports Up 13 Percent

Dry bean trade data is available from the U.S. Department of Commerce, Bureau of the Census. USDA, ERS analyzes dry bean trade by both calendar year and crop years. Calendar year trade is analyzed through the supply and availability tables when per capita dry bean use/availability are calculated. Dry bean per capita availability is on a January–December basis to match estimates produced for most of the other crops grouped with vegetables. However, USDA, ERS also considers crop year trade to match import and export levels to domestic production trends. In this report, the focus is on domestic production trends utilizing crop year trade. Key takeaways for both exports and imports are provided below.

Figure 13
U.S. dry bean export volume by marketing year months (September–August)

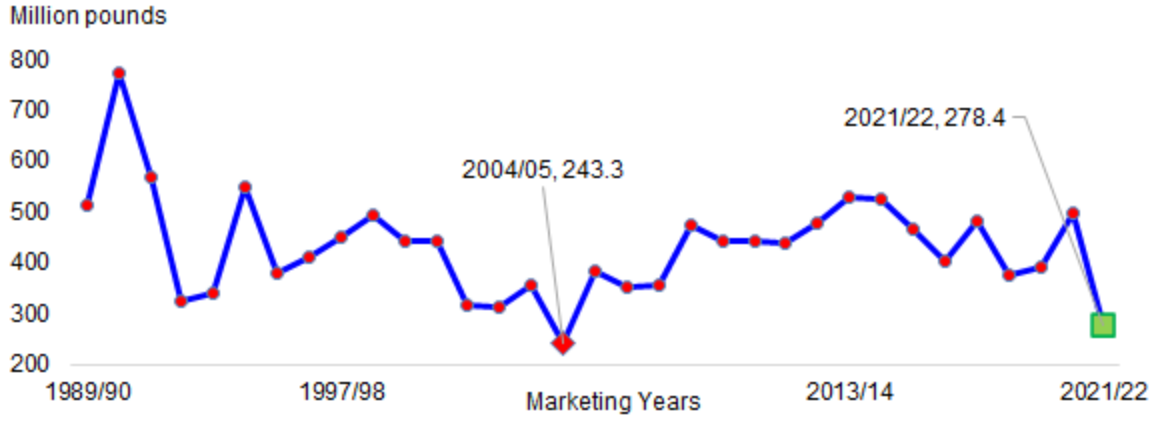


Source: USDA, Economic Research Service using data from the U.S. Department of Commerce, Bureau of the Census.

Dry Bean Exports

- Dry bean exports in the current 2021/22 marketing year from September–February are at a record low for the first 6 months of the bean marketing year. Exports are currently averaging 44 percent below the previous year at 278 million pounds from 498 million pounds during the same months a year earlier (figure 13).
- Historically, the 2021/22 volume is 36 percent below the 32-year average from 1989/90–2020/21. The 6-month export volume in 2004/05 was the only marketing year that was lower than the current 2021/22 over the past 32 years (see figure 14).

Figure 14
U.S. dry bean export volume by marketing year, September–February only



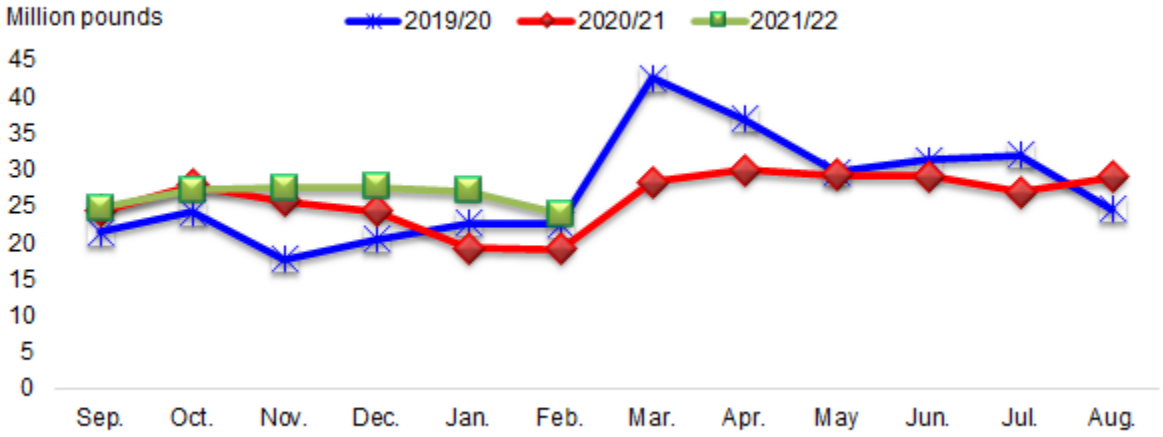
Source: USDA, Economic Research Service using data from the U.S. Department of Commerce, Bureau of the Census.

- The major classes declined—kidney beans (down 47 percent), black beans (down 44 percent), and pinto beans (down 82 percent) which respectively represent 33, 18, and 6 percent of the total 278.4 million pounds of dry beans exported in the first 6 months of the marketing year. Navy exports in 2021/22 increased slightly (1 percent) from the 6-month period of the previous year.
- Significant export declines to the top destination countries—Mexico (down 66 percent), the Dominican Republic (down 62 percent), the United Kingdom (down 67 percent), and Haiti (down 77 percent) are primarily contributing to the large decline despite the 8 percent increase to Canada, the U.S. top destination country. Generally, dry bean export trade during the marketing year trends up in the third quarter before tapering off at the end of the fourth quarter. Table D2 in the dry bean appendix is available to review crop year export volume by class and by origin country from the 2018/19–2021/22 marketing years.

Dry Bean Imports

- Dry bean imports in the current 2021/22 marketing year from September–February are currently averaging 13 percent above the previous year at 158 million pounds from 141 million pounds during the same months a year earlier (figure 15). The increase in imports was spurred by the 30 percent decline in 2021 domestic production and the 26 percent increase in season average grower prices.
- However, the completed 2020/21 dry bean marketing year imports averaged 4 percent below 2019/20 reflecting lower volume primarily in January–April 2021 and then slightly lower in June–July 2021. The top bean class imports, excluding the other bean category, are mung, kidneys, and blacks representing 25, 15, and 10 percent of the total 313 million pounds of beans imported in the 2020/21 marketing year.

Figure 15
U.S. dry bean import volume by marketing year month



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

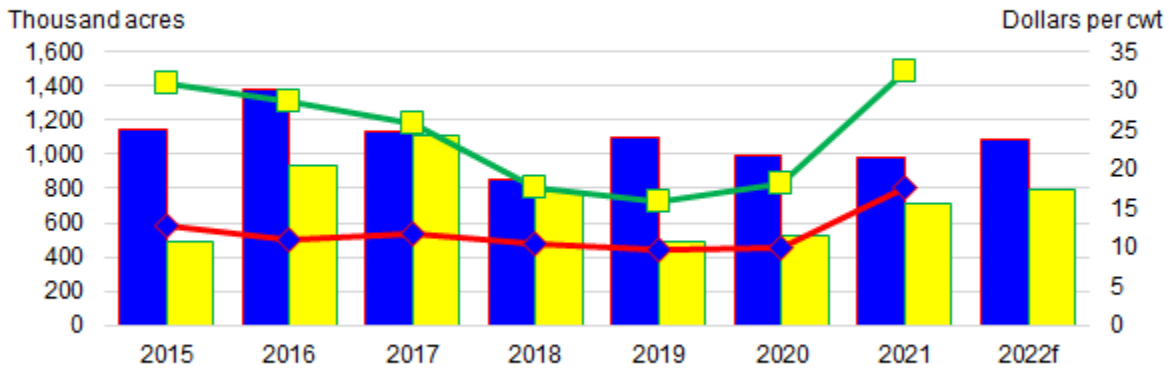
- Most imported mung beans originate from India (29 percent), China (27 percent), and Thailand (16 percent) of the total 79 million pounds of mung bean imports in 2020/21. Kidney bean imports totaled 47 million pounds in 2020/21 which includes dark red, light red, and kidney, other (table D3 in the dry bean appendix). Kidney beans primarily come into the United States from Nicaragua (36 percent), with Canada and Argentina each contributing 13 percent in the 2020/21 marketing year. Black bean imports totaled 33 million pounds and mainly originated from Canada (72 percent), with Mexico and Argentina each accounting for 8 percent. The largest class percentage declines in comparison to the previous 2019/20 marketing year were Great Northern beans (down 55 percent) and pigeon peas.

Dry Peas and Lentils

Planted Acres Expected To Rise After Price Spikes

The current dry pea and lentil marketing year runs from July 2021–June 2022 and is marked by lower supplies, stronger import demand, lower exports, and higher grower prices over the previous year. The USDA, NASS March *Prospective Plantings* reported dry pea and lentil growers are each expected to seed 11 percent more acres in 2022/23 than the previous year (figure 16).

Figure 16
U.S. dry pea and lentil planted acres and season-average prices, 2015–22 1/



Note: Cwt = hundredweight, a unit of measure equal to 100 pounds. Cp = chickpeas.
Source: USDA, National Agricultural Statistics Service.

A summary for both dry pea and lentil supply, price, crop value, and trade are noted using data from USDA, NASS and the U.S. Department of Commerce, Bureau of the Census:

- Dry pea supplies in 2021/22 are tight with production down 60 percent; imports (July 2021–February 2022) up 289 percent; and weak export demand (down 45 percent) from the previous year. USDA, NASS reported dry pea stocks down by about half on December 1, 2021, from the previous year. December dry pea stock levels have not been this low since 2012.
- Lentil supplies in 2021/22 are also lower than the previous year with production down 55 percent; December 1 stocks down by 40 percent; and imports (July 2021–February 2022) up 25 percent and exports down 57 percent.
- USDA, NASS preliminary 2021 season-average price estimates for dry pea and lentil have increased by 78 percent and 79 percent, respectively, from the previous year. The 2021 season-average prices for both dry peas and lentils are the second-highest

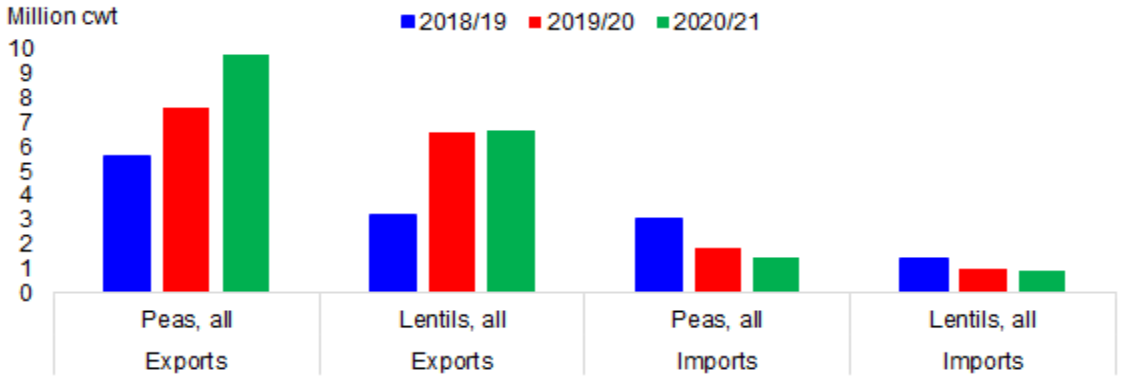
nominal dollar prices on record since 1965. The dry pea season-average price at $17.50 per cwt. is a close second to the record-breaking $17.80 per cwt. of 1972. Similarly, the preliminary 2021 lentil season-average price at $32.50 per cwt. is also second after the $33.80 per cwt. season-average price that broke records in 2008.

- NASS reported crop values in 2021 for dry peas ($152 million) and lentils ($111 million) are expected to decline by 28 and 18 percent respectively from the previous year as the price surges cannot outweigh the production decline affected by unusually dry weather conditions.
- Table E1 in the dry pea, lentil, and chickpea appendix is available for a comprehensive listing of USDA, NASS reported estimates of dry bean area, yield, production, price, and crop value for 2015–22. Likewise, table E2 in the dry pea, lentil, and chickpea appendix provides the same statistics for lentils.

