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Outlook

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Vegetables and Pulses Outlook: April 2023

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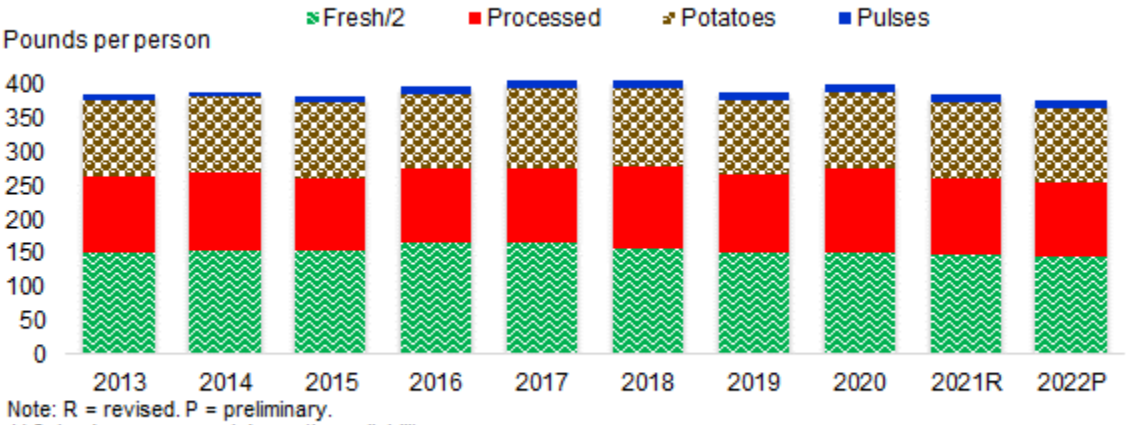
In this report:

Per Capita Availability Declines

In 2022, total U.S. per capita vegetable availability (a consumption proxy) declined 2 percent to 377 pounds. Except for pulse crops, all major categories exhibited decreases. Availability of pulse crops rose 1 percent as pinto and navy bean output increased. Potato availability declined for both table stock and processing products by 2 percent. Fresh-market availability slipped less than 2 percent while processing vegetable availability declined 3 percent in 2022.

U.S. vegetables and pulses: Per capita availability, 2013–22 1/



Note: R = revised. P = preliminary.
1/ Calendar year annual domestic availability per person.
2/ Fresh includes mushrooms and sweet potatoes.
Source: USDA, Economic Research Service, *Vegetables and Pulses Yearbook.*

Industry Overview

Vegetable Production Declines in 2022

Preliminary data indicate that total national supply of fresh-market vegetables declined 3 percent in 2022. Domestic production (largely field-grown), which accounts for nearly two-thirds of fresh-market supply, declined 3 percent in 2022. Production was lower for most of the principal fresh-market vegetables in 2022 due in part to a reduction in planted acres, weather, and pest pressure. Lower production for head and romaine lettuce, onions, and pumpkins offset production gains for leaf lettuce, carrots, and tomatoes.

Preliminary data indicate that per capita availability of all processing vegetables (excluding potatoes, sweet potatoes, and mushrooms) totaled 108.6 pounds in 2022, down 3 percent from a year earlier. Compared with the average of the previous 5 years, per capita availability was down 6 percent. Reduced availability of broccoli, cucumbers, green peas, chili peppers, snap beans, sweet corn, tomatoes, and beets outweighed gains for asparagus, cabbage, carrots, cauliflower, lima beans, dehydrated onions, and spinach.

On the retail side, the Consumer Price Index (CPI) for fresh-market vegetables averaged 5 percent above a year earlier during the first (winter) quarter of 2023. This was well below the 10 percent increase in the overall food-at-home price index experienced this winter in comparison with the first quarter 2022. 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 CPI for processed vegetables (includes fruit) was up 13 percent from a year earlier during the first quarter of 2023. Frozen vegetables led the way with a 20 percent rise, while canned vegetables were up 13 percent.

U.S. potato production was down 4 percent in 2022 compared with the previous year. A combination of factors, including strong prices for alternative crops and high input costs, contributed to a 3 percent decrease in potato planted acreage. USDA, Economic Research Service expects 2023 potato planted acres to increase by 2.5 percent in the 13 USDA, National Agricultural Statistics Service (NASS) surveyed States from last year’s total. Due in part to decreased U.S. domestic production, preliminary data indicate that per capita availability of potatoes declined slightly in 2022 (down 2 percent) from 2021 to 110.7 pounds per person.

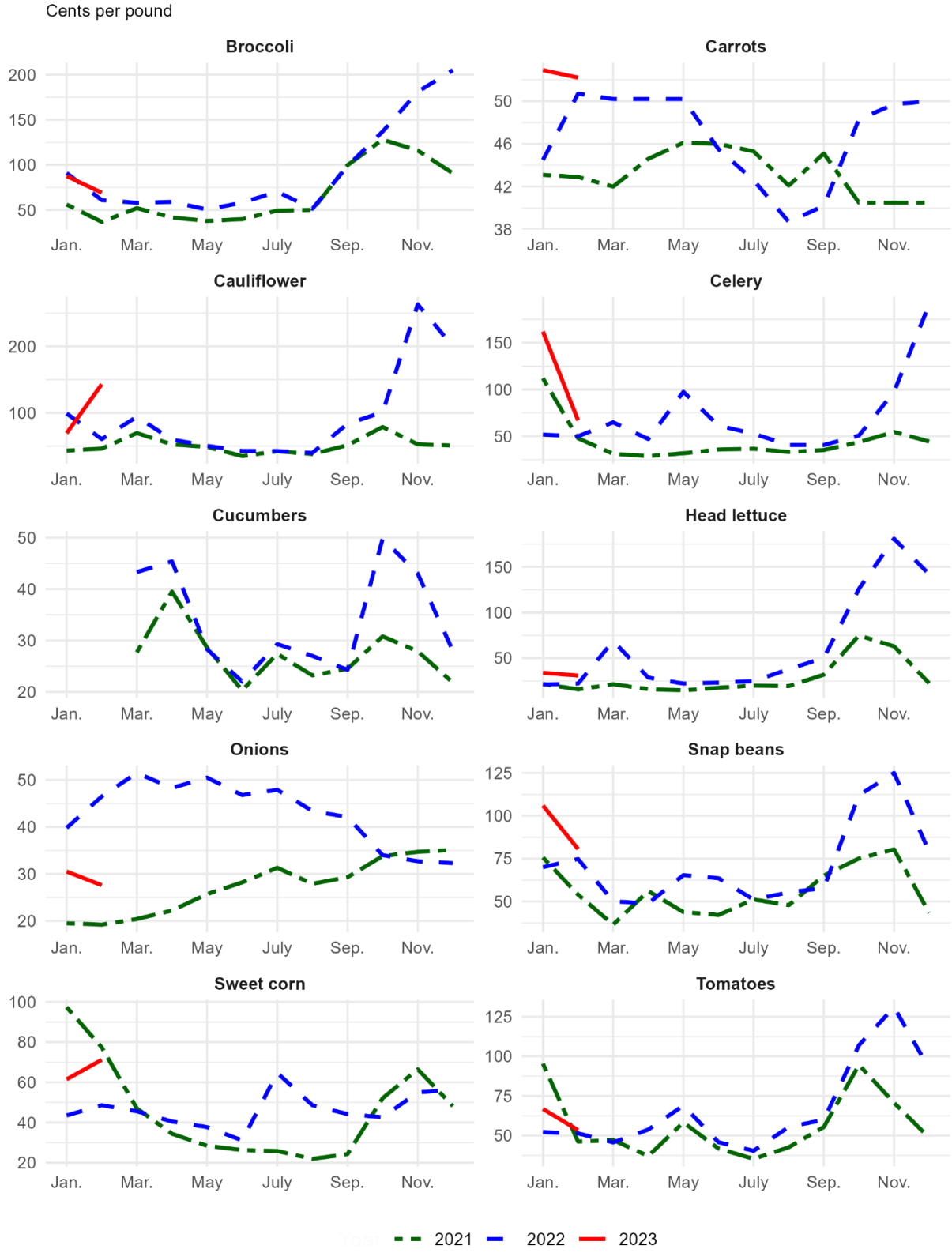
Table 1: U.S. vegetable and pulse industry at a glance, 2019–22/1

Item	Unit	2019	2020	2021	2022	Percent change 2021–22
Area harvested						
Vegetables, fresh and processing/2/8	1,000 acres	2,199	2,141	2,110	2,003	-5.1
Potatoes/9	1,000 acres	937	912	924	896	-3.0
Dry beans, dry peas, lentils, and chickpeas/3	1,000 acres	3,050	3,395	3,089	3,029	-2.0
Mushrooms/4	1,000 acres	30	27	*31*	*30*	-3.1
Total	**1,000 acres**	**6,217**	**6,476**	**6,154**	**5,958**	**-3.2**
Production						
Vegetables fresh/2/8	Million cwt	297	288	272	264	-2.9
Vegetables processing/2/6	Million cwt	352	354	337	333	-0.9
Potatoes/9	Million cwt	424	420	410	392	-4.3
Dry beans, dry peas, lentils, and chickpeas/3	Million cwt	55	66	37	50	33.6
Mushrooms	Million cwt	9	8	8	8	-7.2
Total	**Million cwt**	**1,137**	**1,135**	**1,064**	**1,047**	**-1.6**
Crop value						
Vegetables fresh/2	$ millions	10,305	11,021	9,747	12,569	29.0
Vegetables processing/2/6	$ millions	1,938	1,857	1,949	2,435	25.0
Potatoes/9	$ millions	4,217	3,907	4,174	5,070	21.4
Dry beans, dry peas, lentils, and chickpeas/3	$ millions	1,087	1,483	1,307	1,602	22.6
Mushrooms/4	$ millions	1,135	1,115	1,153	1,064	-7.8
Total	**$ millions**	**18,683**	**19,383**	**18,330**	**22,740**	**24.1**
Imports/7						
Vegetables fresh	$ millions	8,511	9,523	10,008	10,689	6.8
Vegetables processing/5	$ millions	3,202	3,593	3,871	4,408	13.9
Potatoes (including seed)	$ millions	1,529	1,734	2,019	2,543	26.0
Dry beans, dry peas, lentils, and chickpeas/3	$ millions	236	315	355	404	13.8
Mushrooms	$ millions	467	502	595	666	12.0
Total	**$ millions**	**13,946**	**15,667**	**16,847**	**18,709**	**11.1**
Exports/7						
Vegetables fresh	$ millions	2,392	2,306	2,397	2,471	3.1
Vegetables processing/5	$ millions	2,196	2,038	2,255	2,373	5.2
Potatoes (including seed)	$ millions	1,925	1,675	1,873	2,080	11.0
Dry beans, dry peas, lentils, and chickpeas/3	$ millions	620	782	734	674	-8.2
Mushrooms	$ millions	44	42	42	39	-5.6
Total	**$ millions**	**7,177**	**6,844**	**7,301**	**7,637**	**4.6**
Per capita availability						
Vegetables fresh	Pounds	148.8	147.8	145.4	143.1	-1.6
Vegetables processing/5	Pounds	113.1	123.2	112.0	108.6	-3.0
Potatoes/9	Pounds	112.6	115.0	112.9	110.7	-2.0
Dry beans, dry peas, lentils, and chickpeas/3	Pounds	10.3	11.2	10.7	10.8	1.0
Mushrooms	Pounds	3.8	3.7	3.7	3.5	-6.7
Total	**Pounds**	**388.6**	**401.0**	***384.7***	***376.6***	**-2.1**

Note: Hundredweight (cwt) = 100 pounds. $ millions = million U.S. dollars.
1/ Total values rounded.
2/ Utilized production excluding melons.
3/ Includes Austrian winter and wrinkle seed peas where applicable.
4/ Mushroom area equals total fillings (multiple mushroom crops).
5/ Ratio of total value to total production.
6/ Includes canned, frozen, and dried. Excludes potatoes, pulses, and mushrooms.
7/ All international trade data are expressed on a calendar year basis.
8/ Includes both fresh and processed sweet potatoes.
9/ Includes both fresh and processed.
Source: 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 (FOB) prices for selected fresh-market vegetables, 2021–23



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

Input Prices

Agrochemical and Fuel Prices Boost Input Costs in 2022

Average annual prices paid for fertilizer, pesticides, and fuel were higher in 2022 than in 2021. Year-over-year, average annual nitrogen prices increased by 67 percent, pesticide prices increased by 39 percent, and diesel prices increased by 54 percent (table 2). These increases followed an inflationary period in 2021, during which average annual nitrogen prices doubled, average herbicide and insecticide prices increased by 12 percent, and average diesel fuel prices increased by 40 percent. Generally, price increases over the course of the last 2 years were driven by the Coronavirus (COVID-19) pandemic, supply chain disruptions, increased energy costs, extreme weather, and the Russia-Ukraine war. Although agrochemical and fuel prices have decreased from the highs they reached in the spring/summer of 2022, on average, vegetable producers paid 14 percent more for production inputs in 2022 than in 2021.

Table 2: Selected U.S. indices of prices paid by farmers, 2020–23/1

Input	Annual average			First quarter (January–March)		
	2020	2021	2022	2022	2023f	Change[1]
						Percent
Seeds and plants	113.1	117.6	117.3	117.3	117.3	0.0
Fertilizer, nitrogen	69.9	90.9	151.6	150.0	123.3	-17.8
Fertilizer, potash/phosphate	68.1	85.1	110.1	111.0	93.3	-15.9
Chemicals, insecticides	93.2	98.7	137.6	110.7	135.6	22.5
Chemicals, herbicides	96.4	105.3	146.8	118.1	144.7	22.5
Chemicals, fungicides/other	94.7	97.8	136.4	109.8	134.5	22.5
Fuels, diesel	52.5	73.3	112.9	96.9	99.7	3.0
Fuels, gasoline	59.6	78.5	104.4	97.1	89.9	-7.4
Farm machinery	124.8	145.6	171.4	163.7	176.3	7.7
Farm supplies	117.4	127.5	142.1	137.5	145.0	5.4
Custom services	119.6	114.7	126.0	126.0	126.0	0.0
Building materials	120.8	140.5	163.6	160.1	164.7	2.9
Cash rent	124.5	124.5	126.1	126.1	129.0	2.3
Interest	110.9	111.4	112.9	128.6	142.7	11.0
Taxes	126.8	130.0	134.9	138.1	143.8	4.1
Wage rates	138.2	146.1	156.9	157.6	158.4	0.5
Crop sector [2]	111.1	119.0	134.5	132.0	137.0	3.8
Vegetable sector [3]	113.1	121.3	138.8	135.5	137.0	1.1

Note: f = forecast.
1/ First quarter (January–March) change from 2021 to 2022.
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.

Considerable uncertainty exists regarding global fossil fuel supply and pricing trends in 2023. However, prices for diesel and gasoline fuel have decreased since last year's highs and are expected to continue to fall in 2023. Fuel input-specific detail follows:

- According to the U.S. Energy Information Administration's (EIA) Short-Term Energy Outlook released in early April, Brent crude oil prices are expected to drop by approximately 16 percent in 2023 and continue falling (albeit more slowly) in 2024.
- EIA also expects retail gas prices to fall from an average of $3.97 per gallon in 2022 to $3.42 in 2023.
- Generally, EIA's expected decreases in oil and gas prices stem from expected increases in fuel inventories (which grow when production outpaces consumption). Saudi Arabia and other major oil producers announced unexpected production cuts in early April. These reductions, which are expected to start in early May and persist throughout 2023, could limit the extent to which inventories will grow and prices will fall.

For fertilizer costs, U.S. growers generally paid more for nitrogen and potash in 2022 than they did in 2021. This is partly because prices for natural gas, a critical input in the nitrogen fertilizer production process, have been historically high in recent years. In addition, the COVID-19 pandemic disrupted supply chains for intermediate products used in the production of fertilizer, like urea and phosphate. A recent report from economists at Iowa State, *An Examination of Recent Fertilizer Price Changes*, helps explain why fertilizer prices were high in 2021 and 2022:

- In February 2021, a deep freeze in the Southern U.S. Plains caused many natural gas wells to freeze, reducing production, while simultaneously increasing domestic demand. In the fall of 2021, Hurricane Ida disrupted offshore natural gas facilities.
- Toward the end of 2021, global natural gas prices increased dramatically due to low inventories, high demand, and supply disruptions. High prices caused some nitrogen fertilizer plants in Europe to halt or reduce their production.
- Beginning in the summer of 2021, China banned exports of urea and phosphate until June 2022. China has previously been a major supplier of these fertilizer components to the U.S.
- Russia's invasion of Ukraine in late February 2022 led the United States, Canada, Japan, Australia, New Zealand, Taiwan, and much of Europe to levy economic sanctions on Russia. The resulting spike in natural gas prices led many fertilizer plants in France, Hungary, and Italy to reduce their fertilizer production.

Recently, fertilizer prices have fallen substantively. Nitrogen prices were approximately 28 percent lower in February 2023 than they were at their peak in spring 2022. Potash and phosphate prices were approximately 23 percent lower.

Like fuel and fertilizer prices, pesticide (i.e., herbicide, insecticide, and fungicide) prices have also decreased recently. In 2022, there were widespread reports of shortages of critical herbicides containing active ingredients like glyphosate and glufosinate. Among the factors contributing to shortages and high pesticide prices were shipping backlogs, labor issues at U.S. ports, and shortages of truck drivers and shipping materials. Recently, average pesticide prices have dropped. However, shortages persist of certain active ingredients, particularly in herbicides. Supply shortages are expected to continue to ease in 2023 as COVID-19 related restrictions and precautions loosen.

On average, the prices of farm machinery and building supplies rose in 2021 and 2022. In 2023, high interest rates are expected to decrease demand for farm machinery and put downward pressure on farm machinery prices. High interest rates are also expected to decrease demand for commercial and residential real estate and put downward pressure on building supply prices. However, government investment in infrastructure projects may prop up demand for building supplies and limit the extent to which prices of supplies will fall.

Given the high and increasing prices of farm machinery, increases in interest rates, and increases in wage rates in 2022, it is not surprising that the average price of custom rates increased from 2021 to 2022. The recently released *2023 Iowa Farm Custom Rate Survey*, administered every February by Iowa State University, indicates that the cost of a wide range of custom services was up from 2022. The cost of miscellaneous services (which includes tasks like loading or spreading manure and scouting crops) increased the most dramatically year-over-year (24 percent), but harvesting related services were close behind. High interest rates, inflation, and wages may continue to put upward pressure on custom rate prices in 2023.

Labor availability and expense is a critical issue for most commercial vegetable growers. Wage rates rose nearly 6 percent from 2021 to 2022, but relatively little (thus far) in 2023. Unemployment remains at historically low levels, and this may continue to put upward pressure on wages in 2023. Notably, there is uncertainty stemming from recent changes to the H-2A migrant labor program. H-2A workers comprise one-quarter to one-third of all agricultural workers on the West Coast. Changes to the H-2A program that became effective in November 2022 are intended to strengthen worker health and safety protections, update wage

calculations, and facilitate electronic filing and communications (Federal Register, 87 FR 61660).

Changes in average input costs for vegetable and pulse producers are driven by changes in wages, cash rents, custom service prices, fuel prices, and the prices of seeds and plants (all of which account for approximately 75 percent of total input costs, on average). Neither wage rates, cash rents, custom service prices, nor the prices for seeds and plants have changed much, year-over-year, since the first quarter of 2022. Although diesel fuel prices are up approximately 3 percent since this time last year, gasoline prices have dropped by over 7 percent. USDA, ERS's index for input prices paid by vegetable producers is 1.1 percent higher than it was in quarter 1 of 2022. If current trends persist, then the input prices paid by vegetable producers could increase slightly, or even drop throughout the 2023 growing season. If wage rates increase throughout the spring and summer months, then average input costs could rise more substantively.

Fresh Market Vegetables

Storms Led to Wet Fields, Delaying Plantings and Dampening 2023 Production Prospects

U.S. growers are expected to harvest fewer acres of fresh-market vegetables during the first half of 2023 compared with the previous year. Reports of wet field conditions caused by excess rain and strong winds on the Central Coast of California have delayed and restricted planting during February and March, affecting spring vegetable harvest for lettuce and *Brassicas*. Mid-March to early April is the typical transition period for winter vegetables harvested on the West Coast as production moves northward out of Arizona and southern California. As a result of the weather-related delays and restrictions, increased variability in supplies of leafy and cruciferous crops are expected, with fluctuating prices. Retail prices for fresh vegetables are expected to remain higher than usual this spring due to fluctuating supplies.