Dry Pea and Lentil Exports Down, Imports Up in 2021/22

The United States exports to over 70 countries and has been a net exporter of dry peas and lentils for at least 33 years—since 1989. However, the 2021/22 marketing year is likely to be the smallest net export in several years with large declines in exports combined with increasing imports. For the past 5 marketing years, most lentil exports went to Canada. Other top export destinations for lentils varied each year but Spain, India, Mexico, and Sudan have alternated within the top 5 ranking over the past 5 years. The top dry pea export destinations also varied within the past 5 years with China, Canada, Yemen, and Ethiopia being the most frequent. Figure 17 illustrates contrasting trends in dry pea and lentil trade volume in the past 3 complete marketing years.

Figure 17
U.S. dry pea and lentil export and import volume by marketing year 1/



Note: Cwt = hundredweight which equals 100 pounds. 1/ Dry pea and lentil marketing year is July – June.
Source: U.S. Department of Commerce, Bureau of the Census data.

More detailed analysis of the trends for dry pea and lentil trade for the first 8 months (July 2021–February 2022) of the current marketing year using the latest available data from the U.S. Department of Commerce, Bureau of the Census are provided:

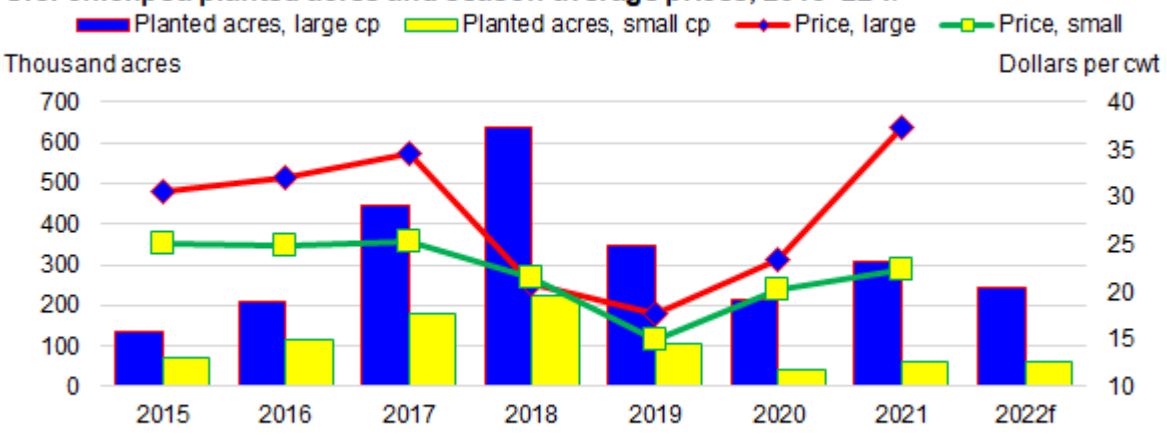
- Dry pea export volume from July 2021–February 2022 reveals a 45 percent decrease over the previous year with a 71 percent decline in pea exports to Canada overshadowing a 164 percent increase in Ethiopian pea exports over the same period the previous year.
- Dry pea import volume from July 2021–February 2022 increased by 289 percent to 3.2 million cwt. in comparison to the same period last year. The sharp increase in dry pea imports primarily reflect a 628 percent increase in pea volume over the previous year from Canada. Canadian dry pea imports represent 74 percent of dry pea imports and are mostly yellow dry peas.
- Lentil export volume from July 2021–February 2022 shows a 57 percent decline over the same period the previous year, attributed primarily to declining lentil exports to Canada (down 46 percent with 0.8 million cwt.), Spain (down 37 percent with 0.2 million cwt.), Mexico (down 43 percent with 0.2 million cwt.), and Columbia (down 22 percent with 0.2 million cwt.).
- Lentil import volume from July 2021–February 2022 increased by 25 percent over the same months the previous marketing year. This is mainly due to a 33 percent increase in lentils imported from Canada. Canadian lentil imports represent 86 percent of the 0.7 million cwt. lentil volume (see table E3 in the dry pea, lentil, and chickpea appendix). Table E3 also provides trade volume by class from 2018–21 for the July–June marketing year.

Chickpeas

Expect the Unexpected: Prospective Acres Decline in 2022

The current chickpea marketing year runs from September 2021–August 2022 and is defined with declining domestic supply due to dry growing regions that reduced yield and production. The reduced chickpea supply supports increased imports, declining export demand, and higher grower prices over the previous year. Despite already reduced chickpea supplies in 2021/22, the USDA, NASS March *Prospective Plantings* surprisingly reported chickpea growers expect to seed 18 percent less in 2022/23 with reduced large chickpea plantings of 22 percent expected to outweigh a 5 percent increase in small chickpea plantings from next year (figure 18).

Figure 18
U.S. chickpea planted acres and season-average prices, 2015–22 1/



Note: Cwt = hundredweight, a unit of measure equal to 100 pounds. Cp = chickpeas.
Source: USDA, National Agricultural Statistics Service.

A summary for chickpea supply, price, crop value, and trade are noted using data from USDA, NASS and the U.S. Department of Commerce, Bureau of the Census:

- The 2020 and 2021 all chickpea production was down by 35 and 30 percent respectively, underlying the tight supply situation for the 2021/22 marketing year currently underway and pushing prices higher than the previous year. Despite this year's 45 percent increase in planted acres from 2020, supplies were down due to dry conditions which resulted in yield being cut by half and production down by 30 percent from the previous year. The declining (down by 18 percent) prospective planted acreage estimate may tighten supplies again next year if the intended estimate is realized.
- Stock reports for chickpea all class are available for June 1 and December 1 only. The December 2021 chickpea all class stock level represents the end of the fourth month of

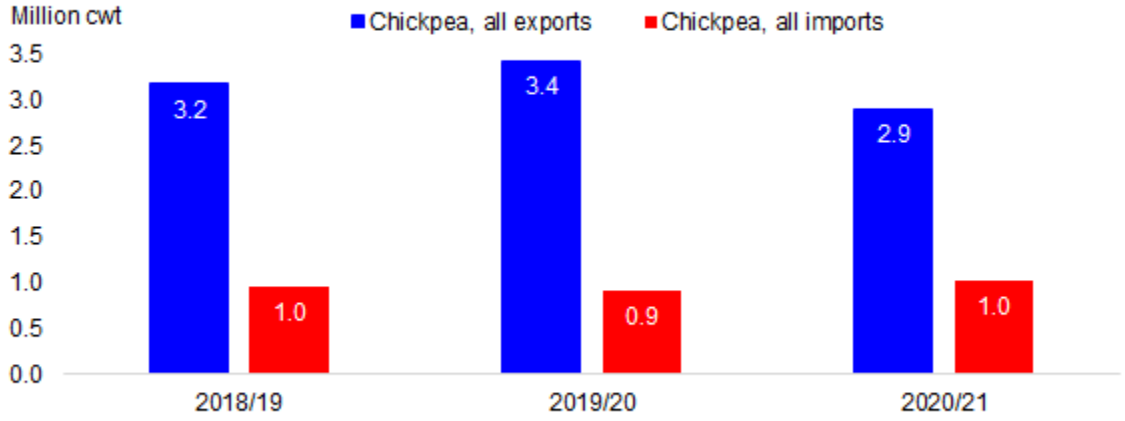
the current 2021/22 chickpea marketing year and was reported at 364 million pounds which is down 39 percent from the previous year.

- Large chickpea production in 2021 is down by 28 percent at 2.5 million cwt. and small chickpeas is down by 42 percent at 0.4 million cwt. Chickpea all class imports in 2021/22 (July–February) are at 470 thousand cwt. (up by 25 percent) for the same months the previous year while chickpea all class exports are at 515 thousand cwt.—down by 63 percent from the previous year.
- The USDA, NASS preliminary 2021 season-average price estimate for chickpea all class of $36.10 per cwt. (up by 63 percent from last year) is the second highest on record after the 2011 price of $37.30 per cwt. Crop value for all classes of chickpeas increased by 18 percent as soaring grower prices outweighed the 30 percent decline in production.
- Tables E4, E5, and E6 in the dry pea, lentil, and chickpea appendix are available for a comprehensive listing of USDA, NASS reported estimates of area, yield, production, price, and crop value for 2015–22 for chickpea, all, large, and small chickpeas.

Chickpea Imports Up and Exports Down in 2021/22

- The United States is also net chickpea exporter (see figure 19) and the top export destinations varied each year, but Canada, Spain, and Pakistan consistently held one of the top 5 rankings over the past 5 years with Italy and Turkey less consistent but still top export destinations.

Figure 19
U.S. chickpea export and import volume by marketing year 1/



Note: Cwt = hundredweight which equals 100 pounds. 1/ Chickpea marketing year is September – August.
Source: U.S. Department of Commerce, Bureau of the Census data.

- Chickpea exports from September 2021–February 2022 are down by 63 percent as exports to Canada, Spain, Italy, and Pakistan are down by 59, 24, 61, and 89 percent, respectively, from last year for the same months.
- Canada and Mexico are consistently the top import sources of chickpeas. U.S. chickpea imports from September 2021–February 2022 are 25 percent above the previous year with 62 percent of chickpeas categorized as garbanzo and the remainder categorized as kabuli.

Table E3 in the dry pea, lentil, and chickpea appendix provides trade volume by class from 2019–21 for the respective pulse marketing years.

Special Article

Fill the Gaps: Supplementing Annual Domestic Specialty Crop Production Estimates

Wilma V. Davis, Nicholas Gallagher, Catharine Weber, and Gary Lucier

Annual production statistics published by the USDA, National Agricultural Statistics Service (NASS) currently cover field-grown vegetable and fruit and tree nut production for major producing States such as California, Florida, Idaho, Arizona, and Washington. Over the past decade, the published data indicate increasing concentration of area and production among the top specialty crop producing States. At the same time, both rising imports and increased domestic production from protected culture or greenhouse continue to reduce the market share of domestic field-grown production.

Rising greenhouse production has been documented in both the Census of Horticulture and Census of Agriculture but is not included in annual USDA, NASS estimates programs. The lack of official published annual observations from this expanding production sector may be underestimating domestic availability for tomatoes, peppers, cucumbers and, to some extent, lettuce. In the case of the supply of fresh-market tomatoes, the production deficit became so noticeable by the mid-2000s, USDA, Economic Research Service (ERS) began supplementing USDA, NASS domestic field-grown production estimates with annual projections of domestic greenhouse tomato production.

Special Article Scope and Purpose

This article provides a description of proposed projection methods for specialty crop production to make stakeholders aware of the data challenges while encouraging stakeholder feedback. USDA, ERS believes feedback is essential to support the allocation of limited resources needed to continue this effort and/or collaboratively refine the proposed methods. As challenges concerning accurately representing specialty crop commodities continue to evolve, USDA, ERS may follow up with special article(s) in future editions of the Outlook report with specific

commodity examples prior to incorporating these projections in the annual USDA, ERS yearbooks. USDA, ERS encourages feedback from industry stakeholders.

Ultimately the results from this project will be used in USDA, ERS supply and availability projections (published annually in USDA, ERS specialty crop yearbooks) which will not only provide more depth for commodity market analytics, but these projections provide specialty crop stakeholders with useful information to evaluate and implement production, processing, marketing, and policy decisions.

USDA Data Availability, Frequency, and Constraints

It is important to have a general understanding of the USDA data currently available, various publication frequencies, as well as the constraints or regulations USDA must follow. All these factors influence the need for this endeavor and the methods USDA, ERS proposes to produce supplemental projections through this project.

USDA, NASS provides annual production estimates for the major vegetables, pulses, non-citrus, citrus, and tree nut crops for the major producing States based on surveys. USDA, NASS is committed to confidentiality and is restricted, by Federal regulation, from disclosing individual farm operation information. This restriction protects the confidentiality of individual operations. To achieve confidentiality, USDA, NASS may publish only aggregated information, and if necessary, will not report the information to protect individual operations by denoting a (D) in the publication instead of the actual estimated value. For example, if there is only one operation in a county or State, USDA, NASS may group the data with other counties or States and only report the aggregate information as “Other Counties/States.” USDA, NASS is required by Federal law to uphold this confidentiality restriction, and this encourages cooperation between agricultural sector participants and USDA, NASS.