Table 3: Annual U.S. production of top 5 fresh-market vegetables, 2019–22

Commodity	2019	2020	2021	2022p	Change 2021–22
	Million pounds				*Percent*
Lettuce, all	8,188	8,438	7,486	7,273	-2.8
Lettuce, head	4,201	3,845	3,514	3,319	-5.5
Lettuce, romaine	2,741	3,029	2,723	2,546	-6.5
Lettuce, leaf	1,247	1,564	1,248	1,408	12.8
Onions, bulb 1/	6,134	6,422	5,905	5,438	-7.9
Carrots	2,432	2,416	2,374	2,385	0.5
Tomatoes 2/	2,172	2,109	2,134	2,156	1.0
Pumpkins 1/	1,750	1,964	2,201	1,996	-9.3
Top 5 fresh total	**20,676**	**21,349**	**20,100**	**19,248**	**-4.2**

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.

Production of the top 5 fresh vegetables, excluding potatoes, declined 4 percent in 2022 from the previous year (table 3). Production was lower for most of the principal fresh-market vegetables (excluding potatoes) in 2022 due in part to a reduction in planted acres, weather, and pest pressure. Lower production for head and romaine lettuce, onions, and pumpkins offset production gains for leaf lettuce, carrots, and tomatoes.

Preliminary data indicate that total national supply of fresh-market vegetables declined 3 percent in 2022. Domestic production (largely field-grown), which accounts for nearly two-thirds

of fresh-market supply, declined 4 percent in 2022 (See table a5 in the fresh vegetable appendix). Aside from the top five fresh-market vegetables, production declines for sweet corn, celery, cauliflower, squash, and cucumbers offset production gains for cabbage, bell peppers, spinach, and garlic.

Onions: By value and consumption, onions are one of the top five U.S. vegetable crops. Fresh dry-bulb onion utilized production declined 7 percent to 43.1 million cwt (hundredweight) in 2022 as a 6 percent reduction in area harvested outweighed a 1 percent gain in yield. Processing utilization (the majority of which is for dehydration) was down 1 percent. Although fresh production was lower, 42 percent higher season-average prices likely slowed demand for fresh-market onions. The National Onion Association reported that stocks of fresh dry bulb onions on January 1 were up 2 percent from a year earlier but still among the lowest in several years.

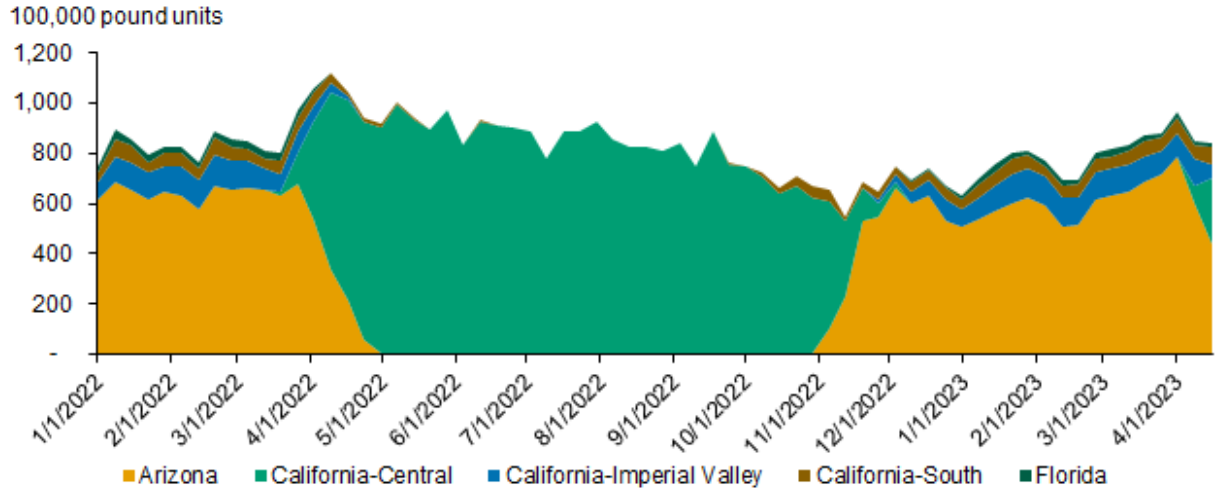
The domestic spring onion season begins around mid-March and runs into early summer. Spring season onions are more perishable (some are still hand harvested to limit damage) than storage onions and account for a little more than one-tenth of the annual U.S. fresh-market onion crop. The bulk of these non-storage onions are grown in Georgia, Texas, and California and are heavily skewed toward higher-priced non-pungent (sweet) onions.

Movement of the 2022 storage crop should finish by the end of April. Onion shipping-point prices have been on a downward trend since last spring's highs so this spring's onion crop will enter a lower-priced market than a year earlier. Reported FOB prices for a 50-pound bag of yellow onions were running about 25 percent below a year earlier during mid-April. Texas growers in the Rio Grande Valley reportedly planted one-third more sweet onions than the 5,200 acres of a year earlier. The yield outlook was favorable due to warm weather and Texas began shipping the 1015 sweet variety in March. However, shipments were stalled in mid-April by 10 days of rain that flooded unharvested fields in the valley. Some acreage was reportedly abandoned due to flooding.

Vidalia onion growers in southeast Georgia completed transplanting in November 2022 but then endured a bout of low December temperatures, which caused minimal damage. Growers there expect to harvest about 10,000 acres in 2023, the same area as a year earlier. The official start to the shipping season was set for April 17. Growers in California's Imperial Valley also began shipping onions in April, while growers in New Mexico endured a cold snap in April but still expect to begin shipping by early June. Planting of the 2023 fall storage crop has begun in California, Colorado, and in other areas that are snow-free.

Lettuce: 2022 romaine and iceberg lettuce production fell as planted acres declined 7 percent from the previous year. California and Arizona faced challenges during the 2022 fall and winter growing seasons as a combination of pest-related challenges like Impatiens Necrotic Spot Virus (INSV) and cool temperatures led to tight supplies. Lower shipment volumes put upward pressure on prices, sending the USDA, NASS head lettuce shipping-point price to a monthly nominal record high of $181 per hundredweight (cwt) in November 2022. While domestic shipment volume from Arizona in early 2023 helped ease prices, heavy rains in California delayed planting and slowed the regional production transition in April from the desert southwest to Central California (figure 2). Shipment volume for romaine and iceberg lettuce from Central California during the first 2 weeks of April 2023 was about one-quarter of the volume recorded in 2022.

Figure 2
Domestic romaine and iceberg lettuce shipments: Rains delay April transition to Central California in 2023



Source: USDA, Economic Research Service using data from USDA, Agricultural Marketing Service, *Market News.*

Most of California Emerges from Drought

On average, 75 percent of California's annual precipitation occurs during the November through March wet season, with about 30 percent of California's water supply dependent on the annual snowpack. A year ago, all of California was classified as being in drought conditions but after this winter, only a small portion of the northeast and the desert southeast remains mostly in the abnormally dry category. The California Department of Water Resources reported that above average precipitation (featuring several strong atmospheric river events) made this year's snowpack one of the largest on record. As of mid-April, California's automated snow sensors indicated that the statewide average snowpack stood at 249 percent of normal and contained the snow water equivalent of 58.3 inches.

Both the Federal Bureau of Reclamation (which operates in 17 western States) and the California Department of Water Resources announced increased water allocations for agriculture compared with a year earlier. The State Water Project announced a 100 percent allocation on April 25, 2023—the highest allocation since 2006 and follows a 5 percent allocation in 2022. The Bureau of Reclamation operates the Central Valley Project which is the largest single source for irrigation water in the State. On March 28, Reclamation increased 2023 initial water supply allocations for irrigation contractors serving the Central Valley from zero in 2022 to 35 percent of their contract total—the highest since 2019's 35 percent.

Based on the announced allocations, water will be less of a limiting factor in 2023 for California's spring, summer, and fall fresh and processing vegetable crops. However, the water situation for winter season fresh vegetables remains at risk over the longer term. The bulk of domestic leafy and cruciferous winter vegetables are produced in the arid southwestern desert regions of California's Imperial Valley and Arizona's Yuma Valley. The desert region depends on irrigation water sourced from the Colorado River system, the sole source of irrigation water for Imperial Valley vegetable growers. Although rain and snowpack were heavy this winter in western states feeding the Colorado River, the 23-year drought led to record low water levels in both Lake Powell and Lake Mead. In April, the Federal Government announced several new investments for water saving infrastructure projects and conservation efforts in the Colorado River Basin to help reduce the long-term over drafting in the system.

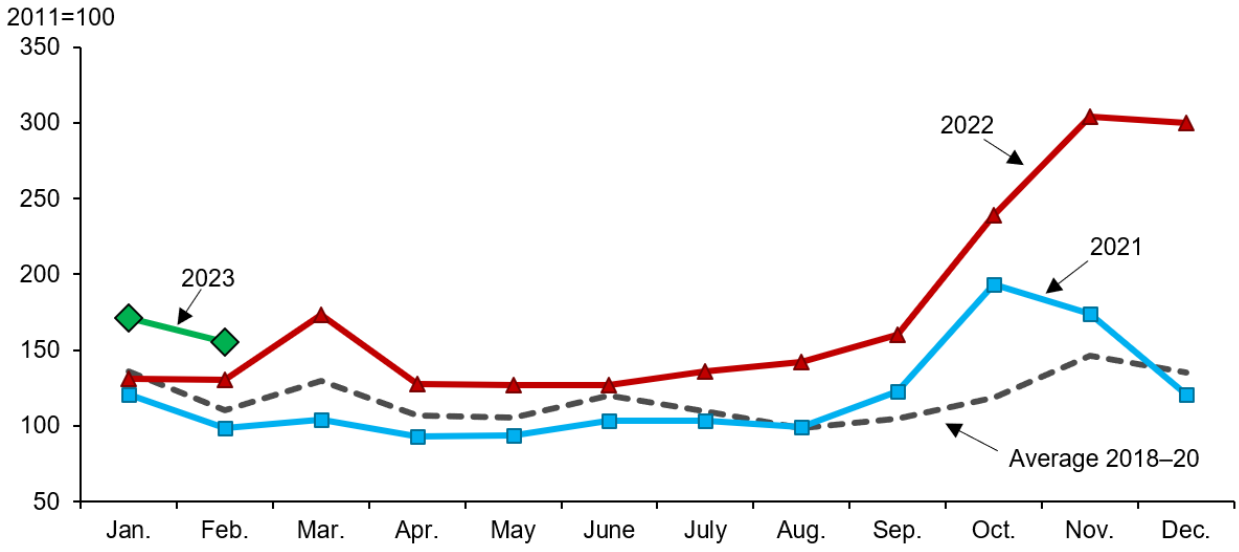
Early 2023 Prices Down from Late 2022 Highs

In 2022, U.S. fresh vegetable value of production (excluding potatoes and mushrooms) rose 29 percent from 2021, driven by higher winter vegetables prices. Fresh-market vegetable crops in California, Florida, and Mexico were hit with a variety of inclement weather during the fall and winter which reduced supplies and contributed to higher shipping-point prices for lettuce, cauliflower, cucumbers, celery, and broccoli.

The domestic vegetable price index computed by USDA, NASS can be used to determine the industry average price change for major vegetables from 2021 to 2022. Overall, prices for the major vegetables (snap beans, broccoli, carrots, cauliflower, celery, lettuce, onions, potatoes, sweet corn, and tomatoes) rose by 46 percent. For January and February 2023, the vegetable price index remained above the same months last year but has fallen below highs observed in October through December 2022 (figure 3).

Figure 3

Monthly vegetable price index, average 2018–23



Source: USDA, Economic Research Service based on data from USDA, National Agricultural Statistics Service, *Agricultural Prices*.

On the retail side, the Consumer Price Index for fresh-market vegetables averaged 5 percent above a year earlier during the first quarter (winter) of 2023 (table 4). This was below the 10 percent increase in the overall food-at-home price index experienced this winter in comparison with the first quarter 2022. 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, 2021–23/1

Price Indices - Items	2021 Q1	2021 Q2	2022 Q1	2022 Q2	2023 Q1P	Change 2022–23/2 Q1
	Index					*Percent*
Consumer Price Indices (CPI, 1982–84 = 100)						
Food at home	252.7	255.9	274.6	285.7	301.9	10
Food away from home	300.6	303.6	320.7	326.2	347.8	8
Fresh vegetables	347.7	346.3	362.8	368.5	379.8	5
Lettuce, all	345.5	339.1	375.5	379.2	411.2	10
Potatoes	374.4	377.7	382.5	408.9	427.7	12
Prepared salads/3	133.1	131.0	142.4	147.8	159.0	12
Tomatoes	350.5	345.3	355.0	348.8	364.0	3
Producer Price Indices (PPI, 1982 = 100)						
Fresh vegetables/4	233.4	181.6	302.4	254.1	289.9	-4
Cabbage	348.0	262.1	277.9	294.8	337.9	22
Carrots	189.3	202.9	232.1	233.1	266.1	15
Lettuce	212.7	173.6	454.3	271.9	311.2	-32
Onions, dry bulb	146.1	147.3	289.5	260.6	191.9	-34
Potatoes	100.8	102.9	141.7	158.7	203.7	44
Sweet corn	367.1	135.9	194.7	168.2	247.8	27
Tomatoes	252.0	275.7	248.1	298.7	251.0	1

Note: Q = calendar quarter. P = preliminary.
1/ Not seasonally adjusted.
2/ Percent change in a simple average of quarter 1 (January–March) in 2023 compared with quarter 1 of 2022.
3/ Index base is 2007 = 100.
4/ Excluding potatoes.
Source: USDA, Economic Research Service calculations using U.S. Department of Labor, Bureau of Labor Statistics data.

Fresh Vegetable Import Volume Up in 2022

In calendar year 2022, the United States remained a net importer of fresh-market vegetables in both volume and value terms. Table A6 includes import and export volumes for selected fresh vegetables. Trade highlights for fresh vegetables in 2022 and January–February 2023 include:

- Value of fresh vegetables (excluding potatoes and mushrooms) imports rose 7 percent to $10.7 billion while the value of exports increased 3 percent to $2.5 billion.
- In 2022, fresh lettuce imports totaled over 1.1 billion pounds with volume rising for head lettuce (up 40 percent) and non-head lettuce (up 13 percent) compared with the previous year. Mexico was the top fresh lettuce supplier to the United States, accounting for 87 percent of head lettuce import volume and 95 percent of non-head lettuce import volume in 2022.
- Sweet potato fresh/dried import volume reached a record 142.5 million pounds in 2022 with 86 percent of that volume imported from China. The United States remained a net exporter of sweet potato fresh/dried in 2022 with export volume (506 million pounds) down 14

percent from 2021. While China is the world's largest producer of sweet potatoes, the United States has long been the world leader in sweet potato exports. However, preliminary trade data from Trade Data Monitor (TDM) reports the United States ranked second in global sweet potato fresh/dried export volume behind Egypt (582 million pounds) in 2022.

Per Capita Availability of Fresh Market Vegetables

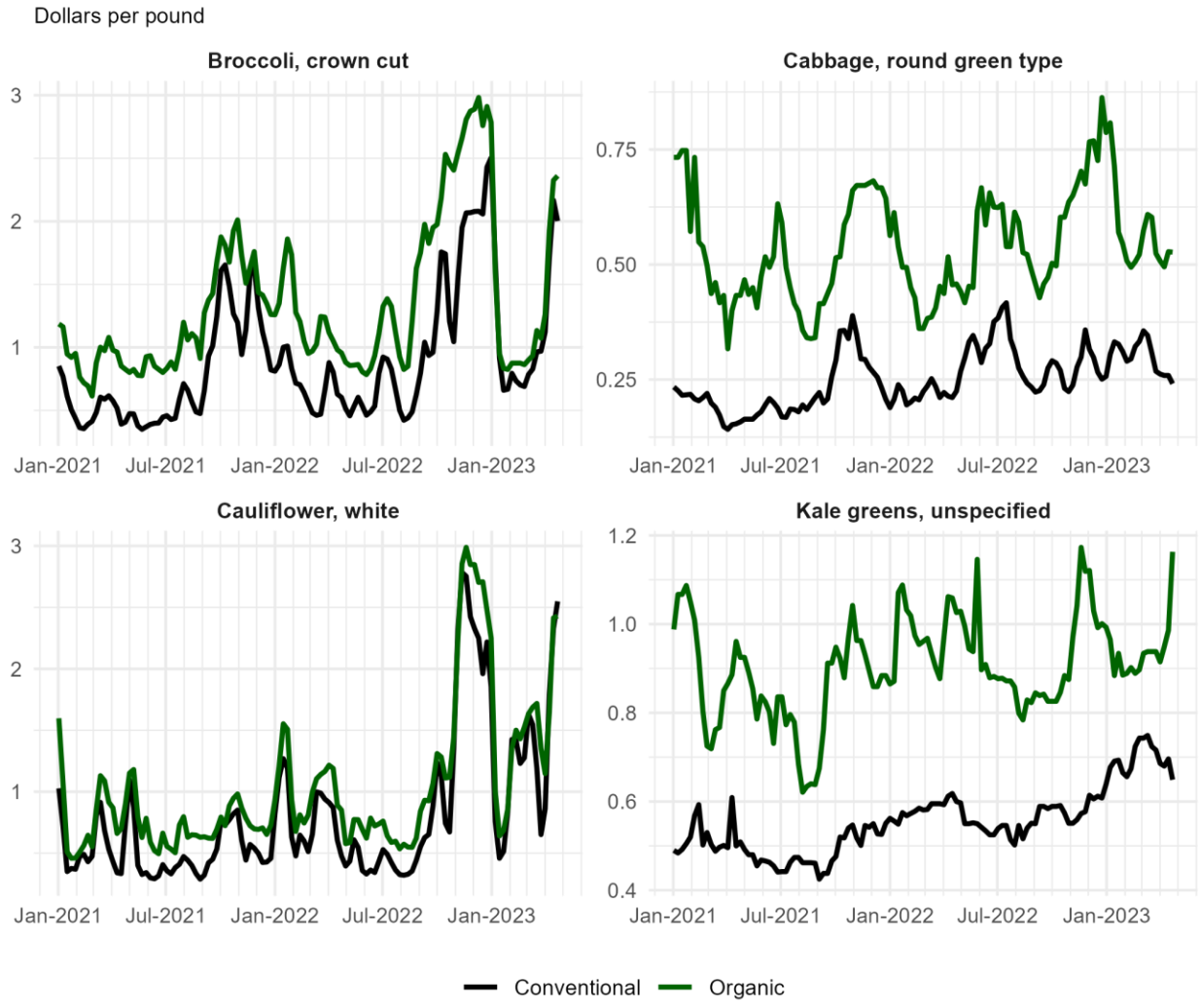
Preliminary data indicate per capita availability of fresh market vegetables (excluding potatoes and mushrooms) slipped by 1.6 percent to 143.1 pounds during 2022. The declines in bulb onions, head lettuce, and bell peppers offset gains in romaine lettuce, tomatoes, carrots, and cucumbers.

- Among the major *Brassicas*, per capita availability declined in 2022 for cauliflower (down 6 percent) while increases in cabbage (up 5 percent) and broccoli (up 4 percent) were realized.
- Lettuce (defined as field-grown leaf, romaine, and iceberg) per capita use declined marginally by less than one-half of 1 percent to 23.1 pounds in 2022. 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 an additional 2 percent to a record low 10.4 pounds in 2022.
- In 2022, per capita availability increases for non-*Brassica* crops of at least 5 percent from a year earlier include garlic (up 38 percent), artichokes (up 23 percent), spinach (up 22 percent), and eggplant (up 5 percent). Per capita use declines for non-*Brassicas* of 5 percent or more include asparagus (down 15 percent), celery (down 12 percent), sweet potatoes (down 11 percent), and both squash and bulb onions (down 8 percent).

2023 Organic FOB Prices Down After Early Price Spike

February and March 2023 organic FOB prices for several fresh-market vegetables were down from highs observed in the previous 2 months (table a8). Prices spiked early in 2023 as cool temperatures slowed crop progress in key growing regions for organic and conventional winter vegetables. As spring production began to shift from western Arizona to California for popular organic and conventional *Brassicas*, FOB prices rose again as rains impeded planting and harvest (table a8 and figure 4).

Figure 4
Organic and conventional weekly FOB prices for *Brassicas* down in 2023 after winter spike



Note: Per pound weight conversions based on container approximate net weights as reported by USDA, Agricultural Marketing Service.
Source: USDA, Economic Research Service based on data from USDA, Agricultural Marketing Service.

Organic Imports Up, Exports Down in 2022

The U.S. Department of Commerce, Bureau of the Census reports organic trade for some fresh vegetable and pulses (table a9). Organic trade highlights include:

- In 2022, organic bell pepper (greenhouse and other) import volume was up 7 percent from the previous year. Mexico accounted for the largest share of organic bell pepper import volume in 2022 at 89 percent, with 78 percent of that volume (86.9 million pounds) designated as greenhouse production. Canada usually accounts for less than 2 percent of U.S. organic bell pepper import volume, but a surge in 2022 brought Canada's share to 8 percent.
- Imports of organic dried yellow peas rose 10 percent in 2022 compared with 2021 as a 24 percent decline in import volume from Russia (down 9 million pounds) was more than offset by Turkey (17.5 million pounds). The organic dried yellow pea trade code went into effect in 2016; 2022 marked the first year the United States imported organic dried yellow peas from Turkey.
- In July 2022, new organic import trade codes for tomatoes and cucumbers were added. Between July 2022 and February 2023, import value for organic tomatoes was $123 million (6 percent of total fresh tomato import value) and organic cucumbers was $72 million (9 percent of total fresh cucumber import value).
- For U.S. organic vegetable exports, lettuce (excluding head lettuce like iceberg) continued to lead in terms of value in 2022 ($74.8 million) and in terms of volume (70.9 million pounds).
- Organic fresh potato export volume was nearly 22.3 million pounds in 2022, up 41 percent from the previous year and the highest annual volume on record since the trade code was added in 2011. Most of the export volume went to Canada (83 percent) and Mexico (15 percent).
- U.S. export volume of organic carrots, cauliflower, and celery fell in 2022 from 2021 levels as unit values increased 11, 35, and 21 percent, respectively.

Processing Vegetables

Processing Tomato Output and Prices Expected to Rise

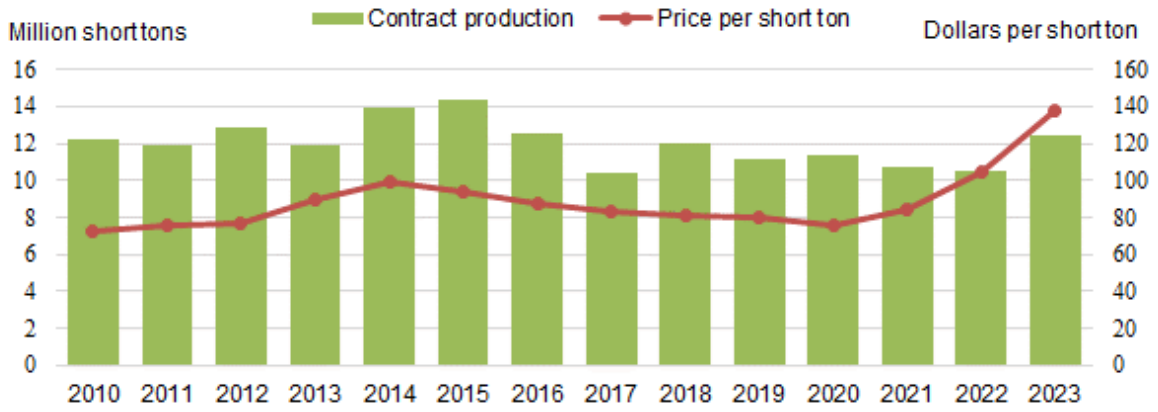
With over 90 percent of U.S. tomatoes produced in California, decisions made by California tomato producers and processors heavily influence changes in domestic tomato prices. Given availability of accurate data characterizing the California tomato market, this section focuses on California-level information and outcomes.

The 2023 California Processing Tomato Report indicates that California tomato processors intend to contract for 12.4 million tons of tomatoes for processing into canned, frozen, and dried tomato products—up 18 percent from the 10.5 million tons produced in 2022 (figure 5). 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 each year. An update to the early January intentions report will be released by the NASS California office on May 31.

A year ago, the California Processing Tomato Report indicated a total of 12.2 million tons were planned by processors, but periods of extreme heat, continued drought, and water restrictions reduced the final tally to 10.5 million tons. The tomato industry could face similar weather-related challenges this season, although heavy rain early in the growing season may foreshadow lower drought pressure than in 2022.

Although the 12.4 million tons that processors intend to contract for in 2023 would be above the average of the previous 5 years, it kicks a critical supply problem down the road. Tomato paste inventories are even lower this growing season than they were during the 2021/22 season. The California League of Food Processors reports that there were only 3.5 million tons of tomato paste in packages or inventory as of March 2023, a nearly 20 percent decrease since March 2022 (when approximately 4.3 million tons were available). If this year's crop falls below intentions, imports are likely to continue to rise and exports are likely to fall.

Figure 5
California processing tomato contract production and field price, 2010–23



Note: One short ton is equal to 2,000 pounds. Contract production for 2023 represents processor intentions.
Source: USDA, Economic Research Service calculations using USDA, National Agricultural Statistics Service and California Tomato Growers data.

CA Producers and Processors Reach Agreement on Contract Tomato Price

- The California Tomato Growers Association (CTGA) and all processors agreed on a base contract price for conventionally grown raw tomatoes at the point of first delivery. The agreed upon price for conventionally grown tomatoes is $138 per ton, which is a 24 percent increase from 2022's base price of $105 per ton (which was up 24 percent from 2021's agreed upon base price of $84.50). As of early February 2023, the base price for organically-grown processing tomatoes had not been set.
- Although fuel and agrochemical input prices have decreased since their highs in 2022, a combination of high input prices and higher prices for the field crops competing with tomatoes for acreage, as well as uncomfortably tight inventories of paste and other finished products, likely contributed to early price agreement within the industry.
- As processed tomato product inventories have continued to tighten, wholesale tomato paste prices have risen. 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 approximately 50 percent higher in the first quarter of 2023 than the average price of tomato paste in 2022. In real terms, tomato paste prices have not been this high since the late 1980s.
- According to industry data, the manufacturer price for bulk (55-gallon drum) tomato paste ranges from approximately 80 to 116 cents per pound (depending on the percent of natural tomato soluble solids). In the early 1980s, real tomato prices were almost 180 cents per pound (in 2021 dollars). These prices dropped in the decades that followed, plateauing

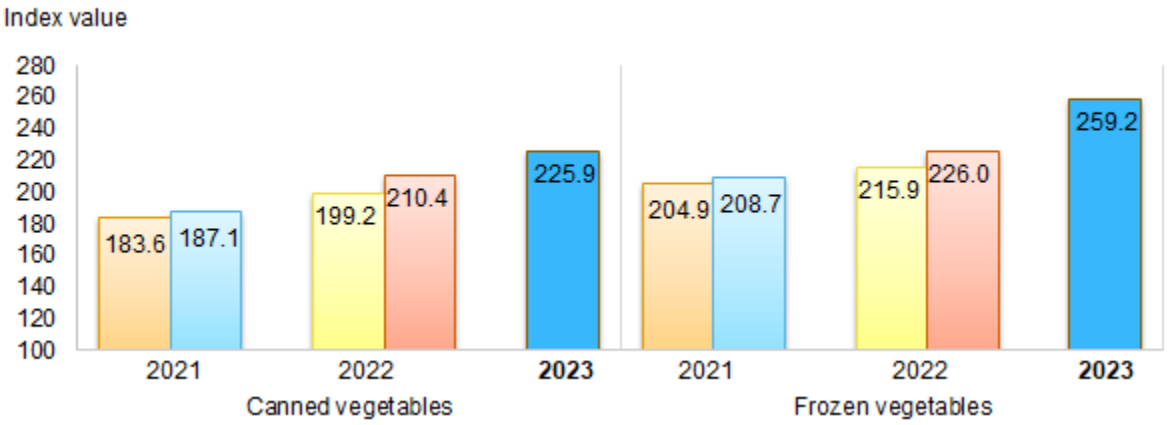
between 40 and 50 cents per pound at the turn of the century through 2020. Real tomato paste prices have risen dramatically over the last several years. Rising paste prices reflect a tightening of the California processed tomato stock situation. The California League of Food Processors reported the March 1 inventory of tomato paste pack and inventory (converted to a raw product “paid for ton” equivalent) was about 20 percent below a year ago.

Processed Vegetable Prices Rising

As with most agricultural prices, wholesale and retail prices for processed vegetables were higher in 2022 than in 2021. So far, this trend has persisted into 2023. Wholesale prices for processed vegetables (the index includes fruit) were up about 19 percent, year over year, during the first quarter of 2023. Most wholesale price gains for processed vegetables have been concentrated over the past 6–9 months and generally reflect the impact of increases in 2022/23 processing costs and 2022/23 contract prices. Generally, wholesale costs increased more quickly than retail costs.

- Wholesale prices for all frozen vegetables were up 26 percent from a year earlier during the first quarter of 2023. The increase reflects historically strong (up 37 percent) increases in potato product (mostly french fries) prices and more modest gains for other frozen vegetables (up 11 percent).
- The Consumer Price Index (CPI) for processed vegetables (includes fruit) was up 13 percent from a year earlier during the first quarter of 2023. Frozen vegetables led the way with a 20 percent rise, while canned vegetables were up 13 percent.
- Generally, retail prices for processed fruits and vegetables have increased more quickly than prices for other types of food. On average, prices for food consumed at home were 10 percent higher in the first quarter of 2023 than in 2022. Prices for food consumed away from home were 8.5 percent higher.

Figure 6
Processed vegetables: U.S. Consumer Price Index (CPI), 2021–23 for Q1 and Q2



Note: Q1 = quarter 1 for months January–March, Q2 = quarter 2 for months April–June. The base year for the CPI for canned vegetables is 1997; the base year for the CPI for frozen vegetables is 1982–84.
Source: USDA, Economic Research Service using data from U.S. Department of Labor, Bureau of Labor Statistics.

- The canned vegetable Producer Price Index (PPI), a measure of prices paid to domestic producers for their output, indicates that canned vegetable prices rose 23 percent, year-over-year, during the first quarter of 2023. Much of the gain reflects higher prices for tomato products and pickled vegetables with moderate gains for other canned vegetables.
- First quarter wholesale prices were up 18 percent for catsup and tomato-based sauces reflecting tighter stocks, higher input costs over the past year, and continued drought in California.

Processed Exports and Imports Up in 2022

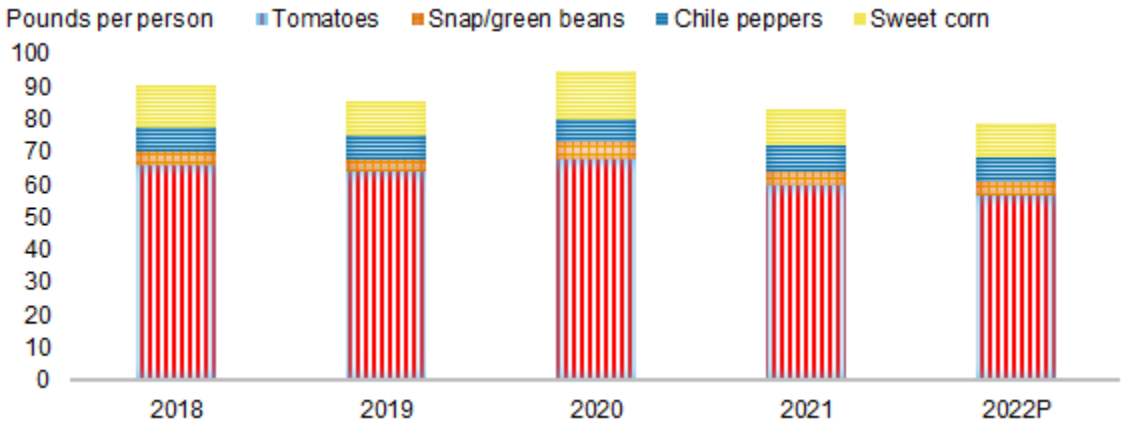
- In 2022, the value of processed vegetable (including potatoes and mushrooms) exports rose 8 percent to nearly $4 billion (see table b10 and table b11). Canada (up 7 percent to $1.1 billion), Mexico (up 6 percent to $0.71 billion), and Japan (up 9 percent to $0.58 billion) remained the leading foreign processed vegetable buyers in 2022.
- In 2022, processed vegetable import value rose 16.4 percent to nearly $6.8 billion and is currently 14 percent above a year ago in early 2023 (January–February).
- The fresh-weight equivalent volume of processed tomato exports dropped 3 percent to 5.7 billion pounds. This was driven by decreases in exports of ketchup, tomato paste, whole tomatoes, and tomato juice. Exports of tomato purees and sauces increased slightly but did not offset decreases in other processed tomato products.
- The fresh-weight equivalent tomato import volume increased 29 percent from last year's record high to a new high of 3 billion pounds. If processing tomato production fails to approach intended levels in 2023, import volume will likely set another record high.

- The fresh-weight equivalent tomato export volume accounted for nearly 15 percent of 2022 processed tomato supply while imports satisfied a record 16 percent of domestic availability.
- Frozen sweet potato export volume (product-weight) reached a record-high 44.7 million pounds in 2022, a 794 percent increase compared with 2021. The large year-over-year jump stems from increases in exports to the European Union, which went from accounting for 1 percent of U.S. frozen sweet potato export volume market share in 2021 to 80 percent in 2022.
- In 2022, the fresh-weight equivalent volume of processed sweet corn (canned and frozen) exports dropped 5 percent to 871 million pounds--the lowest since 1990 and 12 percent of processed sweet corn supply. Frozen corn export volume was down 8 percent while canned sweet corn exports rose 1 percent.
- Despite adequate industry stocks, processed sweet corn import volume rose 10 percent to 518 million pounds in 2022. This follows a 24 percent rise in 2020, and a 34 percent rise in 2021. Imports now fulfill a record-high 14 percent of processing sweet corn availability.
- The fresh-weight volume of pickling cucumber imports rose 19 percent to 158 million pounds. Since the pandemic, import volume has been high. Most additional volume has come from India (and to a lesser extent Mexico and Canada). Imports now satisfy 16 percent of domestic availability, up from less than 10 percent over the past 2 decades.
- Pickling cucumber exports continued recovering from their pandemic lows, rising 24 percent to a record breaking 135 million pounds.
- The fresh-weight volume of dehydrated (dried, powdered, flour) onion exports rose almost 4.5 percent to 562 million pounds. Following a 78 percent surge in import volumes in 2021, dehydrated onion imports rose an additional 26 percent to 221 million pounds—the highest on record. Exports accounted for 48 percent of 2022 supply while imports satisfied 41 percent of domestic availability.

Processing Vegetable Per Capita Availability Declined in 2022

Preliminary data indicate that per capita availability of all processing vegetables (excluding potatoes, sweet potatoes, and mushrooms) totaled 108.6 pounds in 2022, down 3 percent from a year earlier (figure 7). Compared with the average of the previous 5 years, per capita availability was down 6 percent. Reduced availability of broccoli, cucumbers, green peas, chili peppers, snap beans, sweet corn, tomatoes, and beets outweighed gains for asparagus, cabbage, carrots, cauliflower, lima beans, dehydrated onions, and spinach.

Figure 7
Processing vegetables: Per capita availability, 2018–22 /1



Note: P = preliminary.
1/ Calendar year annual domestic availability per person.
Source: USDA, Economic Research Service, *Vegetables and Pulses Yearbook*.

A few of the key changes in 2022 per capita availability estimates include:

- **Tomatoes:** Annual per capita availability of processing tomatoes was estimated at 56.7 pounds in 2022, down 5 percent from the previous year. Despite record-high imports, a short crop and low carryover stocks pulled total domestic supply down to 38.6 billion pounds—the lowest since the turn of the century. In 2023, 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:** Though domestic production increased 2 percent from 2021 to 2022, last year's sweet corn crop was still one of the smallest crops in 4 decades. Reduced at-home meal preparation pulled annual per capita availability of canning and freezing sweet corn down 4 percent to 10.9 pounds in 2022.
- **Snap/green beans:** The supply of snap beans fell 6 percent in 2022, largely due to decreases in domestic production (-3.5 percent) and imports (-13.5 percent). Though imports remain at historically high levels, per capita availability of processed snap beans (on a fresh basis) dropped 9 percent to 4 pounds in 2022. 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):** Increases in domestic production (5 percent) and imports of canned chiles (23 percent) did not fully offset larger decreases in imports of fresh chiles (down 9 percent) and dehydrated chiles (down 7 percent) in 2022. These changes put downward pressure on per capita chile pepper availability, which dropped 6 percent to 7.4 pounds. Notably, availability is still 7 percent higher than it was prior to the pandemic in 2020.

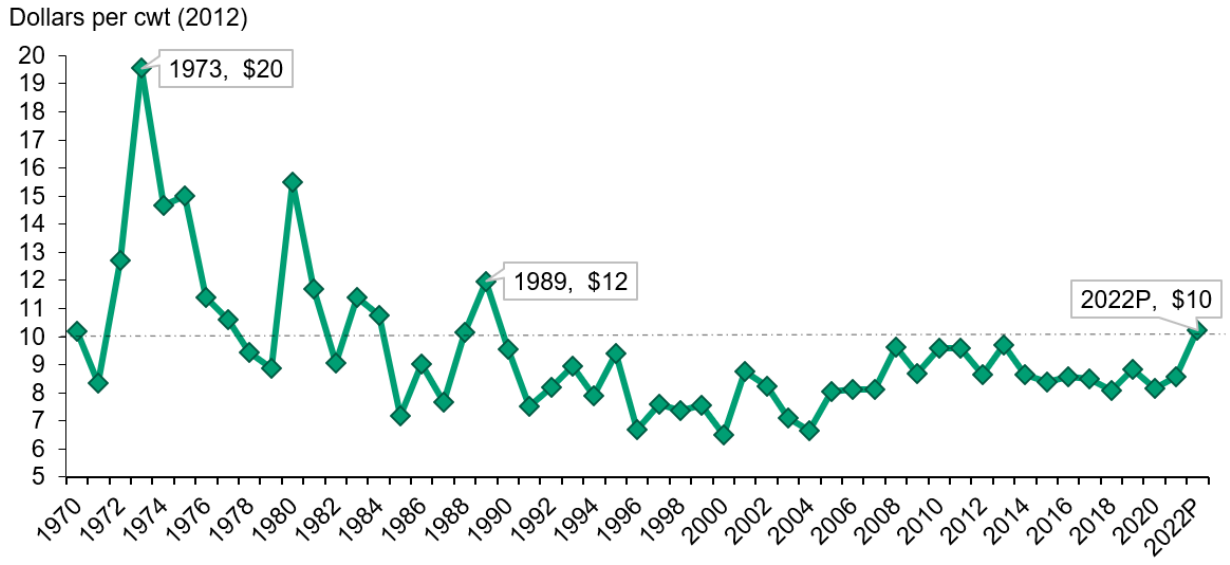
Potatoes

Planted Acres Dropped in 2022, Expected Higher in 2023

Recap on 2022 season: U.S. potato production was down 4 percent in 2022 compared with the previous year. A combination of factors, including strong prices for alternative crops and high input costs, contributed to a 3 percent decrease in potato planted acreage (table c12).