USDA, NASS also conducts the Census of Agriculture through surveys every 5 years. This provides a cumulative and impartial snapshot of the U.S. agriculture industry. The census (since 1974) includes small operations that produce only $1,000 or more during the census year along with domestic protected culture or greenhouse statistics every 5 years. In contrast, USDA, NASS also provides several annual surveys and published estimates more frequently throughout the year, but these estimates are not as comprehensive as the 5-year census due to budgetary restrictions. Thus, the expanding protected culture industry is not well represented in traditional annual USDA data collection programs that have been reporting lower field-grown area and production trends, but the census bridges the gaps with cumulative data every 5

years. This 5-year cycle may not be suitable for stakeholders to make production, processing, marketing, and/or policy decisions during the interim periods, so the need for more complete annual estimates is apparent. Through this project, USDA, ERS seeks to help fill the gaps by supplementing USDA, NASS annual estimates with USDA, ERS production projections by primarily using census data as benchmarks.

Project Background

For decades, USDA, ERS specialty crop outlook analysts have projected various components of commodity supply and availability whenever traditional national data from USDA, NASS or other crop industry sources were temporarily (and sometimes permanently) unavailable. USDA, ERS typically made these projections based on available data from industry, State agricultural bulletins, and census-based interpolations. Although USDA, ERS would prefer official published annual data over alternative estimation techniques, the loss of critical data negatively impacting market analysis or important long-term time series such as per capita availability, sometimes requires USDA, ERS to “fill the gaps” where feasible.

For example, in 1981, severe budget cuts at USDA, NASS resulted in the loss of national production estimates for several specialty crops. This prevented separate fresh and processing supply and availability estimates for many commodities during the 1982–91 period. To maintain supply and availability data for fresh and processed vegetables, USDA, ERS began projecting production utilizing a combination of State-level data and interpolations based on census data until USDA, NASS was able to restore and expand commodity coverage in the early 1990s. USDA, NASS revived estimates in the early 2000s and even expanded coverage to additional vegetable commodities, however, the USDA, NASS expansion for some commodities (e.g., okra) lasted just 2 years (2000–01). USDA, ERS continued to maintain commodity supply and availability tables for commodities discontinued by USDA, NASS because several were in the process of new-found growth (e.g., kale, collards, brussels sprouts) or had not been covered by USDA annual estimates in many years (e.g., radishes, beets, artichokes). Until the USDA, NASS budget revival in the 1990s, USDA, ERS had begun projecting crops (based on State-level and/or census data) that were receiving consumer attention and experiencing growth (e.g., pumpkins, squash, chile peppers) but were either not added or discontinued from national annual production estimates.

The addition and discontinuation of both USDA, NASS and industry-supplied data influenced the level of granularity of USDA, ERS reports for some specialty crop commodities. An example

of this is the loss of industry-supplied canned stocks data in the early 1990s. USDA, ERS continued estimates for commodity stocks using “rules of thumb” percentages but discontinued this method after several years as it became too disconnected from the last known data points. Similarly, after USDA, NASS dropped canning and freezing breakouts for processing vegetable annual estimates for technical reasons after 2015, USDA, ERS continued to estimate these breakouts using historical relationships. After 2019, USDA, ERS discontinued these estimates and folded canning and freezing into “all processing” supply and availability for the affected crops (e.g., sweet corn and snap beans).

Broad and Bilateral Project Scope

This project has a broad scope that includes fresh and processing vegetables, fruits, and tree nut acreage, production, and yield projections from 2000–20. The project is also bilateral with two groups of commodities: specialty crops currently in USDA, NASS annual estimates programs and specialty crops not in the USDA, NASS annual estimates program.

Group 1 – Vegetable Crops Included in USDA, NASS Annual Estimates Program. The commodities included in the annual USDA, NASS vegetable estimates program are shown in table F1 in this article’s appendix. The table indicates for each commodity with a “P” the States for which these estimates are carried out and published. States with a “D” in the table were estimated by USDA, NASS but not disclosed due to confidentiality restrictions. The nondisclosed States are included in the USDA, NASS “Other States” category as well as the U.S. total, but the data are not reported by individual States. Lastly, States with a blank are excluded from USDA, NASS published annual estimates. The first grouping of this project will create estimates of annual production for the excluded States as a supplement to the USDA, NASS published data. The summation of production by commodity from these excluded States will be included in a USDA, ERS supply and availability table and listed as “USDA, ERS Other States Production” or a similar heading.

Group 2 – Vegetable Crops Not Included in USDA, NASS Annual Estimates Program. Specialty crops not in the USDA, NASS annual estimates program are the second group of commodities within this project’s scope and include protected culture or greenhouse-produced crops. Some of these crops were estimated by USDA, NASS in the past (e.g., beets, okra, collards, and berries including blackberries and loganberries) but are no longer included in the estimates program. For greenhouse/protected culture, the primary crops contained in the 2017 Census of Horticulture are tomatoes, peppers, cucumbers, lettuce, and all other food crops

(which includes fruit such as strawberries). Greenhouse or protected culture area for individual vegetables (tomatoes, cucumbers, lettuce, and mushrooms) have been available in census publications as far back as 1969 and prior to that census publications (as early as 1887 census survey which was published in 1890) collected greenhouse vegetables in aggregate with flowers, plants, and mushrooms.

The last census survey in 2017 (published in 2019) includes all field-grown fresh or processing crops produced either organically or conventionally. The census also includes an "All Other" category which contains many familiar vegetables (such as pimentos) that could be grouped under the crop categories already identified in the census but may have names that are not familiar, so were lumped into the miscellaneous category. Tropical commodities like yucca or yams are also included in this group. The vegetable commodities covered by the census are shown in table F2 in the appendix with crops highlighted in bold that are not currently in the USDA, NASS annual estimates program.

Markets are Diverse with Rising Local Output

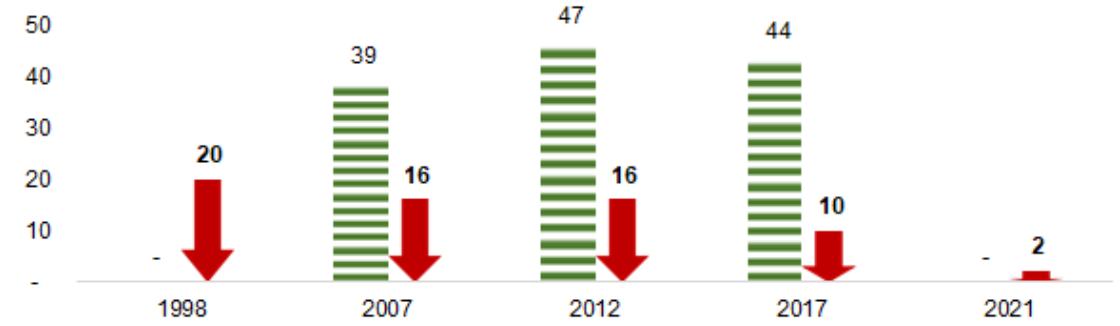
The past two decades have witnessed increasing consumer interest in organic and locally grown food. Organic commodities are being marketed by conventional grower-shippers and many are captured in annual USDA, NASS statistics. Locally grown vegetables and fruit are sold through all market channels including farmers markets, community supported agriculture, local auctions, restaurants, and most major retail food chains. When these commodities are sourced from a State included in the USDA, NASS estimates program, they are included in the official commercial production data. However, USDA, ERS is focused on making production projections for other States that are excluded from the commodities covered in the annual estimates program (e.g., Massachusetts, Nevada, Kansas) as well as projecting production for the so-called "minor crops" not currently included in the annual estimates program (e.g., turnips, beets, kale, radishes).

However, the number of States covered by USDA, NASS annually declined over time. Annual fresh market tomato production over the past 20 years serves as an example of the declining State coverage (see figure 1) that is also affecting several other specialty crops. In 1998, USDA, NASS reported fresh market tomato production in hundredweight (cwt.) for 20 individual States excluding the nondisclosed "D" or "Other States" category. Almost a decade later in 2007, 16 individual States were reported; another decade later in 2017, 10 individual States were reported; and the latest annual estimates now only report 2 individual States with fresh market

tomato production. Figure 1 also contrasts the individual States reported fresh tomato harvested acres, excluding the nondisclosed “D” or “Other States” category, from the 5-year census which reported 39 individual States in 2007, 47 in 2012, and 44 in 2017.

The 2021 USDA, NASS annual fresh utilized production inclusion of two individual States—Florida and California—reflect the changing nature of the fresh tomato industry with retail fresh tomatoes primarily coming from imports, protected culture agriculture, and local farms. The two States remaining in the annual USDA, NASS fresh tomato estimates program now largely serve the domestic foodservice industry. This project attempts to enhance the annual domestic availability projections of protected culture tomato production and add in locally grown output from the other 40+ States using the census data as benchmarks.

Figure 1
Individual States reported fresh tomato annual estimates versus census estimates, 1998–2021



Note: USDA, National Agricultural Statistics Service (NASS) Census surveys are on a 5-year cycle and not available in 1998 or 2021.
Census State counts using area harvested acres while annual State counts utilize production in hundredweight.
Both counts exclude undisclosed States reported with a (D) for the State value.
Source: USDA, National Agricultural Statistics Service, *QuickStats*.

Proposed Methods–Data Sources

USDA, NASS Census and Annual Survey Data. Extensive effort is devoted to conducting and validating the U.S. census and the estimates produced provide the most comprehensive assessment of crop production levels in the United States. In addition to farm and socio-economic characteristics, the census collects data on cropping specifics including harvested area. If production is reported by the Census along with area for a commodity, yield per acre can then be derived by dividing total production by total acres harvested. However, USDA, NASS generally does not report total yield estimates from census data but yield estimates can be derived.

For the purposes of this project, any reported census production levels are considered the best available estimates. When using these data to produce acreage and yield projections, it is important to consider the census values reported are estimates and not the exact values. Therefore, census values are subject to error, and when used they contribute irreducible error in the new projections. USDA, NASS census and survey data are used and published in various reports released by the agency, but this project limits the census report to the traditional 5-year census surveys of years ending in either a 2 or a 7 from 1997–2020. USDA, NASS survey data from the Crop Production, the Vegetables Annual Summary, the Non-Citrus Fruits and Nut report, and the Annual Citrus reports are utilized via the USDA, NASS database, QuickStats.

USDA, FSA Acreage Data Considered. USDA, ERS considered using other industry data such as USDA, Farm Service Agency (FSA) acreage data as farmers participating in various Federal assistance programs are required to disclose their crop acreage each year. Since not all producers participate in these programs, the USDA, FSA acreage reports only give a partial synopsis of total acreage. There was high variability in the amount of correlation between USDA, FSA acreage values and the estimates reported in the USDA, NASS census, so USDA, ERS does not anticipate using USDA, FSA data to project total acreage in this project.

State Acreage Data Considered. USDA, ERS also considered data from private grower associations and State commission groups. Some States have localized initiatives to collect data on crop production levels. Except for California, these efforts tend to be crop specific. In discussions with USDA, NASS State field office statisticians, a general theme arose regarding the availability of crop production data supplemental to the USDA, NASS reports. When production data is available for a crop in a State, it is because sufficient funding exists to conduct an assessment. Funding is available for State-level production estimates only for crops with high-value production levels. When a crop is included in a USDA, NASS survey program, the estimates produced will be the most comprehensive production data available. Therefore, the general trend is that supplemental data is available for the same reasons that USDA, NASS produces State-level estimates. Furthermore, when USDA, NASS does not deem it worthwhile to produce estimates for a specific crop's production in a State, alternative sources of State-level data are unlikely. Thus, USDA, ERS has not discovered acreage data sets from private grower associations and State commission groups that would add additional value besides the USDA, NASS census and survey data.