- The Pacific Northwest (PNW) (Idaho, Washington, and Oregon) recorded a 6 percent decline in production in 2022 compared to the previous year. Cool wet weather in parts of the PNW delayed spring planting and slowed crop development, leading to a drop in yield in all three States.
- The production declines in PNW put upward pressure on fresh (table stock) and processed potato prices. On average, Idaho, Washington, and Oregon account for 60 percent of U.S. potato production and about 80 percent of potato processing volume.
- Due in part to decreased domestic production, preliminary data indicate that per capita availability of potatoes declined slightly in 2022 (down 2 percent) from 2021 to 110.7 pounds per person. The decline in preliminary per capita availability is observed despite increased production in four States (North Dakota, Minnesota, Nebraska, and Texas) and greater import volume for fresh, frozen, chips, and potato starch in 2022 compared with the previous year.
- The projected 2022 season average potato price was $12.90 per cwt, according to the USDA, NASS, *Crop Values 2022 Summary* (January 2023). The 2022 season average price is 26 percent higher than last season, a record high in nominal terms. Contributing factors to the price increase in potatoes include decreased domestic production, inflation, increased crop input costs, and above trend year-over-year increases in processing potato contract prices. While 2022 marks a nominal record high season average price, in real (inflation-adjusted) 2012 dollars, the price was above $10 for the first time since 1989, but below prices observed in the 1970s and 80s (figure 8).
- On the retail sales side, dollar sales for fresh potatoes rose 15.2 percent to $3.8 billion while fresh-weight equivalent volume sales fell 1.2 percent in 2022 from a year earlier, according to a *Potatoes USA* retail sales report. In 2022, 5-pound and 10-pound pack sizes represented 78 percent of fresh potato volume sales, and Russet remained the top fresh potato variety, accounting for 63 percent of retail volume.

Figure 8
Season average potato price 1970–2022P, inflation-adjusted



P = Preliminary. Cwt = hundredweight.
Note: The gross domestic product implicit price deflator is used to allow purchasing power comparisons over time, converting the nominal (current-dollar) statistics to real (inflation-adjusted) amounts (2012=100).
Source: USDA, Economic Research Service and Vegetable and Pulses Yearbook Data.

Potato planting expectations in 2023: USDA, ERS expects 2023 potato planted acres to increase by 2.5 percent in the 13 NASS surveyed States compared with 2022.

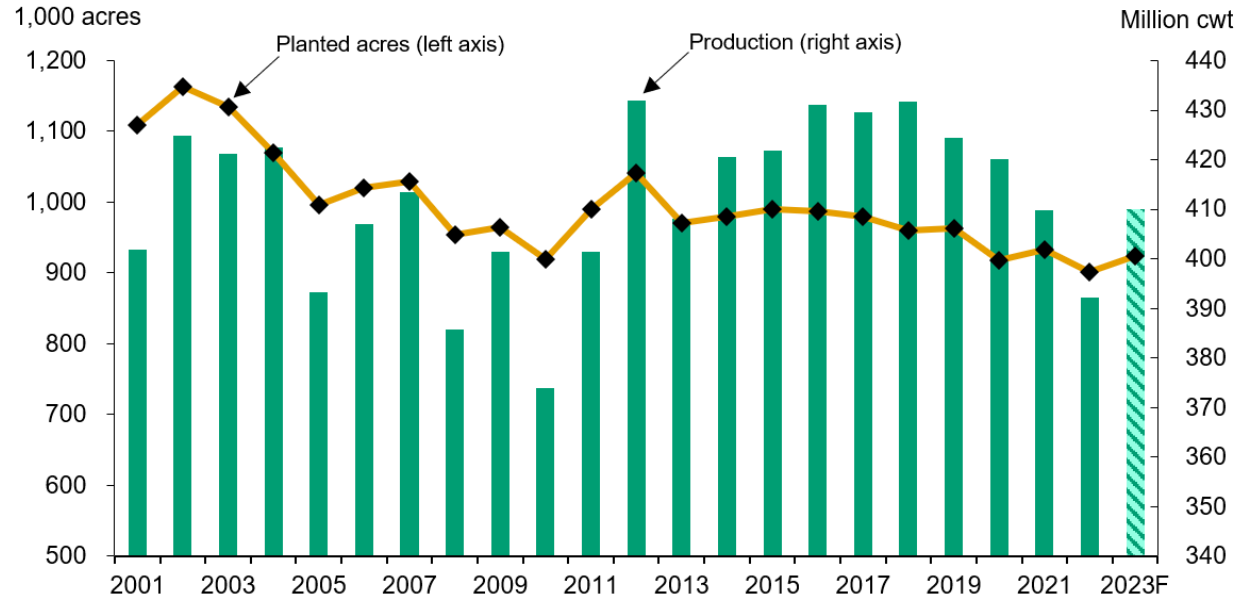
- While the 2023 potato planted acres forecast is above 2022, it is 9,500 acres less than 2021 (figure 9). Idaho and Washington are likely to increase potato plantings in 2023 as production declines in back-to-back seasons have led to tight supplies of processing potatoes.
- Weekly planting progress reports in April 2023 by the USDA, NASS Pacific Northwest office note potato planting may be late again this season in some areas due to snow cover and cooler temperatures. For the week ending April 16, 2023, 7 percent of potatoes were planted in Idaho (5-year average is 20 percent) and 19 percent in Washington (5-year average is 35 percent). Late planting and a cool spring may lead to a decrease in potato sizing and lower yields. Average U.S. potato yields have remained below trend the last 2 years due in part to weather.
- According to industry reports, the contract price negotiations for processing potatoes have stalled between some large processors and growers. One large potato processor in the Pacific Northwest announced in January 2023 that it planned to increase contract prices by about 20 percent for the second year in a row. While an increase in processed potato contract prices in 2023 is expected, it is a departure from the less volatile year-to-year changes in processing potato prices observed over the past decade. Between

2011–21, the annual percentage change for processing potatoes ranged from -5 to +7 percent.

- USDA, NASS report monthly grower prices for fresh potatoes have ranged from $18.50 to $25.90 per cwt since the beginning of the 2022/23 marketing year (MY) (September–February). In contrast, 2021/22 MY (September–February) fresh potato prices ranged from $13.10 to $14. Fresh potato grower prices are expected to remain high during the 2022/23 MY until early fall harvest eases supply constraints.
- Despite tighter domestic supplies, fresh potato export volume (excluding seed) in the first 6 months of the marketing year (September–February) was up 7 percent from the same period last season (table c13). U.S. fresh potato export volume to Mexico rose 41 percent in the first half of the 2022/23 MY compared with 2021/22, accounting for 33 percent of total export volume. See the special article at the end of this outlook report for additional discussion on North American potato trade.
- Import volume of frozen french fries in the first half of the 2022/23 MY was up 11 percent from 2021/22 MY at 1.27 billion pounds. Canada (86 percent) and the European Union (13 percent) accounted for most of the volume. The share of frozen potatoes imports (french fries and other) has trended upward over the past 30 years, representing 34 percent of available domestic supply during the 2022 calendar year.

Figure 9

Top 13 potato-producing States: annual planted acres and production, 2001–23F



F = Forecast. Cwt = 100 pounds.
Note: 2023 estimated production is calculated based a 3-year average for harvest acres (99.2 percent) and 3-year average yield (447.6) cwt per acre. Top 13 States are California, Colorado, Florida, Idaho, Maine, Michigan, Minnesota, Nebraska, North Dakota, Oregon, Texas, Washington, and Wisconsin.
Source: USDA, Economic Research Service based on data from the USDA, National Agricultural Statistics Service.

Dry Edible Beans

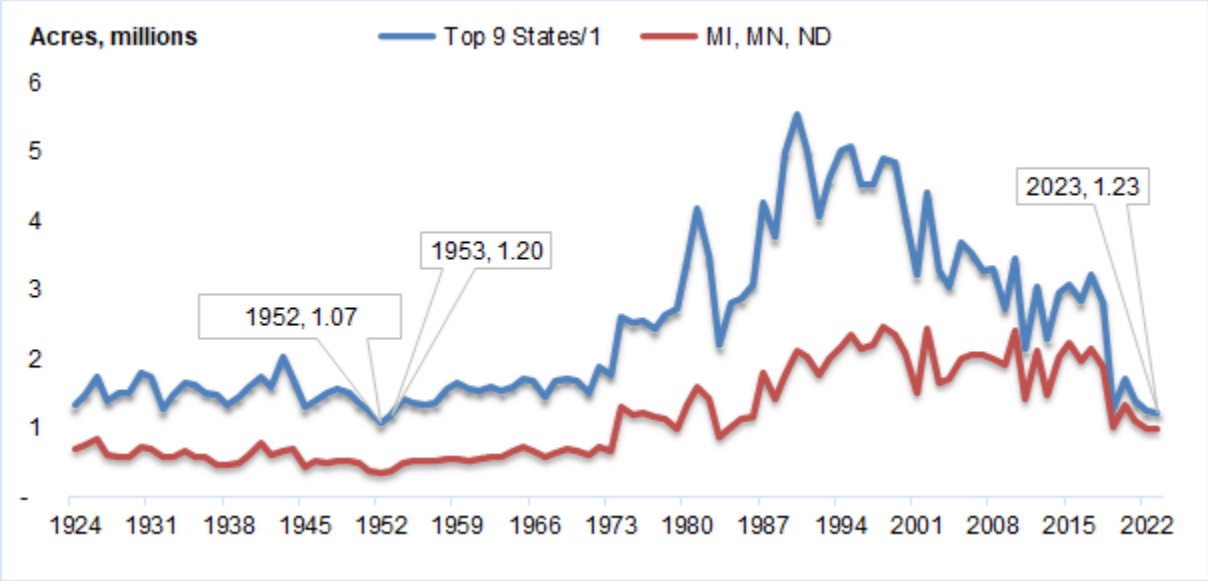
Dry Bean Prospective Area, Production, Stocks, and Prices

April 2023 marks the seventh month of the 2022/23 dry bean marketing year which began in September 2022 and ends in August 2023. Most planting decisions for the 2023 crop have been made but a variety of factors can influence the final crop mix well into spring such as weather, crop market conditions, the availability and prices of production inputs, and competing acreage from other crops. Recent reports and statistics from USDA, NASS and the Upper Great Plains Transportation Institute (UGPTI) at North Dakota State University provide the basis for outlook analysis.

Dry Bean Prospective Area Lowest Since 1953

- Prospective planted area for dry edible beans (excluding chickpeas) is expected to be reduced by 2 percent to 1.23 million acres in 2023 following a 10 percent drop in planted acreage the previous year. This reduction in planted area likely reflects larger stocks and expectations for continued favorable yields. If realized, this would be the lowest reported dry bean area since 1953 and the third lowest since 1924 for the reported nine States shown in the figure below.

Figure 10
U.S. dry edible beans: Prospective area in 2023 lowest since 1953



Note: The second number in the data labels correspond to the number of acres in the specified year, i.e., 1.23 million acres in 2023.
1/ The top 9 States include Michigan, Minnesota, North Dakota, California, Colorado, Idaho, Nebraska, Washington, and Wyoming.
Source: USDA, Economic Research Service using data from National Agricultural Statistics Service, *Prospective Plantings.*

- The top 3 dry bean States in 2023 are North Dakota, Michigan, and Minnesota, representing 81 percent of U.S. prospective planted acres. Minnesota's intended decline (down by 12 percent) offsets an increase in North Dakota planting intentions (up 4 percent) and no change in Michigan's planting from the previous year. If realized, this would be the lowest reported dry bean area for the top three States since 1983 and the third lowest since 1973. Growers in three of the nine reported States in 2023 expect to plant fewer acres than the previous year—Nebraska (down 26 percent), Minnesota (down 12 percent), and Wyoming (down 6 percent). The other six States prospective planted area changes from the previous year range from no change (Michigan and Idaho) to 50 percent higher in California, where irrigation water will not be a limiting factor this year. California represents less than 2 percent of total dry bean seeded area—mostly devoted to limas and blackeyes.
- Table D14 in the dry bean appendix provides a comprehensive listing of USDA, NASS estimates of dry bean area, yield, production, price, and crop value for 2020–23.

Dry Bean Production and Stocks Up

- In 2022, the top 5 bean classes in terms of production were pinto (1,073.5 million pounds), black (599.2 million pounds), dark red kidney (133.2 million pounds), navy (pea) (360.8 million pounds), and light red kidney (111.7 million pounds).
- Compared with 2021, pinto bean outputs increased by 46 percent, navy (pea) beans increased by 33 percent, and light red kidney beans decreased by 11 percent. The other bean classes had relatively small percentage changes. Blackeye pea production decreased by 34 percent, and small white bean production decreased by 39 percent.
- The North Dakota Public Service Commission sent out 37 surveys to licensed companies handling dry edible beans and all 37 companies returned the surveys indicating their dry bean stock levels. At least three or more bean stock surveys must be received for UGPTI to reports stock levels to ensure confidentiality. On December 31, 2022, UGPTI reported stocks for navy beans (up by 31 percent to 151 million pounds), pinto (up by 57 percent to 684 million pounds), and black beans (up by 16 to 111 million pounds) from the previous year. Small red bean stocks, which were last reported in 2017, were estimated to be 25 million pounds at the close of 2022.

Dry Bean Marketing Patterns

Monthly marketings of dry edible beans are influenced by factors such as local and international growing conditions, contract sales, prices, and market demand. Based on the predominance of production of each dry bean class grown in each State along with the 2020/21 sales and 2021/22 marketing percentages, (the most recent estimates available from USDA, NASS), the

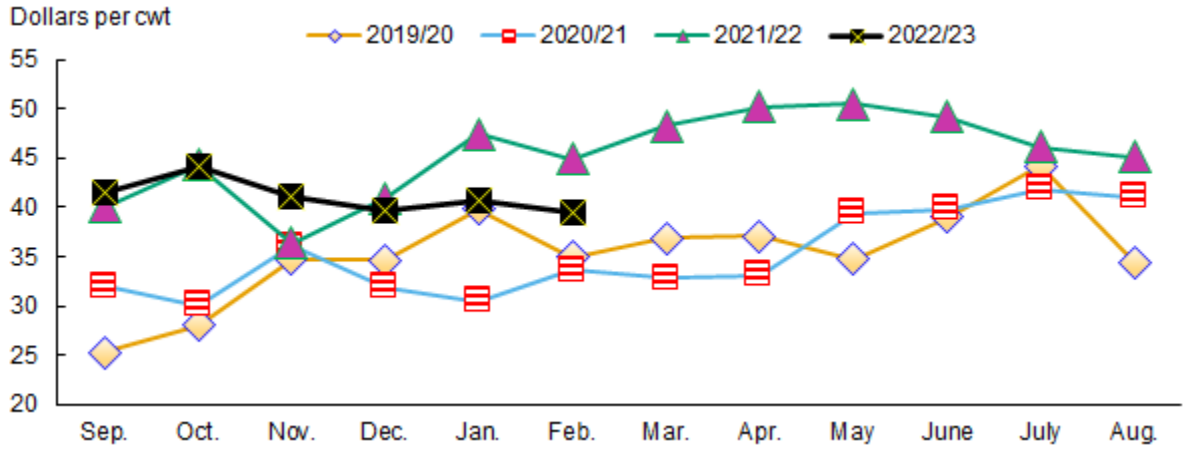
following general assumptions highlight sales marketing patterns for key States and dry bean classes:

- In North Dakota and Michigan, where pinto, black, navy, and cranberry beans are primarily grown, higher sales marketing percentages occur in October and November, suggesting these beans may be harvested and sold earlier in the marketing year than other classes.
- Similarly, in Minnesota, where kidney beans are primarily grown, higher sales occur in October and November.
- In Idaho, where pink, small white, and small red beans are primarily grown, the sales marketing percentage was highest in January, ranging from 29 to 49 percent. This suggests that these beans may be harvested and sold later in the marketing year compared to beans grown in North Dakota, Michigan, and Minnesota.
- In California, where lima and blackeye beans are primarily grown, the sales marketing percentages were highest in February (46–48 percent) and April (16–20 percent), respectively. This indicates that these beans may be harvested and sold later in the marketing year compared to other bean classes grown in North Dakota, Michigan, Minnesota, and Idaho.

Dry Bean Prices Down

- Preliminary estimates for the U.S. aggregate grower price for all dry beans, excluding chickpeas in 2022/23, decreased 1 percent from the previous year to $41.00 per cwt. This marginal price change is influenced by larger supplies offsetting the influence of greater domestic and export demand.

Figure 11
U.S. dry edible beans: Average monthly grower price



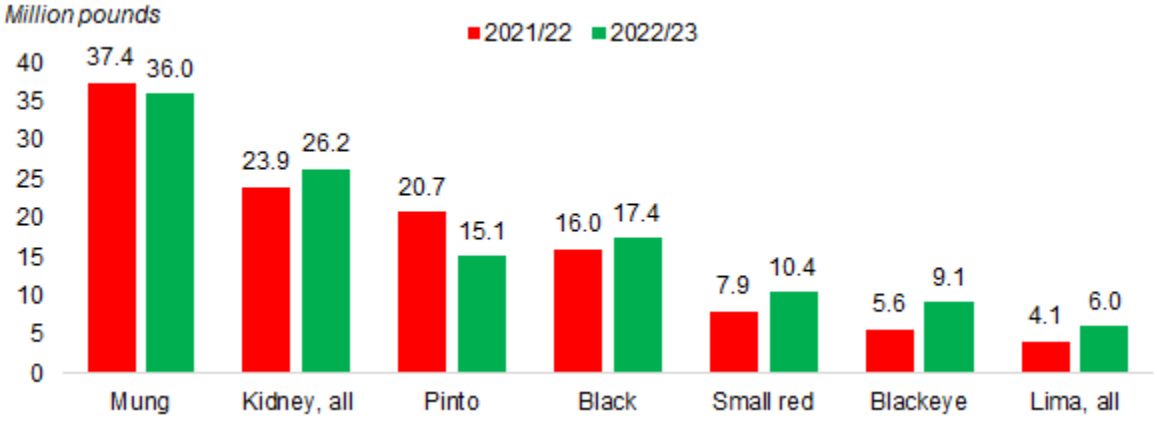
Note: cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: USDA, Economic Research Service calculations using National Agricultural Statistics Service, *Agricultural Prices.*

- Figure 11 above shows 2022/23 U.S. aggregate grower prices for all dry beans averaging marginally below the previous year but above 2019/20 and 2020/21 prices during the initial 6 months of the marketing year.

Dry Bean Import Volume Highlights

- Import trends are mixed but the top bean class imports from September 2022–February 2023, excluding the other bean category, are mung, kidney, and black, representing half of the total 157.6 million pounds of beans imported. The top dry bean countries of origin for 2022/23 are Canada, India, and Nicaragua (table d16).
- Dry bean imports in the 2022/23 marketing year are currently averaging less than 1 percent above the previous year during the same months a year earlier.
- All kidney bean imports increased by almost 10 percent to 26 million pounds with light red kidney beans showing the largest increase of 62 percent. However, dark red kidney bean imports decreased by 32 percent. Pinto and black beans declined by 27 percent to 15 million pounds and 8 percent to 17 million pounds, respectively (figure 12).
- Other classes, such as small red beans, blackeye beans, and lima beans, had mixed trends in imports. Small red beans saw an increase of 31 percent, while blackeye beans and lima beans saw increases of 64 percent and 46 percent, respectively.

Figure 12
Import volume of top U.S. dry bean classes September–February 2021/22 and 2022/23 1/



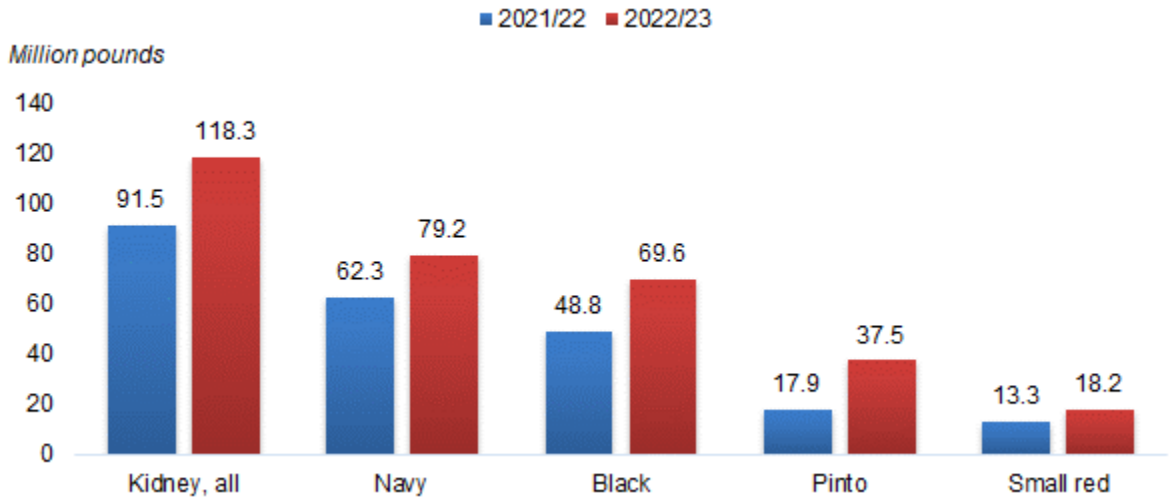
1/ Beans, other is excluded from the chart but the data are available in the appendix table.
Source: USDA, Economic Research Service using data from the U.S. Department of Commerce, Bureau of the Census.