Proposed Methods—Projections

One of the projection challenges encountered with this project is the diversely broad scope of specialty crops. Each crop has a different amount of available USDA, NASS census and survey data, but ultimately USDA, ERS needs to present the same form of projections for each crop. Thus, after querying the USDA, NASS QuickStats data using SQL script and R statistical software, a systematic approach to determine how much data is available or missing needs to be outlined and estimation methods would then proceed accordingly. Thus, the general proposed approach is to first assess the availability of harvested acre estimates from USDA, NASS census and survey data, and when the data are not available, employ projection methods through imputation and interpolation. Ultimately, production level values for each crop will be determined using either the available USDA, NASS census and survey harvest and yield estimates or USDA, ERS projections.

Harvested Acre Projections. Total harvested acres of a crop by State will be determined with the following procedure. When USDA, NASS census data are available, the census values will be used and assumed to be the best possible estimate of the crop's harvested acres in the State for that year. If census data is collected but undisclosed, the projection will be made from the operation size data when available. If census data and operation size data are not available, USDA, NASS survey estimates will be used. While USDA, NASS acknowledges that production estimates produced from survey data are not as consistent as those produced by the census, survey estimates are assumed to be the best alternative to the census data. If USDA, NASS survey estimates are not available, linear interpolation between available adjacent census years are used. If there is insufficient data for interpolation, no estimate will be provided.

Interpolation of harvested acres of a crop for a State is calculated linearly. This relies on the assumption of a linear trend being most appropriate for changes in harvested areas. Harvested areas depend on farmer decisions of area to plant as well as random mid-season crop losses. While this linear trend may in some cases be improved with a second order estimate, this would necessitate 3 years of census data, which is not available for some commodities. Therefore, to keep the approach generalized at this stage of the project, linear interpolation is proposed.

Average Yield and Production Projections. State-wide yield rates are calculated for specialty crops in the USDA, NASS survey programs from the estimate of total production divided by the estimate of total harvested acres. Since total production data are not collected as part of the USDA, NASS census, these values are generally not available for most States. When a survey

value is available, it will be reported. Total production levels for a crop in a State can be calculated as the product of the crop's estimated total harvested area with estimated per area yield average estimates from USDA, NASS or USDA, ERS yield projections.

A K-nearest neighbors (KNN) regression is proposed to project unreported yield values. This method will report the mean yield of the K "closest" values reported by the USDA, NASS survey. The K "closest" values are determined using a weighted Euclidian norm. For this approach, the covariate features used include the year, State-centered latitude and longitude coordinates, and State-averaged monthly rainfall calculated from Oregon State University's PRISM Climate Group data. To determine the optimal K value to use, leave-one-out cross validation (LOOCV) will be used over the available USDA, NASS survey data. LOOCV was chosen since in many instances very few State and year combinations with operation data are reported in the census.

Estimates for per area yield will be taken from USDA, NASS survey data when available and projected using KNN when survey data are not available. If only a few States are available for the KNN calibration for yield, the estimation may be less accurate. Increased geographic variation of the States with available survey data increases the precision of the KNN approach.

Summary, Acknowledgement, and Feedback

Ideally, annual USDA, NASS production statistics would cover all specialty crops in all States and across all types of cultural technologies. Although USDA, NASS does an admirable job within their constraints, a complete accounting every year is not possible due to budgetary and technical reasons. Thus, the goal of this project is to supplement official annually published data (largely relying on benchmarks provided by USDA, NASS published Census data every 5 years) to provide a more complete accounting of U.S. production for fresh and processing specialty crops. Ultimately the results from this project will be used in USDA, ERS supply and availability estimates published annually in USDA, ERS specialty crop yearbooks. This will not only provide more depth for commodity market analytics, but these estimates will provide specialty crop stakeholders with useful information in evaluating and implementing production, processing, marketing, and policy decisions.

Special Thanks. The framework (researching the proposed methods and the initial coding of the R script) presented in this article were developed by Nicholas Gallagher. Gallagher's internship project with the USDA, ERS specialty crops team in the summer of 2021 helped transition the concepts and challenges of this project into a more tangible project within a limited

timeframe. Gallagher is in the Ph.D. program in Agriculture and Applied Economics at the University of Wisconsin, focusing on farm management decision making and farm management information systems. He expects to complete his Ph.D. coursework in 2024.

Feedback Is Welcome. USDA, ERS believes this project could address a vital need that is not being addressed annually. In the interest of transparency USDA, ERS is documenting the proposed methods through this special article. USDA, ERS encourages feedback from the specialty crop community of stakeholders within various parts of USDA, crop extension personnel, university staff, commodity organizations, etc. USDA, ERS will use the feedback received to (1) gauge interest and need; (2) justify priority and/or continuation of this project; and (3) validate or refine the proposed methods.

Please contact Wilma V. Davis and/or Catharine Weber with stakeholder feedback.

Special Article

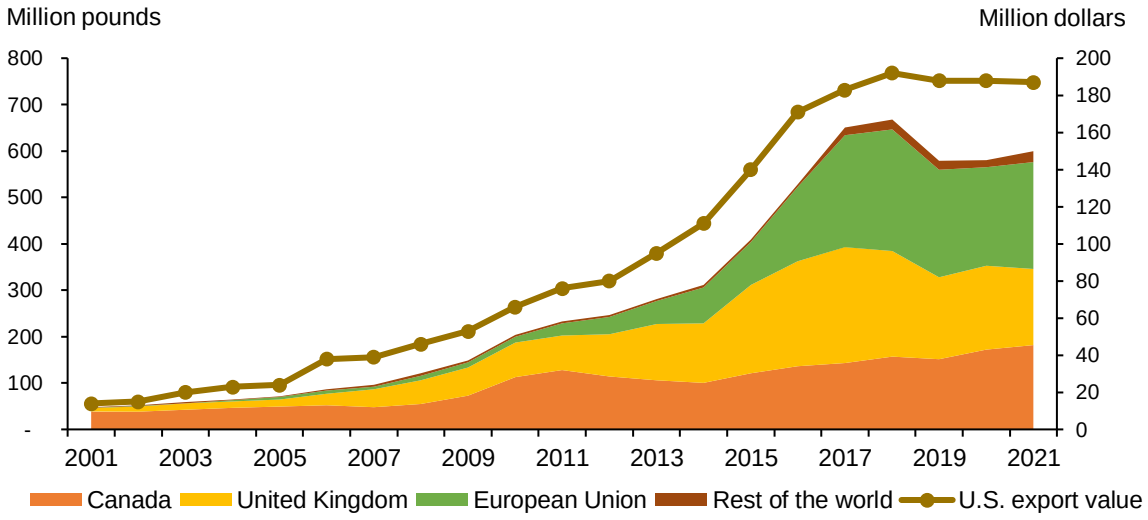
U.S. Sweet Potato Production Leads World in Exports

Catharine Weber, Wilma V. Davis, and Gary Lucier

The United States is the world leader in sweet potato exports. The Food and Agriculture Organization of the United Nations (FAOStat) reports that the United States accounted for 26.8 percent of world sweet potato export value in 2020 (the latest available data). Between 2001 and 2021, U.S. sweet potato export volume (on a fresh-weight basis) increased by 1,157 percent, and the value of exports grew by 1,236 percent (figure 1). In 2021, the United States exported $187 million of sweet potatoes—up from $14 million in 2001.

Exports play an important role in the growth of the U.S. sweet potato industry. This article provides an overview of U.S. sweet potato production and exports in the past 20 years.

Figure 1
U.S. export volume[1] by country and total export value for sweet potatoes, 2001–21



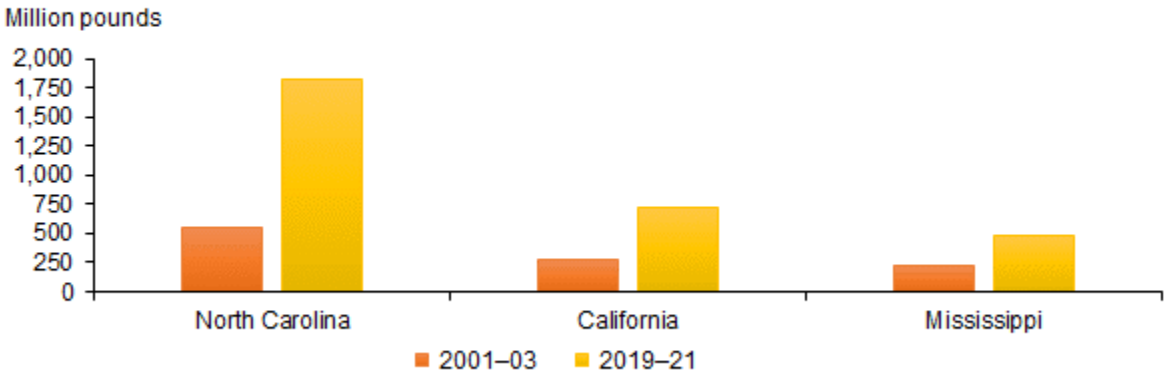
[1]Excludes yams. Includes frozen exports converted to a fresh-weight basis using a factor of 2.0.
Source: USDA, Economic Research Service calculations using U.S. Department of Commerce, Bureau of the Census data.

Growth in Domestic Production and Demand

Sweet potatoes are a root vegetable that contain high levels of vitamins A and C, iron, potassium, and fiber. The bulk of U.S. sweet potato harvest occurs in September and October. After harvest, sweet potatoes may go through a curing process and stored for up to 10 months, which allows for year-round supply.

In the 2017 USDA Census of Agriculture, the United States recorded a total of 172,983 sweet potato acres across 47 States. While many regions of the United States grow sweet potatoes, warmer climates with longer frost-free growing seasons are best suited for cultivation. In the 2017 Census, 3 States, North Carolina, California, and Mississippi, accounted for over 83 percent of harvested sweet potato acres. Between 2001–03 and 2019–21, North Carolina, California, and Mississippi more than doubled sweet potato production to meet growing domestic and international demand (figure 2). The production increase was supported by a 31 percent rise in the season-average farm price, going from an average of $17.10 per hundredweight (cwt.) in 2001–03 to $22.47 per cwt. in 2019–21.

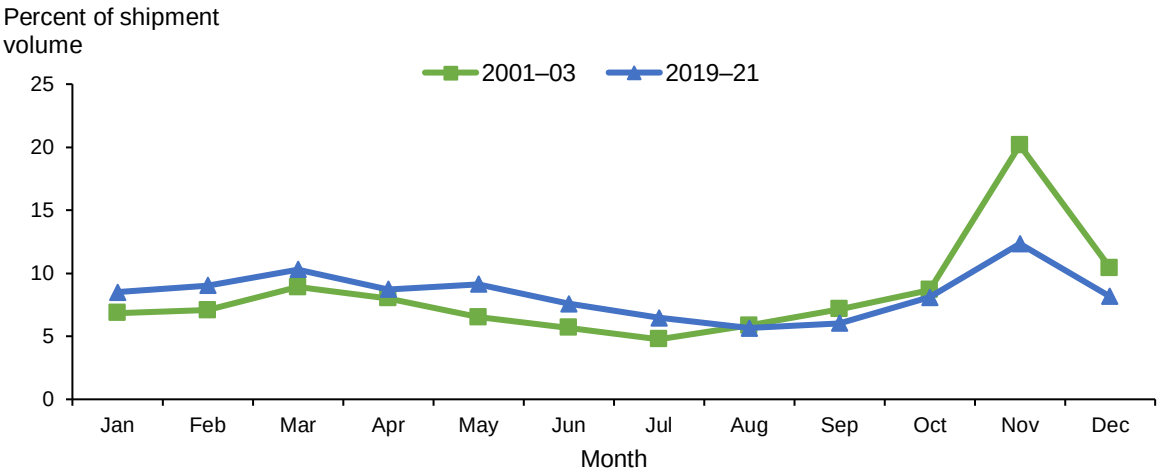
Figure 2
U.S. sweet potato production in top three States and average percentage change, 2001–03 and 2019–21



Source: USDA, National Agricultural Statistics Service.

Per capita availability of sweet potatoes jumped 41 percent, from 4.4 pounds per person in 2001 to 6.2 pounds per person in 2021. Historically, peak domestic demand of sweet potatoes occurs during with the winter holiday season. On average during 2001–03, about 31 percent of domestic sweet potato shipments (AMS *Market News* data) occurred from November through December (figure 3). However, as domestic sweet potato consumption has increased, so has its popularity throughout the year. On average during 2019–21, 21 percent of domestic sweet potato shipments occurred from November through December with a larger share of shipments during the first 10 months of the year.

Figure 3
Average monthly share of annual domestic sweet potato shipment volume, 2001–03 and 2019–21



Source: USDA, Agricultural Marketing Service, *Market News*, movement data.

In the last two decades, the export share of availability in the U.S. sweet potato market grew from 3 percent in 2001 to 20 percent in 2021. The majority (97–99 percent) of U.S. sweet potato export value is from fresh sweet potatoes as opposed to frozen sweet potato products. The U.S. exports sweet potatoes year-round, but export volume tends to peak between February and May and dip during the months leading up to harvest season (September–October).

The U.S. exported a record 667.8 million pounds of sweet potatoes (on a fresh-weight basis) in 2018, following a good harvest season the previous fall. In 2019, annual U.S. sweet potato export volume fell by 10 percent from the previous year. A contributing factor to decreased exports in 2019 was Hurricane Florence's impact on North Carolina during the 2018/19 marketing year (September–August), which led to a decline in production and an increase in price. However, North Carolina bounced back the following growing season within 1 percent of its previous production record. Between 2019 and 2021, U.S. sweet potato export volume rose 4 percent, but remained below 600 million pounds.

Cultivating Export Markets for U.S. Sweet Potatoes

People around the world produce and consume sweet potatoes. In 2020, the United States ranked seventh in global production, trailing China, Malawi, United Republic of Tanzania, Nigeria, Angola, and Ethiopia (FAOstat). For the past 20 years, China led the world in sweet potato production. However, between 2001 and 2020, China reduced its sweet potato production by half while African nations increased their global share of production from 9 percent to 32 percent. Several of the top global sweet potato producing countries grow sweet

potatoes primarily for their domestic market. In 2020, only 4 countries ranked in the top 10 for both sweet potato production and export volume (United States, Vietnam, China, and Indonesia) (FAOstat).

In 2021, the top three U.S. export markets for sweet potatoes were the European Union (EU-27), Canada, and the United Kingdom (U.K.) From 2001 to 2021, the U.S. increased sweet potato export volume to Canada by 369 percent while growing export markets in the U.K. and EU-27 (figure 1). In 2001, 86 percent of U.S. sweet potato export volume went to Canada, with a smaller portion going to the U.K. (16 percent) and EU-27 (1 percent). In 2021, total U.S. export volume increased more than 12 times as the portion of export volume shifted between Canada (30 percent), the U.K. (27 percent), and the EU-27 (38 percent).

U.S. sweet potato exports experienced strong year-over-year growth in the U.K. and EU-27 from the mid-2000s until 2018. Since 2018, U.S. exports to the U.K. declined by volume (down 28 percent) and value (down 27 percent), while exports to the EU-27 declined by volume (down 12 percent) but increased by value (up 3 percent) (table 1). Part of the reason for decreased U.S. exports volume is due to global competition; both Egypt and China have doubled sweet potato export volume to the U.K. and the EU-27 in the last 5 years.

Table 1. Sweet potato U.S. exports by destination, 2018–21

Destination	Unit	2018	2019	2020	2021	Percent change 2018–21
Exports, volume[1]						
Canada	Million pounds	156.8	152.0	171.5	181.7	16%
U.K.	Million pounds	227.1	176.5	181.1	163.8	-28%
EU-27	Million pounds	262.5	231.7	212.1	230.4	-12%
Other	Million pounds	21.4	19.1	14.9	24.1	13%
U.S. total	**Million pounds**	**667.8**	**579.3**	**579.6**	**599.9**	**-10%**
Exports, value						
Canada	Million dollars	48.0	53.0	60.0	58.0	21%
U.K.	Million dollars	67.0	57.0	56.0	49.0	-27%
EU-27	Million dollars	71.0	72.0	65.0	73.0	3%
Other	Million dollars	6.0	5.0	8.0	7.0	-17%
U.S. total	**Million dollars**	**192.0**	**187.0**	**189.0**	**187.0**	**-3%**

[1]Excludes yams. Includes frozen exports converted to a fresh-weight basis using a factor of 2.0.
Source: U.S. Department of Commerce, Bureau of the Census.

During 2020 and 2021, U.S. sweet potato exports remained resilient despite supply chain challenges related to the coronavirus (COVID-19) pandemic. In 2021, the United States recorded a record sweet potato export value ($73 million) to the EU-27. In addition, the United States grew its North American export market by 19.1 million pounds with increased export

volumes to both Canada (up 6 percent) and Mexico (up 9 percent) in 2021 compared to the previous year.

Summary

Over the past 20 years, the domestic and international market for U.S. sweet potatoes expanded. Increased production in North Carolina, California, and Mississippi coincided with higher average grower prices and larger export volumes. In 2021, U.S. consumers ate an average of 6.2 pounds of sweet potatoes per person with a larger share of that consumption occurring in the first 10 months of the year compared to 2001–03. As U.S. sweet potato producers face a myriad of challenges from hurricanes to foreign competition, the industry will continue to look for opportunities to cultivate U.S. sweet potato export markets in the decade to come.

Appendix A: Fresh Vegetables

Return to fresh vegetable section

Table A1. Annual U.S. production of selected fresh-market vegetables, 2018–21

Commodity	2018	2019	2020	2021p	Change 2020-21
	Million pounds				Percent
Lettuce, all	8,052	8,188	8,438	7,486	-11.3
Lettuce, head	4,056	4,201	3,845	3,514	-8.6
Lettuce, leaf	1,073	1,247	1,564	1,248	-20.2
Lettuce, romaine	2,923	2,741	3,029	2,723	-10.1
Onions, bulb 1/	6,283	6,134	6,422	5,890	-8.3
Sweet potatoes	2,738	3,197	3,013	2,885	-4.2
Carrots	3,662	2,432	2,416	2,489	3.0
Pumpkins 1/	1,910	1,750	1,723	2,186	26.9
Tomatoes 2/	2,710	2,172	2,109	2,137	1.3
Cabbage	1,730	1,946	1,876	1,813	-3.4
Celery	1,627	1,574	1,613	1,529	-5.2
Sweet corn	2,255	1,677	1,385	1,422	2.7
Broccoli	1,678	1,584	1,526	1,333	-12.6
Bell peppers	1,290	1,159	1,058	1,004	-5.1
Cauliflower	931	1,006	894	789	-11.7
Squash	739	709	671	691	3.0
Spinach 1/	674	856	645	556	-13.8
Greens, collards 1/	404	411	431	437	1.4
Garlic	523	383	356	419	17.7
Cucumbers	560	459	330	398	20.6
Snap beans	386	304	275	265	-3.6
Greens, kale 1/	293	235	197	258	31.0
Radishes 1/	186	207	185	196	5.9
Greens, mustard 1/	237	239	177	170	-4.0
Eggplant 1/	114	114	160	152	-5.0
Brussel sprouts 1/	128	146	215	119	-44.65
Greens, turnip 1/	117	127	101	105	3.96
Artichokes	100	96	76	83	9.21
Endive and escarole	61	66	43	68	58.14
Asparagus	62	58	48	46	-4.17
Okra	50	61	45	38	-15.56
Rhubarb	24	24	23	24	4.3
Lima beans, green	3	3	2	1	-50.0
Subtotal	**39,527**	**37,317**	**36,453**	**34,989**	**-4.0**
Mushrooms	782	767	761	691	-9.1
Potatoes	45,002	42,442	42,002	40,967	-2.5
Sweet potatoes	2,738	3,197	3,013	2,885	-4.2
Selected fresh total	**88,049**	**83,723**	**82,229**	**79,532**	**-3.3**

1/ USDA, Economic Research Service (ERS) projection of fresh production. 2/ Includes USDA, ERS projection of fresh greenhouse production.
Source: USDA, Economic Research Service calculations using USDA, National Agricultural Statistics Service (NASS) annual estimates, USDA, NASS Census, and NASS, California County Agricultural Commissioners' data.

Fresh Vegetables (continued)

Return to fresh vegetable section

Table A2. Selected fresh-market vegetable trade volume, 2018-21 1/

Item	January - December 2018	2019	2020	2021	Change 2020-21
	Million pounds				*Percent*
Imports, fresh:					
Tomatoes, all	4,092	4,023	4,053	4,266	5
Cucumbers	2,081	2,145	2,193	2,315	6
Peppers, bell	1,535	1,613	1,667	1,843	11
Onions	1,301	1,253	1,304	1,555	19
Squash 2/	1,130	1,206	1,210	1,221	1
Peppers, chile	994	957	970	1,098	13
Lettuce, all	617	789	821	931	13
Asparagus	568	572	586	665	13
Broccoli	423	493	542	553	2
Carrots	494	504	467	527	13
Artichokes	346	357	321	335	4
Cabbage	253	285	279	291	4
Garlic	337	277	274	283	3
Brussels sprouts	187	194	236	246	4
Cauliflower	172	231	218	238	9
Celery	132	244	220	230	5
Snap beans	192	201	218	228	5
Sweet corn	118	127	160	194	21
Eggplant	175	175	186	191	3
Okra	160	162	164	163	-1
Pumpkin	77	92	122	106	-13
Subtotal	**15,384**	**15,900**	**16,210**	**17,479**	**8**
Mushrooms	151	168	179	195	9
Potatoes, excluding seed	911	763	927	892	-4
Sweet potatoes	29	25	20	85	322
Total	**16,475**	**16,856**	**17,336**	**18,651**	**8**
Exports, fresh:					
Onions, dry bulb	713	824	760	703	-8
Lettuce, all	674	682	653	672	3
Sweet potatoes	657	571	576	590	2
Cauliflower	284	243	238	273	15
Celery	248	207	233	219	-6
Tomatoes, all	183	173	145	166	14
Carrots	165	153	151	156	3
Broccoli	159	134	132	155	17
Sweet corn	147	126	134	146	9
Spinach	84	96	103	105	2
Peppers, bell	104	104	99	103	4
Cabbage	90	106	92	97	5
Subtotal	**3,508**	**3,419**	**3,316**	**3,385**	**2**
Mushrooms	18	17	18	16	-11
Potatoes, excluding seed	1,019	1,140	1,043	1,235	18
Sweet potatoes	657	571	576	590	2
Total	**5,202**	**5,147**	**4,953**	**5,226**	**6**

Note: 1/ Excludes melons and dry pulses. 2/ Includes chayote.

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

Fresh Vegetables (continued)

Return to fresh vegetable section

Table A3. Fresh market vegetables: Per capita availability[1], 2017–21

Commodity	2017	2018	2019	2020	2021p	Change 2020-21
	---------- Pounds per capita ----------					*Percent*
Artichokes, all	1.4	1.4	1.4	1.2	1.2	5.0
Asparagus	1.6	1.8	1.8	1.8	2.0	8.6
Bell pepper	11.3	11.2	10.9	10.7	11.3	5.1
Broccoli	7.1	5.9	5.9	5.9	5.2	-11.0
Cabbage	6.2	5.7	6.4	6.1	5.9	-3.2
Carrots	7.4	12.2	8.5	8.3	8.6	4.2
Cauliflower	2.4	2.5	3.0	2.6	2.3	-14.1
Celery	4.7	4.9	5.2	5.1	4.9	-4.0
Cucumbers	7.4	8.0	7.8	7.5	8.0	6.3
Eggplant	1.0	0.8	0.8	1.0	1.0	-0.9
Garlic, all	3.0	2.4	1.8	1.7	1.9	11.1
Leafy greens[2]	3.2	3.3	3.1	2.8	3.0	6.4
Lettuce, head	15.3	12.3	12.9	11.7	10.7	-9.1
Lettuce, romaine	15.1	12.2	12.4	14.4	12.7	-11.6
Onions, bulb	25.0	20.6	19.9	20.4	20.5	0.8
Pumpkins, all	5.1	5.4	5.0	5.0	6.2	23.7
Snap beans	1.6	1.6	1.4	1.3	1.3	0.5
Spinach	1.9	1.9	2.4	1.8	1.5	-15.2
Squash, all	5.7	5.6	5.8	5.7	5.7	1.2
Sweet corn	7.2	6.8	5.1	4.3	4.4	3.7
Sweet potatoes, all	8.0	5.6	7.1	6.5	6.3	-3.8
Tomatoes[3]	20.1	20.2	18.3	18.2	18.8	3.2
Others[4]	2.1	2.2	2.4	2.9	2.6	-10.3
Subtotal	**163.8**	**154.4**	**149.2**	**146.9**	**146.1**	**-0.6**
Mushrooms	2.9	2.8	2.8	2.8	2.6	-7.4
Potatoes	34.9	33.1	30.1	30.3	29.3	-3.3
Total	**209.6**	**195.8**	**189.2**	**186.5**	**177.9**	**-4.6**

Note: p = preliminary, final estimates provided in ERS *Vegetable and Pulses Yearbook* (August 2022).
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: Calculated by USDA, Economic Research Service.