- Table D16 in the dry bean appendix provides a comprehensive list of dry bean import volume and origination countries for the past 3 marketing years including partial marketing year trade from September 2022–February 2023 to the previous year.

Dry Bean Export Volume Highlights

- During the September–February period of the 2022–23 season, the United States exported 358 million pounds of dry beans, an increase of nearly 29 percent from the same period of the previous year. Mexico remained the largest importer of U.S. dry beans with 102 million pounds—up 82 percent from the same months a year earlier. Canada and Italy were the next largest importers of U.S. dry beans at 76 million pounds (up by 21 percent) and 47 million pounds (down by 9 percent), respectively.
- Analyzing dry bean classes with export volumes exceeding 30 million pounds in September 2022–February 2023, pinto bean export volume saw the largest increase from the previous year, rising from 18 million to 37 million pounds, followed by black beans from 49 million to 70 million pounds, kidney beans (all types) up 29 percent from 91 million to 118 million pounds, and navy beans up 42 percent from 49 million to 70 million pounds.
- Dark red kidneys declined almost 13 percent from 55 million to 48 million pounds but gains in light red (up 44 percent) and unspecified kidney beans (up 102 percent) were more than offsetting. Table D15 in the appendix provides a list of export volume and destination countries.

Figure 13
Export volume: Top U.S. dry bean classes September–February 2021/22 to 2022/23 1/



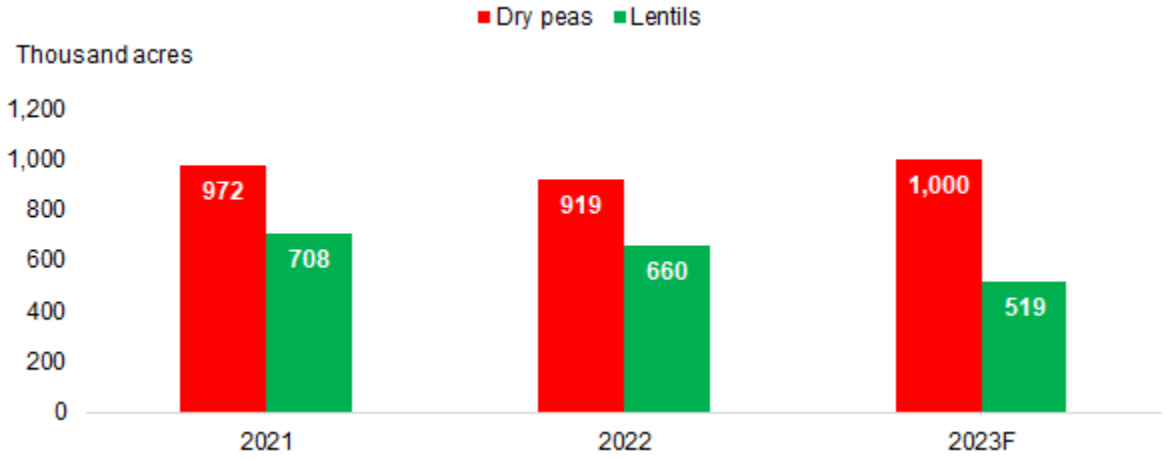
1/ Beans, other is excluded from the chart but the data are available in the appendix table.
Source: USDA, Economic Research Service using data from the U.S. Department of Commerce, Bureau of the Census.

Dry Peas and Lentils

Planted Acres in 2023 Up for Dry Peas, Down for Lentils

The market trends for dry peas and lentils are mixed. Dry pea growers in the July 2023–June 2024 marketing year intend to seed 9 percent more acres over the previous year while lentil growers expect to seed 21 percent less than the previous year according to the USDA, NASS March 2023 *Prospective Plantings* report (figure 14). Grower marketing decisions are influenced by a variety of factors which include local and international growing conditions, contract sales, and market prices and demand. Figure 14 shows planted acre trends for both markets.

Figure 14
U.S. dry edible pea and lentil planted acres, 2021–23



Note: F= forecast.
Source: USDA, Economic Research Service calculations using data from USDA, National Agricultural Statistics Service.

The dry pea market for July 2022 through June 2023 is marked by higher production and stocks combined with lower imports and exports over the previous year. The lentil market is defined by higher supplies due to increases in production, stocks, and imports but stronger export demand over the previous year. 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:

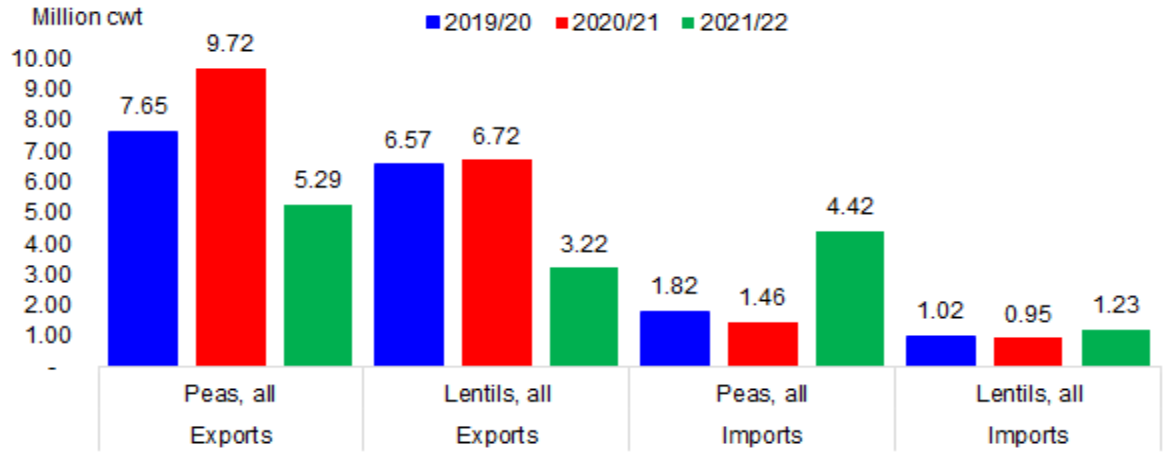
- Preliminary dry pea per capita availability estimates for 2022/23 are up by 9 percent from the previous year. Dry pea supplies in 2022/23 are expanding from the previous year with production up 75 percent, stocks up 26 percent, imports (July 2022–February 2023) down 54 percent, and export demand down 7 percent. Although dry pea stocks were reported to be about one-fourth higher than the previous year on December 1, 2022, they are still about one-fourth below the average of the previous 5 years.

- Lentil supplies in 2022/23 are also higher than the previous year with production up 61 percent, December 1 stocks up 12 percent, imports (July 2022–February 2023) up 8 percent, and export demand up 19 percent.
- USDA, NASS preliminary 2022 season-average price estimates for dry peas are up 1 percent, while lentil 2022 prices are down 6 percent from the previous year.
- Reflecting much stronger production in 2022, preliminary crop values in 2022 for dry peas ($233 million) increased 53 percent from the previous year spurred by significant increases in yield and production. Similarly, larger output pushed the farm value of the lentil crop up 46 percent to $180 million.
- Table E17 in the appendix is available for a comprehensive listing of USDA, NASS reported estimates of dry bean area, yield, production, price, and crop value for 2019–23. Table E18 provides the same statistics for lentils.

Dry Pea and Lentil Trade

The United States is a net exporter of dry peas and lentils. In the 2021/22 marketing year (July–June) 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 Ethiopia, Yemen, Canada, and China being the most frequent. Figure 15 illustrates contrasting trends in dry pea and lentil trade volume in the past 3 complete marketing years.

Figure 15
U.S. dry edible pea and lentil export and import volume by marketing year, 2019–22

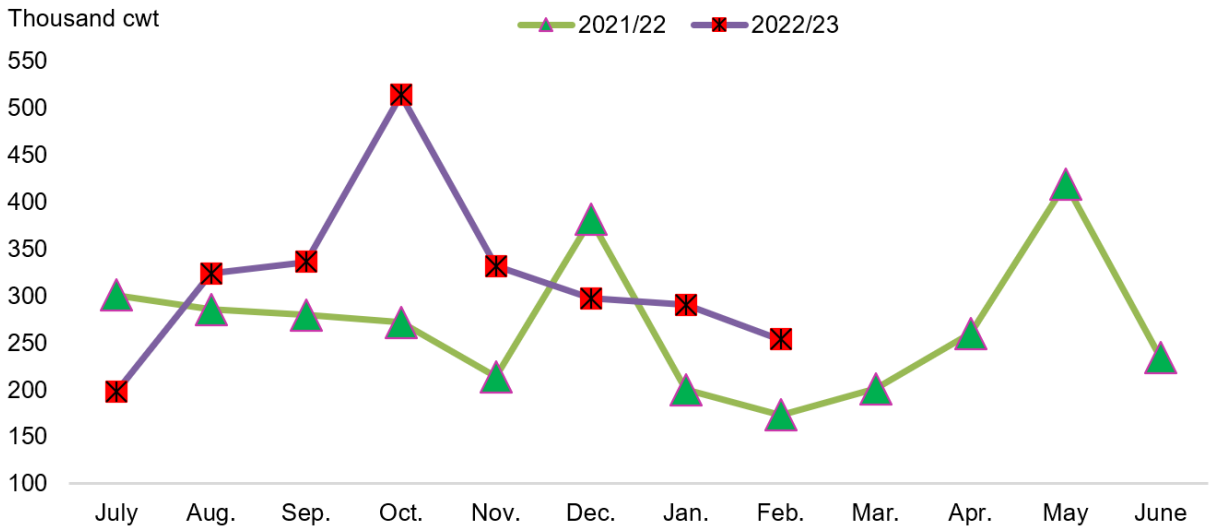


Note: cwt = hundredweight, a unit of measure equal to 100 pounds.
Source: USDA, Economic Research Service calculations using data from USDA, National Agricultural Statistics Service.

More detailed analysis of the dry pea and lentil trade trends for the first 8 months (July 2022–February 2023) of the current marketing year using the latest available data from the U.S. Department of Commerce, Bureau of the Census are:

- Dry pea export volume from July 2022–February 2023 reveals a 7 percent decrease from the previous year, with a 23 percent decline in pea exports to Canada overshadowing a 17 percent increase in dry pea exports to Ethiopia.
- Dry pea import volume from July 2022–February 2023 decreased 50 percent to 1.6 million cwt compared with a year earlier, with declines for yellow peas (down 70 percent) and unspecified peas (down 48 percent). The sharp decrease in dry pea imports primarily reflect a 55 percent decrease in pea volume over the previous year from Canada. Canadian dry pea imports represent 52 percent of dry pea imports and are mostly yellow peas.
- Lentil export volume from July 2022–February 2023 shows a 21 percent increase over the same period as the previous year, attributed primarily to increasing exports to Canada (up 13 percent to 0.9 million cwt), Spain (up 13 percent to 0.3 million cwt), Mexico (up 13 percent to 0.3 million cwt), and Sudan (up 1,685 percent to 0.2 million cwt).

Figure 16
U.S. lentil export volume by marketing year months July 2021–February 2023



Note: Cwt = hundredweight which equals 100 pounds.
Source: USDA, Economic Research Service using data from the U.S. Department of Commerce, Bureau of the Census.

- Lentil import volume from July 2022–February 2023 increased 13 percent over the same months as the previous marketing year. This is mainly due to a 12 percent increase in lentils imported from Canada. Canadian imports represent 86 percent of the 0.6 million cwt lentil volume (table e20 in the appendix). Table E20 also provides trade volume by class from 2019–23 for the July–June marketing year.

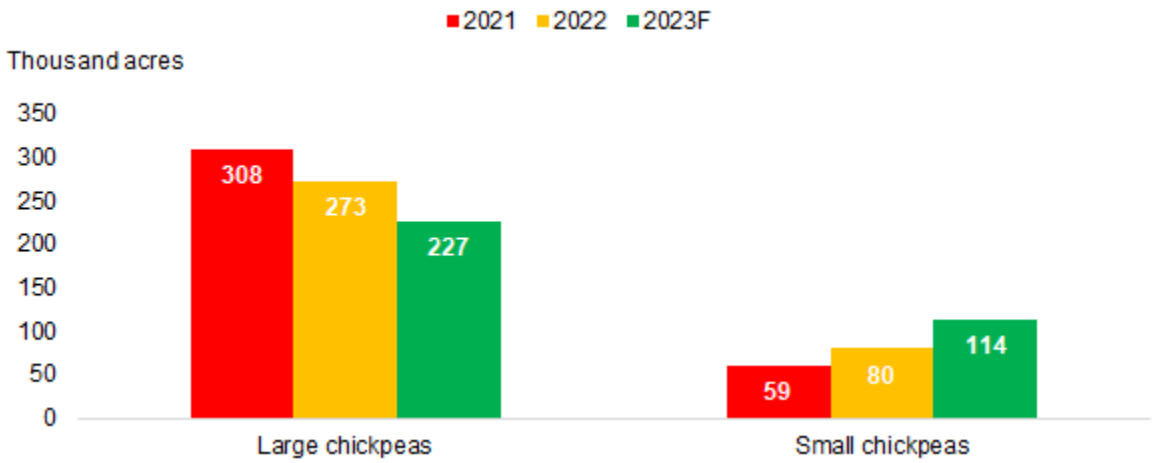
Chickpeas

Prospective Chickpea Area Down in 2023

The chickpea marketing year runs from September 2022–August 2023 and is currently defined by larger supplies due to increased production, building stocks, and greater imports compared with the previous year.

- According to the USDA, NASS March *Prospective Plantings* report, chickpea growers are expected to seed 4 percent less area in 2023 than the previous year. If realized, this will mirror last year's acreage reductions by the same percentage change. Chickpea growers intend to shift plantings from large to small chickpeas. Large chickpea planted area is projected to decline by 17 percent to 227,000 acres while small chickpea planted area is projected to increase by 42 percent to 113,500 acres.

Figure 17
U.S. large and small chickpea planted acres, 2021–23 1/



Note: F= forecast.
Source: USDA, Economic Research Service calculations using data from USDA, National Agricultural Statistics Service.

- On the demand side, 2022/23 chickpea exports are increasing from a year earlier, but are currently running below the 3-year average. Assuming 2023/24 yields are within the 3–5-year average, production and supply will continue to increase, putting downward pressure on prices.

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:

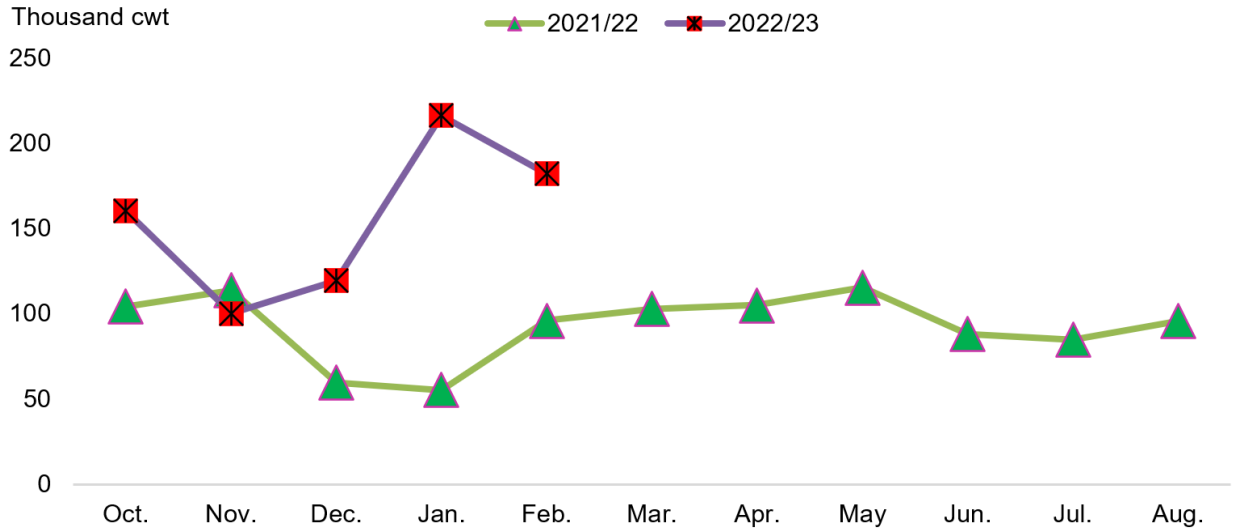
- Overall chickpea production in 2022 increased 29 percent to 3.7 million cwt after sizable production declines for 3 consecutive years ranging from 30 to 51 percent. The production surge of small chickpeas in Montana, Washington, and Idaho propelled overall chickpea production. Large chickpea production in 2022 is up 6 percent to 2.6 million cwt driven primarily by increasing production in Washington which represents one third of large chickpea production in the United States.
- Small chickpea production in 2022 is up 165 percent to 1.1 million cwt from the previous year. The increase in small chickpeas is primarily from Montana (up 271 percent from 0.11 million cwt to 0.39 million cwt), Washington (up 244 percent from 0.12 million cwt to 0.40 million cwt), and Idaho (up 109 percent from 0.09 million cwt to 0.18 million cwt).
- Despite a 4 percent decrease in planted acres in 2022/23, greater yields pushed chickpea production up 29 percent, underlying an expanding supply situation for the 2022/23 marketing year. Larger supplies may continue to nudge prices of both large and small chickpeas below the previous year.
- Stock estimates for total chickpeas (includes both small and large) for June 1 and December 1 are reported by USDA, NASS. The December 2022 chickpea all class stock level represents the beginning of the fourth month of the current 2022/23 chickpea marketing year and was reported at 381 million pounds—up 6 percent from the previous year following 2 consecutive years of lower stocks. The latest reported chickpea stock level of 381 million pounds is 30 percent below the average stock levels of the previous 5 years.
- Despite the strong dollar, total chickpea exports are up almost 20 percent from the previous year at 908,000 cwt.
- The USDA, NASS preliminary 2022 season-average price estimate for all chickpeas is $33.60 per cwt (down 7 percent from last year) with large and small chickpea prices falling by 5 and 8 percent, respectively. Crop value for all classes of chickpeas increased by 18 percent as lower grower prices were outweighed by rising production.
- Table F23, table f24, table f25 in the appendix contain a comprehensive listing of USDA, NASS reported estimates of area, yield, production, price, and crop value for 2016–23 for chickpea, all, large, and small chickpeas.

Chickpea Imports and Exports in 2022/23

- The United States is typically a net chickpea exporter (table f21) and the top export destinations vary each year. 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. During the 2021/22 season the United States imported slightly more (0.08 percent) chickpeas than what was exported the previous year. However, the 2022/23 season exports are rebounding, and the United States is likely to return as a net exporter.
- Chickpea exports from September 2022–February 2023 are up almost 20 percent as exports to Canada, Spain, Pakistan, Turkey, and United Arab Emirates are up 64, 39, 23, 2, and 77 percent respectively, from last year for the same months (table f21).
- Chickpea (all classes) imports in 2022/23 (September–February) totaled 688,000 cwt (up 25 percent) for the same months the previous year as garbanzo chickpeas (up 51 percent) offset a decline (down 22 percent) in Kabuli volume (table f22).
- Canada and Mexico are consistently the top import sources of chickpeas and represent 70 percent or more of total chickpea imports for the past 3 marketing years, with 78 percent of chickpeas categorized as garbanzo (trade code 0713202090) and the remainder categorized as Kabuli (trade code 0713202010).

Table F21 and table f22 in the appendix provides trade volume by class from 2019–23 for the respective chickpea marketing years.

Figure 18
U.S. chickpea export volume by marketing year months September 2021–February 2023



Note: Cwt = hundredweight which equals 100 pounds.
Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of the Census.