Fresh Vegetables (continued)

Return to fresh vegetable section

Table A4. U.S. fresh-market organic vegetable f.o.b. prices per pound, 2021–22

Selected Organic Commodities	2021 – 1st Quarter			2022 – 1st Quarter			2021–2022 Change[1]
	January	February	March	January	February	March	March
	Dollars per pound[2]						*Percent*
Artichokes, globe	1.92	1.32	1.13	1.20	0.88	1.34	19
Asparagus, green	3.95	1.76	1.22	3.16	2.28	1.66	36
Broccoli, crown cut	1.00	0.70	0.99	1.64	1.12	1.13	14
Broccoli, unspecified	1.48	1.00	1.44	2.52	1.61	1.68	17
Cabbage, red type	0.72	0.62	0.43	0.60	0.53	0.45	4
Cabbage, round green type	0.70	0.58	0.44	0.54	0.40	0.41	-7
Carrots, baby peeled	0.97	0.97	0.94	0.96	0.92	0.92	-2
Carrots, unspecified	0.47	0.47	0.44	0.59	0.55	0.55	25
Carrots, baby peeled	0.65	0.56	1.01	1.31	0.76	1.10	9
Celery, hearts	1.44	0.85	0.47	1.18	0.83	0.75	59
Celery, unspecified	0.69	0.35	0.21	0.51	0.34	0.34	58
Lettuce, green leaf	1.28	0.91	0.76	0.99	0.92	1.03	36
Lettuce, iceberg	0.43	0.33	0.31	0.25	0.29	0.31	1
Lettuce, red leaf	1.31	0.92	0.77	0.99	0.92	1.03	33
Lettuce, romaine hearts	1.16	0.94	0.78	1.12	0.95	1.50	93
Lettuce, romaine	0.74	0.58	0.45	0.66	0.68	0.84	85
Spinach, flat	0.81	0.79	0.71	1.02	0.90	0.73	3
Squash, zucchini	1.12	0.60	0.74	0.93	0.89	0.99	35
Sweet potatoes, orange types	0.70	0.70	0.70	0.95	0.96	0.98	39
Sweet potatoes, red types	0.70	0.70	0.70	0.95	0.96	0.98	39
Sweet potatoes, white types	0.73	0.73	0.73	1.03	1.03	1.08	47
Tomatoes, grape type	2.81	2.34	2.28	1.71	1.46	1.37	-40

[1]Change in weekly average in March 2022 over weekly average in March 2021. [2]Per pound weight conversions based on container approximate net weights from USDA, Agricultural Marketing Service *Fresh Fruit and Vegetable Shipments*, 2020.

Source: USDA, Economic Research Service calculations using USDA, National Agricultural Statistics Service and USDA, Agricultural Marketing Service, *Fruit and Vegetable Market News* data.

Fresh Vegetables (continued)

Return to fresh vegetable section

Table A5. Trade data for select organic and greenhouse commodities, 2019–22

Commodity	January–December			January–February		Change[1]
	2019	2020	2021	2021	2022	2021–22
	Million pounds					Percent
Import, volume						
Greenhouse bell peppers	814.4	818.3	892.5	136.9	139.8	2
Greenhouse chili peppers	4.2	6.7	8.9	3.6	2.8	-24
Greenhouse cucumbers	386.3	413.4	434.6	-	-	
Greenhouse tomatoes	2,182.8	2,217.8	2,422.1	439.8	423.3	-3.8
Organic greenhouse bell pepper	66.4	65.3	74.9	15.1	14.8	-2
Organic bell peppers	6.9	10.6	16.0	4.7	5.8	24
Organic dried green lentils	3.0	2.1	4.7	0.2	0.6	255
Organic dried yellow peas	32.4	53.2	44.7	7.3	0.2	-97
Organic squash	55.8	51.0	52.1	16.2	12.7	-22
Exports, volume						
Organic asparagus	2.5	1.7	1.6	0.3	0.3	-22
Organic beet	1.8	2.0	1.8	0.4	0.3	-35
Organic broccoli	11.8	12.3	12.8	1.7	0.1	-92
Organic cabbage	13.3	12.2	12.1	2.1	2.2	1
Organic carrots	53.7	57.1	51.6	9.1	8.3	-8
Organic cauliflower	25.2	24.7	28.5	3.4	4.8	42
Organic celery	19.4	22.7	24.0	2.5	4.3	73
Organic cucumbers	1.4	2.5	3.4	0.7	0.6	-12
Organic lettuce, head	17.8	15.9	8.2	1.0	0.7	-24
Organic lettuce, not head	40.7	51.9	65.5	5.8	6.0	4
Organic peas	5.0	3.9	9.3	2.3	0.1	-97
Organic peppers	3.1	2.5	2.9	0.6	0.9	42
Organic potatoes	7.2	10.8	15.8	1.4	2.6	83
Organic spinach	24.8	29.1	30.5	3.2	3.7	18
Organic tomato, cherry	1.4	4.2	3.5	0.7	0.1	-86
Organic tomato, other	4.7	4.0	5.5	0.9	0.9	-1
Organic tomato, roma	10.3	1.7	2.0	0.4	0.2	-34

[1]Percent change from January–February 2021 to 2022.

Source: U.S. Department of Commerce, Bureau of the Census.

Appendix B: Processed Vegetables

Return to processed vegetable section

Table B1. Processed vegetables: U.S. Consumer and Producer Price Indices, 2020–22 1/

Price Indices - Items	2020		2021		2022	Change 2021/22 2/
	1st Q	2nd Q	1st Q	2nd Q	1st Qp	1st Q
	Index					*Percent*
Consumer Price Indexes (12/97 = 100)						
Processed fruits and vegetables	157.1	163.5	163.5	166.4	175.9	7.6
Canned vegetables	173.2	181.9	183.6	187.1	199.2	8.5
Frozen vegetables (1982-84 = 100)	201.3	209.2	204.9	208.7	215.9	5.4
Dry beans, peas, lentils	182.5	191.6	191.7	196.8	211.0	10.0
Olives, pickles, relishes	146.8	147.0	150.4	148.7	161.1	7.1
Producer Price Indexes (1982 = 100)						
Canned vegetables and juices	183.1	184.4	186.2	186.3	200.0	7.4
Tomato catsup and sauces 3/	161.1	160.5	162.4	163.0	175.5	8.1
Other canned vegetables 3/	204.5	209.5	211.3	210.8	223.2	5.6
Pickles and products	241.1	241.6	243.1	244.7	273.5	12.5
Canned dry beans	173.0	173.5	175.4	175.3	180.2	2.7
Frozen vegetables (excluding potatoes) 4/	156.2	156.4	159.5	161.5	173.7	8.9
Frozen vegetables (including potatoes)	216.2	216.3	219.6	219.8	228.8	4.2
Frozen potato products 4/	209.3	209.8	211.7	210.6	212.9	0.6
Dried/dehydrated fruit and vegetables	239.1	247.8	255.4	255.4	259.5	1.6

Note: Q = calendar quarter. p = preliminary. 1/ Not seasonally adjusted. 2/ Change in projected first quarter 2022 from first quarter 2021.

3/ Index base is 1987 = 100. 4/ Index base is 1990 = 100. 5/ Index base is 2011=12.

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

Processed Vegetables (continued)

Return to processed vegetable section

Table B2. Vegetables for processing: Per capita availability, 2017–21

Commodity	2017	2018	2019	2020	2021p	Change 2020-21
	Pounds per capita					*Percent*
Asparagus	0.2	0.1	0.2	0.1	0.1	-7
Beans, lima	0.2	0.3	0.2	0.2	0.2	-11
Beans, snap/green	5.0	4.7	4.1	3.8	4.4	15
Beets	0.6	0.5	0.5	0.5	0.5	2
Broccoli	2.6	2.4	2.5	2.6	2.6	0
Cabbage	1.4	0.6	0.9	1.4	0.9	-39
Carrots	3.5	3.4	3.0	2.3	2.2	-2
Cauliflower	0.5	0.6	0.7	0.7	0.7	0
Corn, sweet	13.1	13.1	10.6	12.1	11.4	-6
Cucumbers 2/	3.7	3.3	3.0	2.9	3.2	10
Onions, dehydrating	0.3	1.8	1.4	1.6	1.8	8
Peas, green	2.0	1.9	1.5	1.8	1.7	-3
Peppers, chile 1/	7.4	7.2	7.1	7.0	7.9	14
Spinach	0.8	0.9	0.7	0.6	0.6	2
Tomatoes	54.5	60.7	63.5	67.4	61.6	-9
Other processing	9.6	12.3	11.9	11.6	13.0	12
Processing subtotal	**105.5**	**113.8**	**111.9**	**116.8**	**112.9**	-3
Other processing						
Mushrooms	1.0	0.9	1.0	0.9	1.1	19
Potatoes 3/	82.9	84.5	82.5	84.7	82.7	-2
Other subtotal	83.9	85.4	83.5	85.7	83.8	-2
Grand total	**105.5**	**199.3**	**195.4**	**202.5**	**196.7**	-3

Note: 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: Calculated by USDA, Economic Research Service.

Processed Vegetables (continued)

Return to processed vegetable section

Table B3. Selected processed vegetable trade value, 2017–21[1, 2]

Item	2017	2018	2019	2020	2021	Change 2020–21
	Million dollars					Percent
Imports						
Canned vegetables and juices	**1,618**	**1,650**	**1,595**	**1,838**	**2,036**	**10.8**
Tomatoes	195	215	232	311	340	9.6
Mushrooms and truffles	117	111	115	118	147	24.5
Peppers	125	127	113	114	138	21.4
Artichokes	152	139	139	124	134	8.0
Others	1,029	1,058	995	1,172	1,277	9.0
Frozen vegetables	**2,035**	**2,286**	**2,345**	**2,582**	**2,854**	**10.5**
Potatoes	863	960	969	1,064	1,297	21.9
Broccoli	296	341	360	381	385	0.9
Cauliflower	57	64	80	92	81	-12.2
Others	819	921	935	1,045	1,092	4.5
Dried, dehydrated, chipped	**718**	**786**	**747**	**806**	**940**	**16.6**
Starches	163	199	212	197	228	15.6
Potato flakes/granules/dried	140	149	153	184	198	7.7
Potato chips	75	90	102	115	150	30.8
Mushrooms and truffles	30	36	24	27	33	21.9
Others	309	310	256	284	331	16.9
Total processed imports	**4,371**	**4,722**	**4,687**	**5,227**	**5,830**	**11.5**
Exports						
Canned vegetables and juices	**1,854**	**1,802**	**1,785**	**1,646**	**1,852**	12.5
Tomatoes	1,283	1,235	1,247	1,177	1,367	16.1
Sweet corn	110	108	96	86	83	-2.8
Cucumbers	65	63	71	46	63	38.4
Others	396	397	371	338	338	0.0
Frozen vegetables	**1,533**	**1,506**	**1,584**	**1,317**	**1,485**	12.7
Potatoes	1,175	1,159	1,252	1,021	1,189	16.4
Sweet corn	110	107	105	95	102	7.7
Others	247	240	227	201	194	-3.5
Dried, dehydrated, chipped, starch	**527**	**488**	**504**	**512**	**527**	2.8
Potato chips	197	190	185	186	198	6.4
Potatoes, dried/dehydrated	125	119	141	135	124	-8.1
Onions, dehydrated	81	80	79	82	82	0.6
Others	124	99	99	109	121	11.8
Total processed exports	**3,914**	**3,796**	**3,873**	**3,476**	**3,863**	**11.1**

[1]Potato chips were grouped with dried and dehydrated for the purposes of this table. This table includes vegetables, potatoes, and mushrooms. [2]Dried and dehydrated excludes vegetables processed and sold as spices such as paprika and other peppers.