Special Article

Mapping Potato Exports in North America

Mauricio Soria Rodriguez, D. Adeline Yeh, Xiaoli Fan, and Catharine Weber

The North American potato industry is highly integrated. The top three countries in the region (Canada, Mexico, and the United States) have various roles in the potato supply chain and benefit from trading with each other. Table SA1-1 shows the share of potato imports and exports by trade value and by product category. Note the shares by trade volume (see Special Article table SA1-2 at the end of the article) are slightly different, especially for the frozen and other processed product categories and for export shares. The differences in trade volume and trade value can be attributed to potato product prices and exchange rates, among other factors.

The United States-Mexico-Canada Agreement (USMCA) is an economic and trade agreement that came into effect on July 1, 2020, and replaced the North American Free Trade Agreement (NAFTA). USMCA lowers trade barriers and includes provisions related to intellectual property, digital trade, and labor rights. The USMCA agreement also requires science-based plant health regulation and risk assessments, as well as improved information exchange and cooperation among parties, which can help decrease the impact of disease or pest concerns for commodities like potatoes.

This article shows trade flows for four potato product categories—fresh, seed, frozen, and other non-frozen processed potatoes—among States and Provinces in the United States, Canada, and Mexico. The top 10 routes with the highest trade value for the 2021/22 marketing year (September 1, 2021, to August 31, 2022) are visualized in terms of U.S. dollars (USD).

The data source for the trade flow maps between the United States and Canada and between Canada and Mexico is the Province/State-level trade value data from Statistics Canada. The U.S. Department of Commerce, Bureau of the Census (Census Bureau) also provides potato trade data, but only at the State/country level. For example, the Census Bureau provides potato export data from Idaho to Canada, without specifying to which Canadian Province the potatoes were exported. Statistics Canada's trade data links the States with the Canadian Provinces. The only limitation is that Statistics Canada does not provide potato trade data between U.S. States

to Mexico. For trade between States in the United States and Mexico, authors use trade data from the U.S. Census Bureau and treat Mexico as one single trade entity. Also note that authors follow international standards and use trade data attributed to the country (State/Province) of origin and country of last known destination (State/Province), as opposed to the port of entry and the port from which the good was last shipped (United Nations, 2011).

Table SA1-1: Share of U.S. import and export value for fresh potatoes and potato products, 2021/22

	Import sources			Export destinations		
	Canada	Mexico	Other countries	Canada	Mexico	Other countries
	percent					
Fresh	100	0.0	0.0	31.5	26.4	42.1
Seed	100	0.0	0.0	51.8	23.3	24.9
Frozen	88.0	0.0	12.0	6.4	19.7	73.9
Other processed	33.1	26.0	40.8	39.8	15.4	44.8

Note: Marketing year begins in September and ends in August of the following year.
Source: U.S. Department of Agriculture, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census.

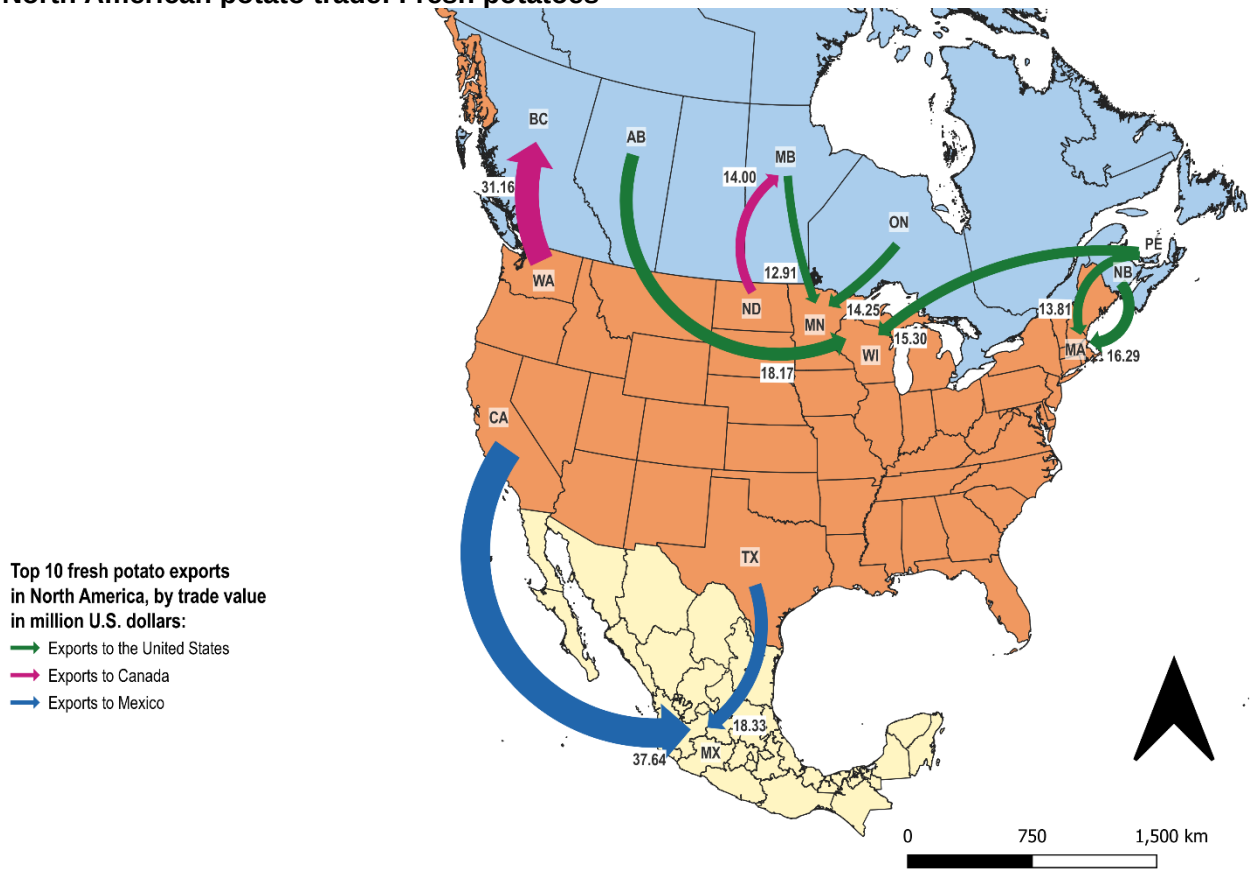
Fresh Potato Trade in North America

Figure SA1-1 presents the trade flow of the region's top 10 fresh potato export routes in the 2021/22 marketing year, representing about 40 percent of the overall trade of fresh potatoes in the region. Each arrow represents one trade route between two Provinces/States but does not account for shipments within each country. The thicker the arrow, the larger the trade value. At the tip of the arrow, the trade value associated with that trade route is shown in million USD.

Fresh potatoes generally flow from large potato-producing States/Provinces to potato-processing or consumption States/Provinces. Most fresh potatoes are exported from Canadian Provinces to U.S. States and from U.S. States to Mexico, except for two routes: Washington to British Columbia and North Dakota to Manitoba. Fresh potatoes exported from North Dakota to Manitoba are mostly for processing needs, while potatoes exported from Washington to British Columbia are usually for consumption purposes. Washington, California, Texas, and North Dakota are the top fresh potato-exporting States.

Figure SA1-1.

North American potato trade: Fresh potatoes



Note: Data covers period from September 1, 2021, to August 31, 2022. At the tip of the arrow, the trade value that is associated with that trade route is shown in million U.S. dollars. Values in Canadian Dollars are adjusted into U.S. Dollars using monthly exchange rate. Fresh potato category includes the following HS codes: 0701.90.00.10 – Potatoes, other than seed, fresh or chilled, certified organic. 0701.90.00.20 – Potatoes, other than seed, fresh or chilled, not certified organic.
Source: USDA, Economic Research Service calculations based on the Canadian International Merchandise Trade Web Application and U.S. Department of Commerce, Bureau of the Census.

The trade pattern for fresh potatoes has experienced two major changes in the past year. First, the U.S. fresh potato industry historically faced regulatory restrictions to export to Mexico. In April 2021, the Mexican Supreme Court ruled unanimously to legally authorize the imports of fresh U.S. potatoes to Mexico. The first shipment of U.S. fresh potatoes to Mexico took place a year later in May 2022. Before the ruling, the Mexican market was open to U.S. fresh potatoes only along the two nations' border. Fresh potato trade in the region is expected to continually evolve, given the rule change.

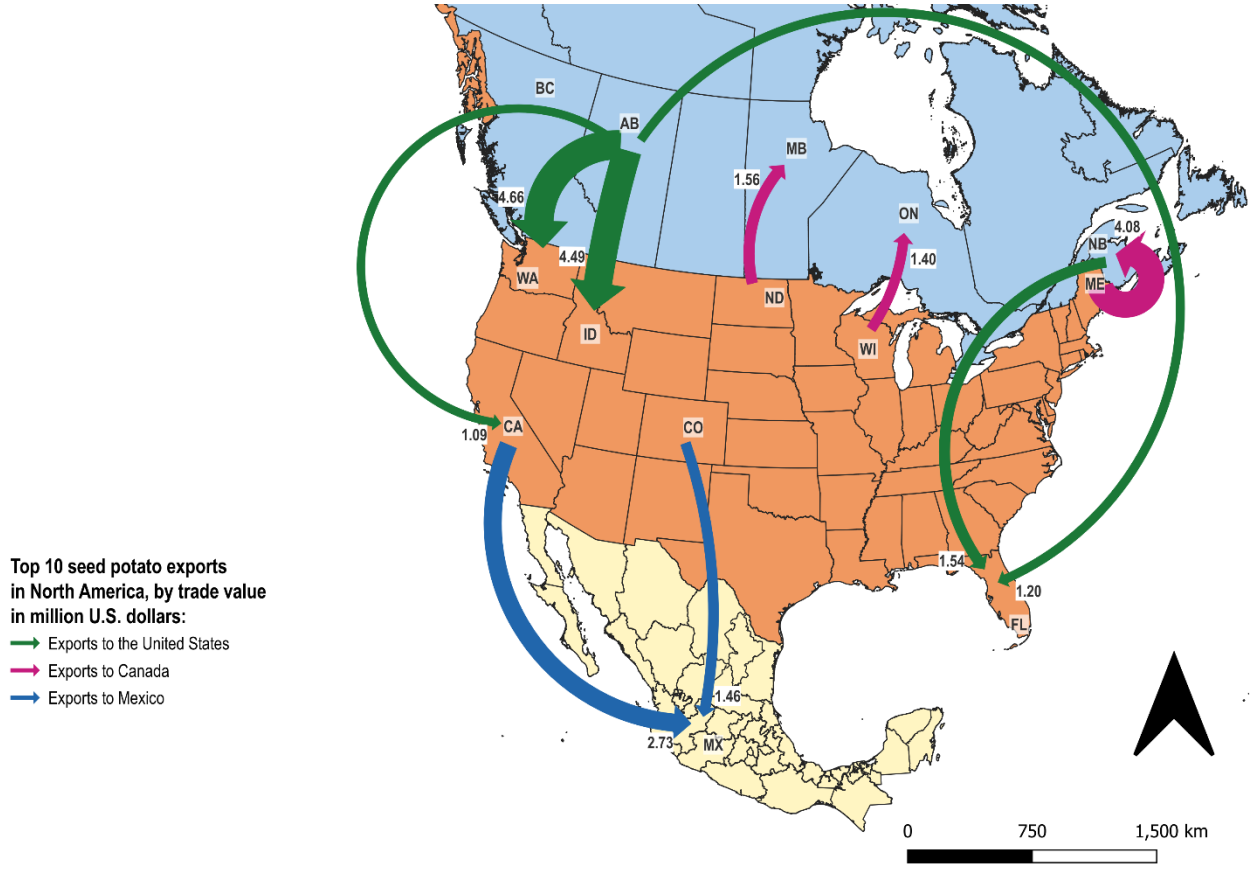
The second change was Canada's voluntary suspension of all potato exports for consumption and planting from Prince Edward Island (PE) to Puerto Rico and the continental United States in November 2021, due to multiple detections of potato wart fungus. Potato wart infestation decreases crop yields but does not harm human health. According to a draft report from USDA Animal and Plant Health Inspection Service (APHIS) (2022), the movement of infected potato tubers and contaminated soil are two major pathways introducing the disease to U.S. potato

production. Currently no treatments are available to control potato wart. On Feb 8, 2022, USDA Secretary Tom Vilsack announced the resumption of table stock potatoes from Prince Edward Island, Canada, into Puerto Rico (USDA Press, 2022). On April 1, 2022, USDA, APHIS announced it amended requirements for the importation of potatoes (Solanum tuberosum) from Prince Edward Island to prevent the introduction of potato wart (Federal Order DA-2022-14). The amended requirements prohibit the importation of field-grown seed potatoes from Prince Edward Island into the United States but allow for the importation of potatoes for consumption under specified conditions.

Seed Potato Trade in North America

Figure SA1-2 shows the top 10 seed potato trade flows in the region in the 2021/22 marketing year. The routes correspond to 59 percent of the total trade of seed potatoes in the area. Alberta is the largest exporter of seed potatoes in the region, followed by Maine and California. Washington and Idaho import the largest value of seed potatoes in the United States (4.66 million USD and 4.49 million USD), both from Alberta. On the other hand, New Brunswick and Manitoba import the largest value in Canada seed potatoes (4.08 million USD and 1.56 million USD), which come from Maine and North Dakota, respectively.

Figure SA1-2.
North American potato trade: Seed potatoes

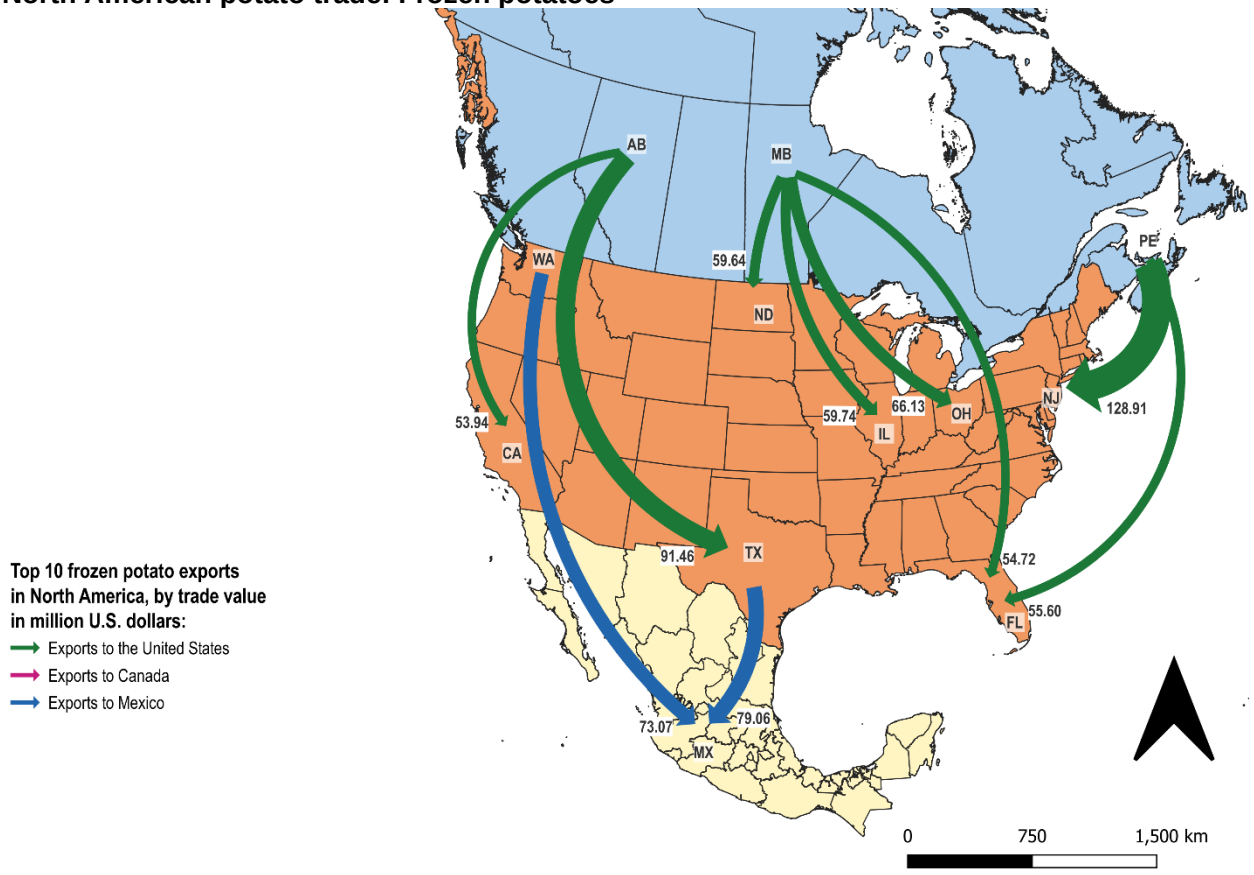


Note: Data covers period from September 1, 2021, to August 31, 2022. At the tip of the arrow, the trade value that is associated with that trade route is shown in million U.S. dollars. Values in Canadian Dollars are adjusted into U.S. Dollars using monthly exchange rate. Seed potato category includes the following HS code: 0701.10.00 – Potatoes, seed, fresh or chilled.
Source: USDA, Economic Research Service calculations based on the Canadian International Merchandise Trade Web Application and U.S. Department of Commerce, Bureau of the Census.

Frozen Potato Trade in North America

Among the four potato product categories, frozen potato has the highest traded value. Frozen potato products include french fries, chips, hash browns, patties, and diced potatoes, among others. As shown in figure SA1-3, frozen potato products mainly flow from three Canadian provinces (Alberta, Manitoba, and Prince Edward Island) to the United States. The top three frozen potato trade routes are from Prince Edward Island to New Jersey (128.91 million USD), Alberta to Texas (91.46 million USD) and Texas to Mexico (79.06 million USD). The 10 routes shown in the figure represent about 43 percent of the total trade of frozen potatoes in the region.

Figure SA1-3.
North American potato trade: Frozen potatoes



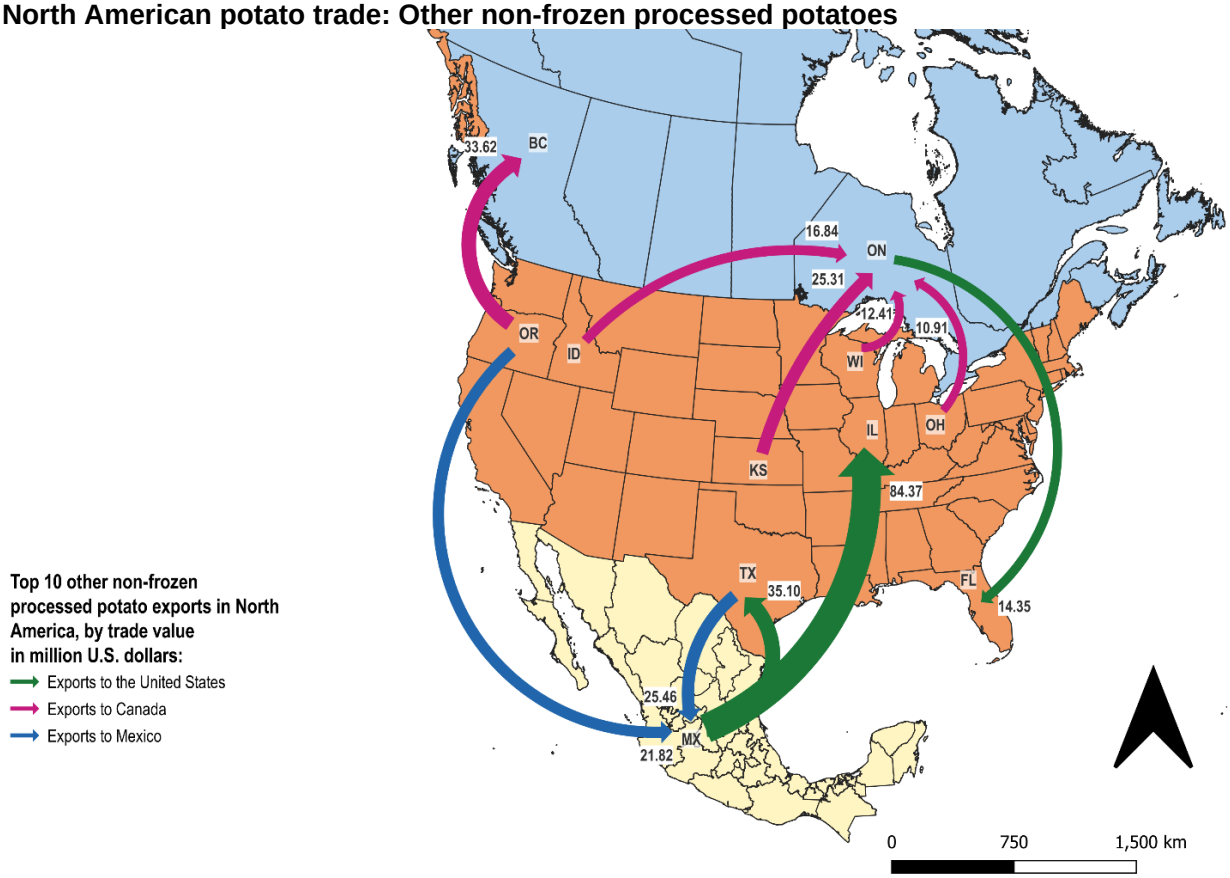
Note: Data covers period from September 1, 2021, to August 31, 2022. At the tip of the arrow, the trade value that is associated with that trade route is shown in million U.S. dollars. Values in Canadian Dollars are adjusted into U.S. Dollars using monthly exchange rate. Frozen potato category includes the following HS codes: 0710.10.00 – Potatoes uncooked/cooked by boiling in water, frozen. 2004.10.00 – Potatoes, prepared or preserved other than by vinegar/acetic acid, frozen.
Source: USDA, Economic Research Service calculations based on the Canadian International Merchandise Trade Web Application and U.S. Department of Commerce, Bureau of the Census.

The potato industry has a complex supply chain system. Major potato processing plants are concentrated in only a few States/Provinces along the Canada–United States border, including Washington, Idaho, and North Dakota in the United States, as well as Alberta, Manitoba, and New Brunswick in Canada (Potato Marketing Association of North America, 2023). The locations of the potato processing plants correlate with the trade flow of frozen potatoes, which has the largest trade value among the four potato product categories. Lucier and Parr (2020) reported that the port choice for vegetable commodities depends on not only the route but also factors such as costs, speed, mode of transport, and product characteristics, among others. Based on 2017–19 data, they found that the top three ports—Tacoma, Washington, Seattle, Washington, and Laredo, Texas—accounted for an average of 85 percent of the U.S. frozen potato export to the rest of the world, which is partly due to the location of leading french fry production plants in the Washington area.

Other Non-frozen Processed Potato Exports in North America

For other non-frozen processed potato products such as potato chips, flakes, granules, and pellets, as well as starch for food or industrial use, the trade pattern is different from the frozen potato product counterparts. Figure SA1-4 shows that many States export non-frozen processed potatoes to Canada (mainly to Ontario and British Columbia). There are also non-frozen processed potatoes shipped from Mexico to Illinois (84.37 million USD) and Texas (35.10 million USD). The 10 routes represent 53 percent of the total trade of other processed potatoes in the region.

Figure SA1-4.
North American potato trade: Other non-frozen processed potatoes



Note: Data includes period from September 1, 2021, to August 31, 2022. At the tip of the arrow, the trade value that is associated with that trade route is shown in million U.S. dollars. Values in Canadian Dollars are adjusted into U.S. Dollars using monthly exchange rate. Other non-frozen processed potatoes include the following HS codes: 1105.10.00.00 – Potato flour, meal, and powder. 1105.20.00.00 – Potato flakes, granules, and pellets. 1108.13.00.10 – Potato starch, for food use. 1108.13.00.20 – Potato starch, for industrial use, non-food. 2005.20.00.10 – Potato salad, not in airtight container, prepared or preserved other than by vinegar/acetic acid. 2005.20.00.20 – Potato chips, flakes, frills, prepared or preserved other than by vinegar or acetic acid. 2005.20.00.90 – Potatoes, not elsewhere specified, prepared, or preserved other than by vinegar or acetic acid, not frozen.
Source: USDA, Economic Research Service calculations based on the Canadian International Merchandise Trade Web Application and U.S. Department of Commerce, Bureau of the Census.

Conclusion

Trade flows in North America vary for fresh, seed, frozen, and other non-frozen processed potatoes. The trade patterns are influenced by potato growing regions, supply chain logistics, tariffs, location of specialized processing facilities, and pest-related trade restrictions, among others. Due in part to these influences, the United States, Canada, and Mexico are important trading partners for all potato products, but especially fresh, seed, and frozen potatoes.

Table SA1-2: Share of U.S. import and export volume for fresh potatoes and potato products, 2021/22

	Import sources			Export destinations		
	Canada	Mexico	Other countries	Canada	Mexico	Other countries
	percent					
Fresh	100	0.0	0.0	39.0	22.8	38.2
Seed	100	0.0	0.0	61.0	20.6	18.4
Frozen	86.8	0.0	13.2	6.6	20.8	72.6
Other processed	25.5	9.8	64.7	37.7	21.2	41.0

Note: Marketing year begins in September and ends in August of the following year.
Source: U.S. Department of Agriculture, Economic Research Service based on data from U.S. Department of Commerce, Bureau of the Census.

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Special Article

Lettuce Trends: Conventional, Organic Growth, and Production

Catharine Weber, Wilma V. Davis, Gary Lucier, and Seth Wechsler

Lettuce (*Lactuca sativa*) is the most widely consumed leafy green in the United States. According to the Food and Agriculture Organization of the United Nations, the United States is the second leading producer of lettuce in the world, behind China. Although lettuce comes in many forms, commercial production in the United States is categorized into three main groupings: head lettuce (which largely refers to iceberg also known as crisphead), romaine lettuce (also known as cos), and leaf lettuce (composed of many types led by green leaf and red leaf). The majority of lettuce consumed in the United States is conventionally field-grown but there are burgeoning organic and protected culture industries producing premium whole and packaged retail products (e.g., baby leaf, microgreens, butterhead, Boston, and bibb lettuces).

Despite the prevalence of conventionally grown lettuces, organic lettuces have made substantial gains in the U.S. lettuce market. According to the USDA Certified Organics Survey released by USDA, National Agricultural Statistics Service in December 2022, 45,964 acres of field-grown lettuce were harvested in 2021—up 19 percent from 2019. This represents nearly one-fifth of all field-grown lettuce area. As in conventionally produced lettuce, California and Arizona account for the vast majority (93 percent) of organic lettuce production.

Lettuce is also produced under various protected structure systems in both rural and urban environments. In 2019, 55.2 million pounds (from an area of 5.5 million square feet) of lettuce were produced under protected culture—two-thirds of which were from hydroponic systems. Although protected culture area was up 28 percent from the previous survey in 2014, output more than doubled.

California and Arizona Lead U.S. Lettuce Production

California (73 percent of harvested acres in 2017) and Arizona (21 percent) are the top producing lettuce States, with 19 other States (led by Florida, Colorado, and New Jersey) reporting production of at least 100 acres in the 2017 Census of Agriculture. In terms of domestic production over the past 3 years, head lettuce remains the leader with 46 percent of

reported lettuce production during 2020–22. Romaine and leaf lettuce followed with 36 percent and 18 percent, respectively. Season average lettuce yields can be negatively affected by heat, drought, and pest-vectored disease losses. In the past 5 years (2018–22), lettuce yields have been well below trend (especially in California) at 300 hundredweight (cwt) per acre (table SA2-1).

Table SA2-1: U.S. lettuce industry statistics, 1998–2002 to 2018–2022[1]

		Average		
	Unit	1998–2002	2018–2022	Percent change
Acres harvested	Acres	285,696	262,920	-8
Production	Million pounds	9,511	7,887	-17
Yield	Cwt per acre	333	300	-10
Romaine/leaf lettuce share of domestic availability	Percent	26	53	105
Per capita availability	Pounds per person	31.3	24.4	-22
Lettuce imports share of consumption	Percent	0.9	10.7	1089
Lettuce exports share of total supply	Percent	7.9	8.0	1

[1]Includes head lettuce and romaine/leaf lettuce.
cwt = hundredweight.
Source: USDA, Economic Research Service *Vegetable and Pulses Yearbook 2021*; and USDA, National Agricultural Statistics Service.

Lettuce Production Regions Change Seasonally

Although domestic lettuce production occurs year-round, production areas shift with the growing seasons. The main domestic lettuce producing regions and associated growing seasons include:

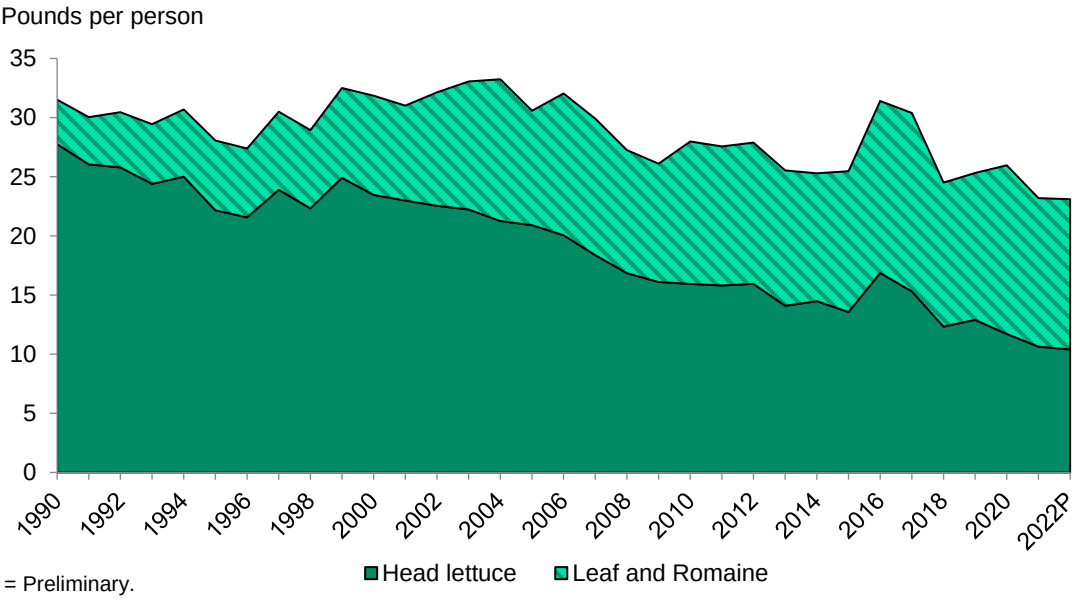
- During late April through mid-October most lettuce comes from California's Central Coast led by the Salinas Valley in Monterey County, with smaller volume from the coastal Valleys around Santa Maria and Ventura;
- A transitional area in California's Central Valley (around Huron in Fresno County) bridges the gap in output between the Central Coast and the winter desert areas during April and again in mid-October to mid-November;
- From mid-November through early April, lettuce is sourced from the irrigated southern desert valleys of California's Imperial County and the Yuma area of Arizona; shipments from Florida also fill in regional market gaps during the winter–spring period; and
- During spring through fall, local production from most other States serves farmers markets, regional/local retail and restaurant demand, and community supported agriculture (CSA).

According to USDA, ERS forecasts, U.S. growers received $21.8 billion in cash receipts (cash income the farm sector receives from commodity sales) from the marketing of vegetables and melons in 2022. Lettuce accounted for nearly one-fifth of 2022 vegetable cash receipts, led by romaine ($1.54 billion), iceberg ($1.33 billion), and leaf lettuce ($1.25 billion). Sharply higher prices caused by a combination of drought, pest pressure, and input price inflation accounted for the lion's share of the 54 percent surge in the nominal farm value of lettuce in 2022.

Imports Offset Part of U.S. Production Decline

Per capita availability of all lettuce totaled 23.1 pounds in 2022, unchanged from a year earlier but 10 percent below the average of the previous 5 years. Greater net imports (up 117 percent) offset a 3 percent reduction in domestic output in 2022. Per capita lettuce availability peaked in 2004 at 33.2 pounds during the heyday of salad bars and with the introduction of more varied retail packaged salads (figure SA2-1). Trending higher, romaine and leaf lettuce combined accounted for 53 percent of domestic lettuce availability during 2018–22, up from 26 percent from the 1998–2002 average.

Figure SA2-1
U.S. lettuce per capita availability peaked in 2004



P = Preliminary.
Source: USDA, Economic Research Service calculations and the *Vegetables and Pulses 2021 Yearbook Tables*.

Since peaking in 2004, total lettuce availability has been on a downward trend. This reflects several possible factors including the cannibalization of the bulk lettuce market by packaged salads (less waste), the impact of the 2008 recession and the Coronavirus (COVID-19) pandemic on foodservice demand, price inflation in the early 2020s, and several food safety outbreaks involving lettuce. The Center for Disease Control (CDC) reported 11 multistate

outbreaks linked to either packaged salads or romaine lettuce between 2014 and 2021. Following such incidences, it takes time for consumer confidence to be restored.

By volume, the United States has been a net importer of lettuce since 2019. In 2022, imports surged 20 percent to 1.1 billion pounds with head lettuce (40 percent) and romaine and leaf lettuce (up 13 percent) reaching record highs. Given reduced yields from weather, pests, droughts, and nominal dollar record-high shipping-point prices, the import share of availability for all lettuce reached a record high of nearly 15 percent in 2022. The leading suppliers of lettuce are Mexico (90 percent of 2018–22 volume) and Canada (10 percent), with import shipments greatest during the adverse weather-prone fall and winter months.

Given high domestic lettuce prices and a very strong dollar, U.S. export volume of all lettuce declined 5 percent in 2022 from a year earlier. Head lettuce exports have trended lower since peaking in 1986. The downward trend in head lettuce export volume over the past few decades has led to annual export volumes in the early 2020s reaching lows not recorded since the mid-1960s. Export demand for other (non-head) lettuces only fell 1 percent from a year earlier in 2022—largely on the strength of higher romaine volume. As a share of supply, U.S. exports of lettuce have not changed greatly over the past few decades. During 2018–22, 8.0 percent of all lettuce supplies were exported compared with 7.9 percent average over the 1998–2002 period. During 2018–22, the top foreign markets for U.S. lettuce were Canada (80 percent), Mexico (11 percent), and Taiwan (6 percent).

Appendix A: Fresh Vegetables

Return to fresh vegetable section

Table A5: Annual U.S. production of selected fresh-market vegetables, 2019–22

Commodity	2019	2020	2021	2022p	Change 2021–22
	Million pounds				*Percent*
Lettuce, all	8,188	8,438	7,486	7,273	-2.8
Lettuce, head	4,201	3,845	3,514	3,319	-5.5
Lettuce, romaine	2,741	3,029	2,723	2,546	-6.5
Lettuce, leaf	1,247	1,564	1,248	1,408	12.8
Onions, bulb 1/	6,134	6,422	5,905	5,438	-7.9
Carrots	2,432	2,416	2,374	2,385	0.5
Tomatoes 2/	2,172	2,109	2,134	2,156	1.0
Pumpkins 1/	1,750	1,964	2,201	1,996	-9.3
Cabbage	1,946	1,876	1,804	1,931	7.0
Sweet corn	1,677	1,385	1,367	1,296	-5.2
Celery	1,574	1,613	1,473	1,242	-15.7
Broccoli	1,584	1,526	1,283	1,172	-8.7
Bell peppers	1,159	1,058	972	1,041	7.1
Cauliflower	1,006	894	786	782	-0.5
Spinach	856	657	636	764	20.1
Squash	709	671	691	613	-11.3
Garlic	383	356	354	452	27.7
Greens, collards 1/	419	426	419	439	4.8
Cucumbers	459	330	385	331	-14.0
Greens, kale 1/	203	212	338	317	-6.2
Beans, snap/green	304	275	244	221	-9.4
Radishes 1/	207	185	196	200	2.0
Greens, mustard 1/	217	186	205	199	-2.9
Eggplant 1/	114	160	152	160	5.3
Brussel sprouts 1/	146	215	119	152	27.73
Greens, turnip 1/	134	99	95	98	3.16
Endive and escarole 1/	66	42	75	77	2.67
Artichokes	96	76	79	74	-6.33
Okra 1/	58	46	43	43	0.00
Asparagus	58	48	44	38	-13.64
Rhubarb 1/	24	23	24	23	-4.2
Beans, lima green 1/	3	2	1	1	0.0
Sweet potatoes 3/	3,197	3,013	2,910	2,594	-10.9
Selected fresh total	**37,276**	**36,723**	**34,794**	**33,508**	**-3.7**

1/ USDA, Economic Research Service (ERS) projection of fresh production.
2/ Includes USDA, ERS projection of fresh greenhouse production.
3/ Includes processed 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 A6: Selected fresh-market vegetable trade volume, 2020–23

Commodities	2020 Annual	2021 Annual	2022 Annual	January–February 2022	January–February 2023	Change 2022–23
				----- Million pounds -----		-- Percent --
Imports, fresh:						
Tomatoes, all	4,053	4,276	4,370	777	807	3.8
Cucumbers, all	2,193	2,315	2,419	482	518	7.5
Peppers, bell	1,667	1,843	1,793	408	388	-4.7
Onions and shallots	1,234	1,469	1,457	206	217	5.4
Squash, all	1,088	1,093	1,032	265	249	-6.1
Peppers, chile	970	1,098	1,001	177	161	-9.0
Lettuce, all	820	930	1,113	181	185	2.2
Broccoli, all	760	791	834	181	194	7.4
Asparagus, all	586	665	580	105	95	-9.7
Carrots, all	466	527	601	92	110	20.1
Mushrooms, all	179	195	202	37	32	-11.8
Sweet corn	160	194	203	75	67	-11.1
Sweet potatoes	20	85	142	45	50	11.0
Vegetables, other	3,044	3,175	3,297	614	666	8.4
Subtotal, excluding potatoes	**17,239**	**18,657**	**19,044**	**3,645**	**3,740**	**2.6**
Potatoes (excludes seed)	927	892	1,205	173	272	57.5
	18,165	**19,548**	**20,249**	**3,817**	**4,011**	**5.1**
Exports, fresh:						
Lettuce, all	706	740	701	101	105	4.0
Onions and shallots	742	695	605	87	75	-13.8
Sweet potatoes	576	590	506	101	111	9.8
Broccoli, all	371	430	331	65	60	-6.8
Carrots, all	208	209	189	31	28	-8.9
Tomatoes, all	145	166	177	32	28	-13.6
Sweet corn	134	147	128	7	9	28.5
Asparagus, all	36	58	59	14	13	-7.6
Cucumbers, all	32	50	31	8	4	-46.5
Mushrooms, all	18	16	13	3	2	-18.9
Vegetables, other	1,075	1,086	1,021	177	159	-10.5
Subtotal, excluding potatoes	**4,042**	**4,187**	**3,760**	**625**	**594**	**-5.0**
Potatoes, all	1,043	1,234	1,118	143	156	9.3
Total	**5,085**	**5,421**	**4,878**	**768**	**750**	**-2.4**

1/ Excludes seeds, melons, olives, and dry pulses.
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 A7: Fresh-market vegetables: Per capita availability, 2018–22

Commodity	2018	2019	2020	2021R	2022P	Change 2021–22
	---------- Pounds per capita ----------					*Percent*
Artichokes, all	1.35	1.37	1.19	1.23	1.52	23.3
Asparagus	1.76	1.76	1.81	1.96	1.68	-14.5
Bell pepper	11.17	10.87	10.73	11.18	11.06	-1.0
Broccoli	5.94	5.91	5.86	5.07	5.24	3.5
Cabbage	5.68	6.35	6.13	5.91	6.18	4.6
Carrots	12.21	8.31	8.10	8.12	8.39	3.3
Cauliflower	2.50	3.03	2.65	2.26	2.12	-6.0
Celery	4.90	5.17	5.11	4.73	4.15	-12.2
Cucumbers	7.99	7.83	7.55	7.99	8.16	2.1
Eggplant	0.81	0.80	0.97	0.96	1.01	4.8
Garlic, all	2.38	1.82	1.71	1.73	2.39	38.4
Leafy greens/2	2.95	3.02	2.86	3.25	3.22	-0.9
Lettuce, head	12.33	12.90	11.71	10.65	10.39	-2.4
Lettuce, romaine	12.06	12.29	14.26	12.54	12.71	1.3
Onions, bulb	20.56	19.85	20.82	20.83	19.18	-7.9
Pumpkins, all	5.39	4.99	5.66	6.23	5.62	-9.7
Snap beans	1.63	1.38	1.32	1.26	1.21	-4.1
Spinach	1.87	2.43	1.82	1.75	2.15	22.4
Squash, all	5.64	5.77	5.65	5.72	5.26	-7.9
Sweet corn	6.81	5.11	4.27	4.26	4.11	-3.5
Sweet potatoes, all	5.56	7.14	6.53	6.35	5.67	-10.7
Tomatoes/3	20.24	18.33	18.22	18.82	19.04	1.1
Others/4	2.24	2.37	2.85	2.59	2.65	2.1
Subtotal	**154.0**	**148.8**	**147.8**	**145.4**	**143.1**	-1.6
Mushrooms	3.91	3.76	3.74	3.71	3.65	-2
Potatoes	117.56	112.61	115.03	112.92	110.68	-2
Total	**275.44**	**265.18**	**266.58**	**262.02**	**257.43**	**-1.8**

Note: R = revised. P = preliminary, final estimates provided in ERS Vegetable and Pulses Yearbook (August 2023).
1/ Availability is a proxy for calendar-year consumption.
2/ Collards, kale, mustard greens, and turnip greens.
3/ Includes both domestic and imported hothouse tomatoes.
4/ Includes brussels sprouts, escarole, endive, okra, radishes, and lima beans.
Source: USDA, Economic Research Service, Vegetables and Pulses Yearbook (August 2022).