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

Appendix C: Potatoes

Return to potato section

Table C1. Potatoes: U.S. consumer and producer price indices and advertised retail prices, 2020–22[1]

Item	2020				2021				2022	1st Q Change[3]	
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q p[2]	Quarter	Year
	Index									*Percent*	
Producer price indexes											
Fresh tablestock (2011=100)	139.8	122.1	128.1	106.6	100.7	99.9	124.7	133.1	141.6	6.4	40.7
Fresh, russet (1991=100)	229.8	192.1	221.6	169.7	154.5	160.0	209.6	227.5	238.5	4.9	54.4
Fresh, red (1991=100)	265.8	261.5	213.9	196.5	181.7	174.8	214.8	203.0	231.6	14.1	27.5
Fresh, round white (1991=100)	229.4	248.6	161.4	250.6	239.8	189.6	178.5	204.1	223.5	9.5	-6.8
Frozen potato products (1990=100)	209.5	209.5	210.6	212.7	211.9	210.3	209.5	211.2	213.2	0.9	0.6
Chips (includes corn) (1985=100)	222.2	222.2	222.3	222.7	223.8	224.7	225.5	237.0	240.3	1.4	7.4
Consumer price indexes											
Fresh tablestock (1982-84=100)	371.1	392.9	390.7	360.7	374.4	377.7	388.7	368.2	382.5	3.9	2.2
	Dollars per pound										
Retail prices[4]											
Fresh potatoes, white	0.79	0.85	0.84	0.77	0.78	0.77	0.79	0.78	0.81	2.8	3.8
Potato chips	4.6	5.0	5.1	5.1	5.0	5.0	5.1	5.2	5.4	2.8	7.2

Note: p = preliminary. Q = calendar quarter. [1]Not seasonally adjusted. [2]All U.S. Department of Labor, Bureau of Labor Statistics (BLS) indexes are subject to revision four months after original publication. [3]Change in projected fourth quarter 2022 from the previous quarter/year. [4]As reported by BLS.

Source: USDA, Economic Research Service calculations using U.S. Department of Labor, Bureau of Labor Statistics.

Potatoes (continued)

Return to potato section

Table C2. U.S. potato trade volume, September–February

Commodity	2018/19	2019/20	2020/21	2021/22	Percent change 2020/21–21/22
		----------Million pounds----------			*Percent*
Exports					
Fresh	468.6	449.5	459.4	484.9	6
Frozen, all	1,096.3	1,183.3	1,089.3	1,011.5	-7
French fries	962.3	1,049.7	948.2	885.6	-7
Other frozen	134.1	133.6	141.1	125.8	-11
Chips	54.3	52.0	53.4	48.3	-10
Dried and dehydrated	90.8	104.0	91.4	82.8	-9
Other preparation/preserved	40.9	45.3	44.5	39.8	-11
Seed	15.9	18.6	19.1	26.9	41
Starch	8.2	9.8	8.1	5.9	-27
Total	**1,775.0**	**1,862.0**	**1,765.0**	**1,700.0**	**-4**
Imports					
Fresh	436.4	475.0	503.9	495.2	-2
Frozen, all	1,058.8	1,142.7	1,210.6	1,378.9	14
French fries	934.8	952.7	1,018.3	1,154.4	13
Other frozen	124.0	190.0	192.3	224.6	17
Chips	24.6	26.4	31.0	33.7	9
Dried and dehydrated	48.4	50.2	69.8	65.2	-7
Other preparation/preserved	28.3	32.0	40.0	37.2	-7
Seed	47.7	48.4	68.3	39.9	-42
Starch	132.8	132.8	135.5	145.7	8
Total	**1,777.0**	**1,907.6**	**2,059.0**	**2,195.8**	**7**

Source: U.S. Department of Commerce, Bureau of the Census.

Appendix D: Dry Beans

Return to dry beans section

Table D1. U.S. dry beans: Area, yield, production, price, and crop value, 2015–22[1]

Year	Acreage		Yield	Production	Season-average	Crop
	Planted	Harvested	per acre		price	value
	-------- 1,000 acres ------		*Cwt per acre*	*1,000 cwt*	*Dollars per cwt*	*Million dollars*
2015	1,559	1,506	183	27,544	27.30	866.22
2016	1,339	1,238	188	23,277	29.20	863.43
2017	1,472	1,412	205	28,904	26.70	1,006.35
2018	1,231	1,182	211	24,958	25.40	951.05
2019	1,291	1,174	18	20,756	31.80	676.97
2020	1,727	1,665	20	32,665	31.20	1,046.59
2021p	1,394	1,336	17	22,721	39.20	892.91
2022f	1,313					

Note: cwt = hundredweight, a unit of measure equal to 100 pounds. f = forecast. p = preliminary.
1/ This table excludes chickpeas with the exception of crop value prior to 2019.
Source: USDA, Economic Research Service calculations using data from USDA, National Agricultural Statistics Service.

Dry Beans (continued)

Return to dry beans section

Table D2. U.S. dry bean crop-year export volume[1]

Commodity	September–August 2018/19	September–August 2019/20	September–August 2020/21	September–February 2020/21	September–February 2021/22	Change 2/ 2020/21 – 2021/22
	Million Pounds					Percent
By class						
Kidney, all	**249.5**	**245.2**	**303.8**	**171.2**	**91.1**	-46.8
Dark red kidney	139.2	154.2	152.9	90.7	54.3	-40.1
Kidney, other	79.8	65.0	123.2	60.9	30.4	-50.2
Light red kidney	30.5	26.0	27.8	19.6	6.5	-67.1
Navy	155.7	142.1	118.9	62.0	62.4	0.7
Black	105.4	163.9	194.7	87.7	48.9	-44.2
Pinto	112.7	109.2	183.2	99.6	17.9	-82.1
Small red	21.4	21.1	54.2	40.4	13.3	-67.2
Cranberry	5.0	9.6	7.1	4.8	12.5	158.8
Lima, all	**24.4**	**20.7**	**13.1**	**5.3**	**6.6**	24.5
Lima, large	20.4	17.6	11.8	0.6	1.1	92.2
Lima, baby	4.0	3.1	1.3	4.8	5.6	16.7
Great Northern	51.0	17.3	16.8	8.1	4.4	-45.5
Pink	4.6	3.6	4.6	2.0	1.8	-5.9
Mung	4.3	2.8	5.7	3.5	1.7	-50.7
Blackeye	2.1	1.8	2.3	1.5	0.9	-40.0
Beans, other 3/	48.1	17.0	22.5	11.5	16.8	45.6
Total	**784.2**	**754.2**	**927.0**	**497.7**	**278.4**	**-44.1**
All by origin country						
Canada	119.0	74.1	91.1	57.9	62.7	8.3
Mexico	166.0	179.4	345.6	164.9	56.1	-66.0
Italy	99.0	87.8	89.6	50.3	51.2	1.8
Dominican Republic	53.5	73.5	87.0	49.8	18.9	-62.1
Costa Rica	5.6	26.1	36.8	17.7	15.2	-14.1
United Kingdom	74.8	64.2	61.8	31.0	10.1	-67.5
Haiti	26.1	35.7	30.4	20.8	4.8	-76.8
Other countries	240.3	213.5	184.7	105.3	59.4	-43.6
Total	**784.2**	**754.2**	**927.0**	**497.7**	**278.4**	**-44.1**

1/ Excludes garbanzo beans. 2/ Percent change from September–February 2020/21 to 2021/22. 3/ Beans, other includes white, pigeon pea, bambara, broad and horse bean, and other general bean classes.

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

Dry Beans (continued)

Return to dry beans section

Table D3. U.S. dry bean crop-year import volume[1]

Commodity	September–August 2018/19	September–August 2019/20	September–August 2020/21	September–February 2020/21	September–February 2021/22	Change 2020/21 – 2021/22
	Million Pounds					*Percent*
By class						
Mung	44.2	66.6	79.3	40.8	37.4	-8.4
Kidney, all	40.9	57.0	47.2	23.0	24.1	4.6
Pinto	15.6	27.8	22.6	10.9	20.7	90.2
Black	25.9	36.8	32.7	14.1	15.8	12.5
Small red	13.7	19.6	16.0	7.3	7.9	8.8
Broad and horse	20.7	15.6	18.2	5.5	7.8	42.1
Blackeye	15.8	13.1	13.2	6.2	5.6	-10.1
Pigeon pea	17.9	22.9	17.0	10.0	5.0	-50.4
Lima, all	1.5	1.7	8.9	1.9	4.2	117.5
Great Northern	1.4	6.6	3.0	1.7	2.2	31.4
Navy	7.5	3.2	3.1	1.6	1.9	19.7
White	1.3	2.5	2.2	1.1	0.9	-13.2
Cranberry	1.2	1.3	1.2	0.6	0.2	-71.4
Bambara	0.2	0.3	0.5	0.2	0.0	-96.9
Other dry beans	35.7	51.5	48.2	15.7	24.5	55.9
Total	**243.4**	**326.3**	**313.3**	**140.6**	**158.2**	**12.5**
All by origin country						
Canada	66.5	74.0	79.1	33.3	44.6	34.0
Mexico	28.4	56.8	29.8	8.0	22.3	179.6
India	29.5	45.2	40.6	22.6	17.2	-23.9
Nicaragua	24.6	33.6	35.0	17.0	13.5	-20.6
Thailand	8.1	11.0	13.3	5.2	11.9	127.5
Peru	13.0	13.5	20.8	6.7	10.3	52.8
China	28.9	25.6	28.9	15.5	8.3	-46.6
Other	44.4	66.6	65.7	32.3	30.0	-6.9
Total	**243.4**	**326.3**	**313.3**	**140.6**	**158.2**	**12.5**

1/ Excludes garbanzo beans. 2/ Percent change from September–February 2020/21 to 2021/22.

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

Appendix E: Dry Peas, Lentils, and Chickpeas

Return to dry peas section

Table E1. U.S. dry peas: Area, yield, production, price, and crop value, 2015–22[1]

Year	Acreage		Yield	Production	Season-average price	Crop value
	Planted	Harvested	per acre			
	1,000 acres		*Cwt per acre*	*1,000 cwt*	*Dollars per cwt*	*Million dollars*
2015	1,143	1,084	16.87	18,283	12.80	229.39
2016	1,383	1,331	20.86	27,762	11.00	304.66
2017	1,128	1,052	13.50	14,195	11.80	165.77
2018	857	808	19.72	15,929	10.50	163.96
2019	1,102	1,046	21.23	22,210	9.64	210.45
2020	998	970	22.30	21,629	9.84	212.54
2021p	977	834	10.25	8,549	17.50	152.40
2022f	1,088					

Note: cwt = hundredweight, a unit of measure equal to 100 pounds. f = forecast. p = preliminary.
1/ This table excludes chickpeas with the exception of crop value prior to 2019.
Source: USDA, Economic Research Service calculations using data from USDA, National Agricultural Statistics Service.

Return to lentil section

Table E2. U.S. lentils: Area, yield, production, price, and crop value, 2015–22[1]

Year	Acreage		Yield	Production	Season-average price	Crop value
	Planted	Harvested	per acre			
	1,000 acres		*Cwt per acre*	*1,000 cwt*	*Dollars per cwt*	*Million dollars*
2015	493	475	11.08	5,263	31.00	162.25
2016	933	905	14.14	12,794	28.50	366.56
2017	1,104	1,022	7.32	7,482	25.90	188.91
2018	780	718	11.71	8,408	17.70	131.74
2019	486	425	12.50	5,311	15.70	83.57
2020	523	510	14.51	7,398	18.20	135.04
2021p	708	549	6.06	3,327	32.50	110.93
2022f	788					

Note: cwt = hundredweight, a unit of measure equal to 100 pounds. f = forecast. p = preliminary.
1/ This table excludes chickpeas with the exception of crop value prior to 2019.
Source: USDA, Economic Research Service calculations using data from USDA, National Agricultural Statistics Service.

Dry Peas, Lentils, and Chickpeas (continued)

Return to dry pea and lentils section Return to chickpeas section

Table E3. U.S. dry edible peas, chickpeas, and lentils: Trade volume by class 1/

Commodity	July – June 2/			July – February 3/		Change 4/
	2018/19	2019/20	2020/21	2020/21	2021/22	2020/21–2021/22
	1,000 cwt (bags)					Percent
Exports						
Peas, all	**5,629**	**7,648**	**9,827**	**6,701**	**3,696**	**-45**
Peas, split	1,755	2,534	2,347	1,533	1,395	-9
Peas, other	677	459	1,248	409	795	94
Peas, green	2,884	3,540	3,160	1,977	786	-60
Peas, yellow	284	1,098	3,056	2,773	709	-74
Peas, Austrian winter	30	17	15	10	11	16
Lentils, all	**3,248**	**6,566**	**6,718**	**4,935**	**2,099**	**-57**
Chickpeas, all	**3,176**	**3,427**	**2,900**	**1,395**	**515**	**-63**
Total Exports	**12,053**	**17,641**	**19,445**	**13,031**	**6,310**	**-52**
Imports						
Peas, all	**3,028**	**1,822**	**1,460**	**817**	**3,182**	**289**
Peas, yellow	1,947	947	704	357	2,368	563
Peas, other	429	364	428	254	412	62
Peas, split	554	457	260	178	308	73
Peas, green	96	50	67	27	92	239
Peas, Austrian winter	2	4	2	1	1	-12
Lentils, all	**1,382**	**1,021**	**946**	**600**	**749**	**25**
Lentils, other	741	539	533	352	442	26
Lentils, red	366	328	252	165	159	-3
Lentils, green	276	154	161	84	148	77
Chickpeas, all	**961**	**916**	**1,029**	**378**	**470**	**25**
Chickpeas, garbanzo	726	683	633	270	290	7
Chickpeas, kabuli	235	233	396	108	180	68
Total Imports	**5,372**	**3,759**	**3,436**	**1,795**	**4,401**	**145**

Note: Cwt = hundredweight which equals 100 pounds.

1/ This table excludes planting seed. 2/ Chickpea months are September–August. 3/ Chickpea months are September–February.

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

Dry Peas, Lentils, and Chickpeas (continued)

Return to chickpeas section

Table E4. U.S. chickpeas: Area, yield, production, price, and crop value, 2015–22[1]

Year	Acreage		Yield	Production	Season-average	Crop
	Planted	Harvested	per acre		price	value
	-------- 1,000 acres ------		*Cwt per acre*	*1,000 cwt*	*Dollars per cwt*	*Million dollars*
2015	208	202	12.42	2,513	28.70	61.04
2016	325	320	17.02	5,447	28.80	149.87
2017	626	611	11.55	7,057	30.00	223.13
2018	863	847	15.11	12,787	21.20	281.45
2019	453	405	15.47	6,256	16.50	116.29
2020	254	251	16.30	4,087	22.20	88.57
2021p	369	351	8.15	2,861	36.10	104.18
2022f	304					

Note: cwt = hundredweight, a unit of measure equal to 100 pounds. f = forecast. p = preliminary.

1/ This table excludes chickpeas with the exception of crop value prior to 2019.

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

Return to chickpeas section

Table E5. U.S. large chickpeas: Area, yield, production, price, and crop value, 2015–22[1]

Year	Acreage		Yield	Production	Season-average	Crop
	Planted	Harvested	per acre		price	value
	-------- 1,000 acres ------		*Cwt per acre*	*1,000 cwt*	*Dollars per cwt*	*Million dollars*
2015	135	131	12.3	1,607	30.60	38.45
2016	212	209	16.8	3,509	32.10	98.95
2017	446	435	11.7	5,088	34.60	170.96
2018	638	624	15.1	9,441	20.90	209.77
2019	348	313	15.5	4,865	17.80	93.54
2020	212	210	16.2	3,396	23.30	74.91
2021p	309	298	8.3	2,457	37.40	92.44
2022f	242					

Note: cwt = hundredweight, a unit of measure equal to 100 pounds. f = forecast. p = preliminary.

1/ This table excludes chickpeas with the exception of crop value prior to 2019.

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

Dry Peas, Lentils, and Chickpeas (continued)

Return to chickpeas section

Table E6. U.S. small chickpeas: Area, yield, production, price, and crop value, 2015–22[1]

Year	Acreage		Yield	Production	Season-average	Crop
	Planted	Harvested	per acre		price	value
	-------- 1,000 acres ------		*Cwt per acre*	*1,000 cwt*	*Dollars per cwt*	*Million dollars*
2015	72	72	12.6	906	25.10	22.60
2016	114	111	17.5	1,938	24.90	50.92
2017	180	176	11.2	1,969	25.40	52.17
2018	226	223	15.0	3,346	21.50	71.68
2019	105	91	15.2	1,391	15.00	22.75
2020	42	41	16.9	691	20.20	13.66
2021p	59	54	7.6	404	22.40	11.74
2022f	62					

Note: cwt = hundredweight, a unit of measure equal to 100 pounds. f = forecast. p = preliminary.

1/ This table excludes chickpeas with the exception of crop value prior to 2019.

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

Appendix F: Special Article—Fill the Gaps

Return to special article

Table F1: Vegetables in the annual USDA, National Agricultural Statistics Service estimates program, by State.

Commodities	AL	AZ	CA	CO	DE	FL	GA	ID	IL	IN	MD	MI	MN	MS	MO	NJ	NM	NY	NC	OH	OR	PA	SC	TN	TX	VA	WA	WI
Fresh-market																												
Artichokes			P																									
Asparagus			P									P				D											D	
Beans, snap			D			D	D		P			P	P					P			P	P						P
Broccoli		D	D																									
Cabbage		P	P			D	D					P						D							P			D
Carrots			D																								D	P
Cauliflower		D	D																									
Celery			D																									
Corn, sweet			P			P	P		P				P					P			P						P	P
Cucumbers			P			D	D					P							P						P			D
Garlic			P																									
Lettuce, head		P	P																									
Lettuce, leaf		P	P																									
Lettuce, romaine		P	P																									
Onions, dry bulb			P	P			D	P									P	P			D				D		D	
Pea, green													D								D						D	P
Peppers, bell			P			D	D					D				D			D									
Peppers, chile			D														D											
Pumpkins			P						P	D		D						D	D	D	D	D			P	P	P	P
Spinach		P	D													D									D			
Squash			D			D	D					P				D		P	D		P							
Sweet potatoes			P											P					P									
Tomatoes			P			P																						
Processing																												
Asparagus												P				D											D	
Beans, snap			D			D	D		P			P	P					P			P	P						P
Broccoli		D	D																									
Cabbage			P			D	D					P						D										D
Carrots			D																								D	P
Cauliflower		D	D																									
Celery			D																									
Corn, sweet									P				P					P			P						P	P
Cucumbers			P			D	D					P							P						P			D
Garlic			P																									
Onions, dry bulb			P				D	P													D				D		D	
Pea, green													D								D						D	P
Peppers, bell			P			D	D					D				D			D									
Peppers, chile			D														D											
Pumpkins			P						P	D		D						D	D	P	D	D				P	P	P
Spinach		P	D													D									D			
Squash			D			D	D					P				D		P	D		P							
Sweet potatoes			P											P					P									
Tomatoes		P	P																									

Note: P = Estimates published in 2020. D = Estimates made but not disclosed in 2020.

Source: USDA, National Agricultural Statistics Service.

Special Article—Fill the Gaps (continued)

Return to special article

Table F2: Vegetable (field-grown excluding melons) area harvested: 2017 Census of Agriculture

Fresh-market vegetables	2017 Acres	Processing vegetables	2017 Acres
Fresh-market	2,405,751	**Processing**	1,744,648
Artichokes	7,231	**Artichokes**[1]	70
Asparagus	24,485	Asparagus	5,422
Beans, green lima[1]	4,913	**Beans, green lima**[1]	25,400
Beans, snap	79,988	Beans, snap	139,386
Beets[1]	6,919	**Beets**[1]	7,621
Broccoli	132,694	Broccoli	2,490
Brussels sprouts[1]	9,115	**Brussels sprouts**[1]	331
Cabbage, chinese (bok choy)[1]	9,237	**Cabbage, chinese (bok choy)**[1]	812
Cabbage, head	63,180	Cabbage, head	9,116
Cabbage, mustard[1]	1,153	**Cabbage, mustard**[1]	0
Carrots	74,513	Carrots	21,930
Cauliflower	47,982	Cauliflower	2,349
Celery	34,717	Celery	1,871
Chicory[1]	852	**Chicory**[1]	0
Collards[1]	9,677	**Collards**[1]	1,641
Corn, sweet	216,876	Corn, sweet	279,220
Cucumbers and pickles	40,519	Cucumbers and pickles	79,136
Daikon[1]	1,046	**Daikon**[1]	105
Eggplant[1]	5,294	**Eggplant**[1]	71
Escarole & endive[1]	2,432	**Escarole & endive**[1]	0
Garlic	20,014	Garlic	14,888
Ginger root[1]	250	**Ginger root**[1,2]	16
Ginseng[1]	100	**Ginseng**[1,2]	950
Herbs, fresh-cut[1]	17,772	**Herbs, fresh-cut**[1]	0
Horseradish[1]	365	**Horseradish**[1]	2,600
Kale[1]	14,565	**Kale**[1]	760
Lettuce, head	147,369	Lettuce, head	0
Lettuce, leaf	74,399	Lettuce, leaf	0
Lettuce, romaine	121,198	Lettuce, romaine	0
Mustard greens[1]	11,306	**Mustard greens**[1]	780
Okra[1]	3,085	**Okra**	200
Onions, dry bulb	116,418	Onions, dry bulb	47,563
Onions, green[1]	6,081	**Onions, green**[1]	711
Parsley[1]	5,714	**Parsley**[1]	121
Pea, chinese (sugar and snow)[1]	3,069	**Pea, chinese (sugar and snow)**[1]	7,529
Pea, green	6,443	Pea, green	141,348
Pea, southern[1]	8,944	**Pea, southern**[1]	6,299
Peppers, bell (excluding pimientos)	43,686	Peppers, bell (excluding pimientos)	5,115
Peppers, other (including chile)	13,155	Peppers, other (including chile)	11,010
Potatoes	535,792	Potatoes	597,336
Pumpkins	75,342	Pumpkins	18,221
Radishes[1]	14,078	**Radishes**[1]	250
Rhubarb[1]	1,344	**Rhubarb**[1]	183
Spinach	63,410	Spinach	6,559
Squash, summer	33,739	Squash, summer	3,710
Squash, winter	24,859	Squash, winter	7,881
Sweet potatoes	132,220	Sweet potatoes	40,763
Taro[1]	266	**Taro**[1,2]	250
Tomatoes, field	89,459	Tomatoes	245,891
Turnip greens[1]	4,129	**Turnip greens**[1]	1,439
Turnips[1]	3,003	**Turnips**[1]	913
Watercress[1]	698	**Watercress**[1]	0
Others[1]	40,656	**Others**[1]	4,391
Vegetables not in annual program	**186,063**	**Vegetables not in annual program**	**63,443**

1/ Vegetables not in the annual USDA, National Agricultural Statistics Service estimates program.
2/ USDA, Economic Research Service projection.
Source: USDA, National Agricultural Statistics Service, *Census of Agriculture*.

Suggested Citation

Davis, Wilma, Catharine Weber, and Gary Lucier, *Vegetables and Pulses Outlook: April 2022*, VGS-368, U.S. Department of Agriculture, Economic Research Service, April 29, 2022.