Fresh Vegetables (continued)

Return to fresh vegetable section

Table A8: U.S. fresh-market organic vegetables FOB prices per pound, 2022–23

Selected organic commodities	2022 – 1st Quarter			2023 – 1st Quarter			2022–2023 Change[1]
	January	February	March	January	February	March	March
	Dollars per pound[2]						*Percent*
Broccoli, crown cut	1.64	1.12	1.13	1.05	0.87	1.02	-10
Broccoli, unspecified	1.31	0.84	0.88	0.85	0.65	0.82	-7
Cabbage, red type	0.60	0.53	0.45	0.63	0.56	0.51	14
Cabbage, round green type	0.54	0.40	0.41	0.63	0.51	0.58	42
Carrots, baby peeled	0.96	0.92	0.92	0.92	0.92	0.93	1
Carrots, unspecified	0.59	0.55	0.55	0.69	0.68	0.71	29
Cauliflower, white	1.31	0.76	1.10	0.80	1.46	1.60	45
Celery, hearts	1.18	0.83	0.75	2.28	0.90	0.76	1
Celery, unspecified	0.51	0.34	0.34	1.01	0.42	0.34	2
Lettuce, green leaf	0.49	0.46	0.52	0.54	0.43	0.43	-17
Lettuce, iceberg	0.25	0.29	0.31	0.37	0.36	0.34	9
Lettuce, romaine hearts	1.12	0.95	1.50	1.12	0.82	0.98	-35
Lettuce, romaine	0.66	0.68	0.84	0.57	0.45	0.52	-38
Spinach, flat	1.28	1.12	0.92	1.02	0.91	0.95	3
Sweet potatoes, orange types	0.95	0.96	0.98	1.07	1.04	1.00	3
Sweet potatoes, red types	0.95	0.96	0.98	1.07	1.04	1.00	3
Sweet potatoes, white types	1.03	1.03	1.08	1.07	1.04	1.00	-7
Tomatoes, grape type	1.93	1.99	1.87	1.63	1.78	1.78	-5

[1] Change in weekly average in March 2023 over weekly average in March 2022.

[2] Per pound weight conversions based on container approximate net weights from USDA, Agricultural Marketing Service *Fresh Fruit and Vegetable Shipments*, 2021.

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 A9: Selected organic vegetable and pulses commodity trade volume, 2020–23

	January–December			*January–February*		*Change* [1]
Commodity	2020	2021	2022	2022	2023	2022–23
	----------Million pounds----------					*Percent*
Import, volume						
Bell pepper	10.8	16.0	22.3	5.9	7.0	19
Bell pepper, greenhouse	65.3	74.9	75.4	14.8	13.2	-11
Dried lentils	2.1	4.6	4.8	0.6	2.4	300
Dried yellow peas	53.2	44.7	49.0	0.2	0.6	200
Garlic	5.7	4.0	4.5	0.5	0.7	40
Squash	51.0	52.1	51.1	12.7	35.7	181
Exports, volume						
Asparagus	1.7	1.8	1.5	0.2	0.4	100
Beets	2.0	1.9	1.2	0.2	0.2	0
Broccoli	12.3	12.9	4.6	0.2	--	--
Cabbage	12.1	12.0	15.5	2.1	1.9	-10
Carrots	57.0	51.9	45.9	8.3	9.0	8
Cauliflower and headed broccoli	24.8	28.6	24.0	4.8	3.6	-25
Celery	22.8	24.3	19.4	4.4	1.8	-59
Cucumbers	2.4	3.5	2.9	0.6	0.6	0
Head lettuce	15.8	8.1	3.8	0.7	0.6	-14
Peas (*Pisum* sativum)	3.9	9.3	2.3	--	--	--
Peppers (*Capsicum* or *Pimenta*)	2.5	2.8	4.4	0.9	1.0	11
Potatoes	10.8	15.8	22.2	2.7	2.0	-26
Romaine lettuce	38.1	49.5	51.0	3.7	3.5	-5
Salad mix	13.9	16.3	19.9	2.3	2.5	9
Spinach	29.0	30.7	36.4	3.7	2.6	-30
Tomatoes, cherry	4.2	3.4	1.5	0.1	0.3	200
Tomatoes, other	4.2	5.5	4.2	0.9	1.0	11
Tomatoes, Roma	1.8	2.0	9.1	0.2	0.3	50

[1]Percent change from January–February 2022 to 2023.
Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of the Census.

Processed Vegetables (continued)

Return to processed vegetable section

Table B10: Selected processed vegetable import value, 2019–22

Item	2019	2020	2021	2022	Change 2021–22
	---------- *Million dollars* ----------				*--- Percent ---*
Imports					
Vegetables, prepared or preserved	**1,628**	**1,888**	**2,104**	**2,449**	**16.4**
Tomatoes	232	310	338	439	30.0
Artichokes	139	124	134	183	37.3
Potato chips	102	115	150	176	17.6
Mushrooms and truffles	115	117	146	164	12.3
Cucumber	63	98	94	100	5.5
Sweet corn	10	17	30	37	21.7
Others	966	1,106	1,212	1,349	11.3
Vegetable juice	**68**	**62**	**77**	**94**	**20.8**
Tomatoes	1	1	2	5	108.0
Others	68	61	75	89	18.1
Frozen vegetables	**2,345**	**2,582**	**2,854**	**3,334**	**16.8**
Potatoes	969	1,064	1,298	1,626	25.3
Broccoli	360	382	385	412	7.2
Cauliflower	80	92	81	94	17.1
Sweet corn	39	43	50	52	3.9
Spinach	46	50	42	47	11.5
Mushrooms and truffles	23	22	22	25	12.1
Tomatoes	11	6	6	12	115.4
Others	817	923	971	1,066	9.7
Dried and dehydrated/1	**645**	**690**	**787**	**903**	**14.8**
Potato flakes/granules/dried/starch	250	283	303	344	13.7
Mushrooms and truffles	24	27	33	35	8.4
Tomatoes	23	16	24	32	34.5
Spinach	9	12	12	14	17.0
Broccoli	4	5	7	7	15.0
Others	334	347	408	470	15.0
Selected processed imports	**4,686**	**5,222**	**5,823**	**6,779**	**16.4**

Note: This table includes vegetables, potatoes, and mushrooms, but excludes processed olives.
1/ 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.

Processed Vegetables (continued)

Return to processed vegetable section

Table B11: Selected processed vegetable export value, 2019–22

Item	2019	2020	2021	2022	Change 2021–22
	---------- *Million dollars* ----------				*--- Percent ---*
Exports					
Vegetables, prepared or preserved	**1,931**	**1,789**	**2,009**	**2,143**	**6.7**
Tomatoes	621	616	655	680	3.7
Potatoes (chips and other)	278	275	295	315	6.5
Sweet corn	96	86	83	94	13.1
Cucumber	71	46	63	76	20.8
Onions	4	5	4	5	36.3
Mushrooms and truffles	3	3	2	3	12.5
Others	857	759	906	971	7.1
Vegetable juice	40	44	48	37	-23.7
Tomatoes	2	2	3	2	-36.6
Others	37	42	45	35	-22.8
Frozen vegetables	1,506	1,584	1,317	1,485	12.7
Potatoes	1,252	1,021	1,178	1,341	13.8
Sweet corn	105	95	101	97	-4.1
Sweet potato	3	2	2	16	647.0
Spinach	2	3	2	4	77.6
Others	222	197	190	185	-2.8
Dried and dehydrated/1	319	326	327	334	2.2
Potato flakes/granules/dried/starch	141	135	123	121	-1.5
Onions	79	82	82	87	6.5
Mushrooms and truffles	4	4	4	5	13.3
Others	96	105	117	120	2.7
Total processed exports	**3,795**	**3,743**	**3,702**	**3,999**	**8.0**

Note: This table includes vegetables, potatoes, and mushrooms, but excludes processed olives.
1/ 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 C12: U.S. potato production, 2019–22

Item	Unit	2019	2020	2021	2022	Percent change 2021–22
Planted acres	Thousand acres	963.3	918.5	933	901	-3.4
Harvested acres	Thousand acres	937.3	911.7	923.6	895.6	-3.0
Yield	Cwt per acre	453	461	444	438	-1.4
Total production	Million cwt	424	420	410	392	-4.3
Price[1]	Dollars per cwt	9.94	9.3	10.2	12.9	26.5
Production value	Million dollars	4,217	3,907	4,174	5,070	21.4

Cwt is hundredweight, a unit of weight equal to 100 pounds. Cwt per acre = 100 pounds per acre.
Million cwt = million hundredweight, a weight equal to 100,000,000 pounds. Dollars per cwt = dollars per 100 pounds.
[1]Grower return from all sales modes.
Source: USDA, Economic Research Service based on data from USDA, National Agricultural Statistics Service.

Potatoes (continued)

Return to potato section

Table C13. U.S. potato trade volume, September–February, 2019/20–2022/23

Commodity	2019/20	2020/21	2021/22	2022/23	Percent change 2021/22–22/23
	----------*Million pounds*----------				*Percent*
Exports					
Fresh	449.4	459.1	484.4	520.4	7.4
Frozen, all	1,183.3	1,084.3	1,007.7	1,019.0	1.1
French fries	1,049.7	943.0	884.2	894.0	1.1
Other frozen	133.6	141.4	123.5	125.0	1.2
Chips	52.0	53.3	48.3	57.6	19.2
Dried and dehydrated	104.0	91.4	81.9	111.8	36.5
Other preparation/preserved	45.3	45.3	40.5	40.7	0.6
Seed	18.6	19.2	27.4	23.5	-14.1
Starch	9.8	8.1	5.9	7.5	25.9
Total	**1,862.4**	**1,760.8**	**1,696.1**	**1,780.4**	**5.0**
Imports					
Fresh	475.0	503.9	495.2	687.3	38.8
Frozen, all	1,142.7	1,210.8	1,378.9	1,563.6	13.4
French fries	952.7	1,018.3	1,154.3	1,277.1	10.6
Other frozen	190.0	192.5	224.6	286.4	27.6
Chips	26.4	30.9	33.7	40.1	19.1
Dried and dehydrated	50.2	69.6	65.2	86.3	32.3
Other preparation/preserved	32.0	40.0	37.2	30.4	-18.5
Seed	48.4	68.4	39.9	53.7	34.7
Starch	132.8	135.5	145.6	160.2	10.0
Total	**1,907.6**	**2,059.1**	**2,195.7**	**2,621.5**	**19.4**

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

Appendix D: Dry Beans

Return to dry beans section

Table D14. U.S. dry edible beans: Area, yield, production, price, and crop value, 2020–23/1

Year	Acreage		Yield per acre	Production	Season-average price	Crop value
	Planted	Harvested	*Cwt per acre*	*1,000 cwt*	*Dollars per cwt*	*Million dollars*
	-------- 1,000 acres -------					
2020	1,727	1,665	19.62	32,665	31.20	1,046.59
2021	1,394	1,327	17.02	22,587	41.30	928.95
2022p	1,250	1,223	21.13	25,847	41.00	1,076.74
2023f	1,226					

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

Dry Beans (continued)

Return to dry beans section

Table D15. U.S. dry edible bean crop-year export volume, 2019/20–2022/23

	------- September–August -------			---- September–February---		Change/1
Commodity	2019/20	2020/21	2021/22	2021/22	2022/23	2021/22–2022/23
	---------- *Million pounds* ----------					----- *Percent* -----
By class/2						
Kidney, all	**245.18**	**302.64**	**183.52**	**91.51**	**118.25**	**29.2**
Kidney, dark red	154.18	151.86	103.86	54.71	47.80	-12.6
Kidney, light red	26.03	27.61	13.14	6.42	9.21	43.5
Kidney, other	64.98	123.17	66.51	30.38	61.24	101.6
Navy	142.08	118.69	129.06	62.34	79.18	27.0
Black	163.85	194.67	109.09	48.79	69.56	42.6
Pinto	109.19	183.56	45.99	17.86	37.48	109.8
Beans, other/3	14.23	17.56	34.33	16.26	10.81	-33.6
Small red	21.11	54.27	25.39	13.27	18.23	37.4
Cranberry	9.59	6.92	25.17	12.71	4.36	-65.7
Lima, all	**20.68**	**13.01**	**13.85**	**6.63**	**9.16**	**38.2**
Lima, baby	3.07	1.17	1.89	1.06	1.58	49.1
Lima, large	17.62	11.84	11.96	5.57	7.58	36.2
Great Northern	17.28	16.80	11.15	4.44	4.02	-9.3
Mung	2.78	5.74	5.22	1.71	4.81	181.3
Pink	3.60	4.56	3.58	1.85	1.27	-31.5
Blackeye	1.82	2.35	1.84	0.90	0.29	-67.7
White	2.76	4.99	1.63	0.50	0.70	41.4
Total exports	**754.15**	**925.74**	**589.82**	**278.76**	**358.12**	**28.5**
All by destination country						
Canada	74.06	91.12	107.82	62.60	75.78	21.1
Mexico	179.36	345.96	104.89	56.07	101.86	81.6
Italy	87.80	88.92	98.87	51.22	46.59	-9.0
Dominican Republic	73.46	87.01	61.41	18.87	25.08	32.9
United Kingdom	64.16	62.06	45.08	10.09	23.69	134.8
Costa Rica	26.13	36.76	23.19	15.21	16.94	11.3
Haiti	35.67	30.39	14.82	4.83	5.63	16.6
Other countries	213.51	183.52	133.73	59.87	62.55	4.5
Total exports	**754.15**	**925.74**	**589.82**	**278.76**	**358.12**	**28.5**

1/ Percent change from September–February 2021/22 to September–February 2022/23.
2/ Excludes garbanzo beans.
3/ Beans, other includes 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 D16. U.S. dry edible bean crop-year import volume, 2019/20–2022/23

Commodity	September–August 2019/20	September–August 2020/21	September–August 2021/22	September–February 2021/22	September–February 2022/23	Change/1 2021/22–2022/23
	Million pounds					*Percent*
By class/2						
Beans, other/3	84.15	79.90	82.69	35.66	32.49	-8.9
Mung	66.59	79.26	68.79	37.40	35.97	-3.8
Kidney, all	**57.03**	**47.22**	**53.40**	**23.93**	**26.25**	**9.7**
Kidney, dark red	3.96	5.05	8.24	4.16	2.84	-31.6
Kidney, light red	22.22	19.30	21.43	9.76	15.83	62.2
Kidney, other	30.85	22.88	23.72	10.01	7.58	-24.3
Pinto	27.81	22.56	37.58	20.71	15.05	-27.3
Black	36.82	32.75	30.60	16.01	17.35	8.4
Small red	19.57	16.07	18.76	7.93	10.41	31.2
Blackeye	13.05	13.24	12.81	5.55	9.12	64.2
Lima, all	**1.70**	**8.85**	**9.68**	**4.14**	**6.03**	**45.5**
Lima, baby	0.61	1.25	1.34	0.86	2.38	175.9
Lima, large	1.09	7.61	8.34	3.28	3.64	11.2
Navy	3.17	3.05	3.98	1.89	2.41	27.5
Great Northern	6.58	2.98	3.32	2.24	1.22	-45.6
White	2.47	2.21	2.19	0.94	1.02	7.8
Cranberry	1.28	1.18	1.00	0.19	0.34	82.3
Total imports	**320.22**	**309.27**	**324.80**	**156.60**	**157.64**	**0.7**
All by origination country						
Canada	73.54	78.87	87.88	44.68	37.19	-16.8
Mexico	56.81	29.81	49.69	22.33	14.91	-33.3
Nicaragua	33.43	34.01	36.82	13.31	20.70	55.6
India	44.83	40.25	35.83	16.93	23.24	37.3
Peru	13.30	20.83	23.32	10.25	16.02	56.4
Thailand	10.96	13.31	21.75	11.91	10.91	-8.4
China (Mainland)	25.58	30.24	15.76	8.26	9.25	11.9
Other countries	61.75	61.96	53.74	28.94	25.43	-12.1
Total imports	**320.22**	**309.27**	**324.80**	**156.60**	**157.64**	**0.7**

1/ Percent change from September–February 2021/22 to 2022/23.
2/ Excludes garbanzo beans.
3/ Beans, other includes 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.

Appendix E: Dry Peas and Lentils

Return to dry peas and lentils section

Table E17. U.S. dry edible peas: Area, yield, production, price, and crop value, 2019–23

Year	Planted area	Harvested area	Production	Crop value	Yield per acre	Season average price
	-------- 1,000 acres --------		*1,000 cwt*	*Million dollars*	*Cwt per acre*	*Dollars per cwt*
2019	1,102	1,046	22,210	210.45	21.2	9.64
2020	998	970	21,629	212.54	22.3	9.84
2021	972	846	8,636	152.10	10.2	16.20
2022	919	862	15,092	233.26	17.5	16.30
2023F	1,000					

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

Table E18. U.S. lentils: Area, yield, production, price, and crop value, 2019–23

Year	Planted area	Harvested area	Production	Crop value	Yield per acre	Season average price
	-------- 1,000 acres --------		*1,000 cwt*	*Million dollars*	*Cwt per acre*	*Dollars per cwt*
2019	486	425	5,311	83.57	12.5	15.70
2020	523	510	7,398	135.04	14.5	18.20
2021	708	567	3,417	123.47	6.0	35.60
2022	660	602	5,489	180.12	9.1	33.60
2023F	519					

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

Dry Peas and Lentils (continued)

Return to dry peas and lentils section

Table E19. U.S. dry edible peas and lentils: Export volume by class 1/

Commodity	July–June 2019/20	July–June 2020/21	July–June 2021/22	July–February 2021/22	July–February 2022/23	Change/2 2021/22–2022/23
	Thousand cwt (bags)					*Percent*
Exports by class						
Peas, all	**7,648**	**9,717**	**5,294**	**3,746**	**3,472**	**-7.3**
Peas, split	2,534	2,337	2,069	1,380	2,059	49.2
Peas, green	3,540	3,123	1,430	829	723	-12.8
Peas, other	459	1,183	1,038	817	399	-51.2
Peas, yellow	1,098	3,058	739	709	281	-60.4
Peas, Austrian winter	17	15	17	11	11	-4.5
Lentils, all	**6,566**	**6,716**	**3,222**	**2,106**	**2,546**	**20.9**
Lentils, other	6,566	6,716	3,222	2,106	2,546	20.9
Total exports	**14,214**	**16,433**	**8,516**	**5,853**	**6,018**	**2.8**
All by destination country						
Peas, all	**7,648.0**	**9,717.1**	**5,293.9**	**3,746.2**	**3,472**	**-7.3**
Ethiopia	805.2	679.6	1,303.8	1,067.0	1,252	17.3
Canada	1,544.0	1,845.7	579.0	410.6	316	-23.1
Yemen (Sana)	462.8	756.6	573.3	344.4	400	16.2
Philippines	495.2	501.1	328.6	177.9	113	-36.7
China (Mainland)	753.1	2,627.0	197.1	142.5	270	89.4
Other countries	3,587.7	3,307.1	2,312.1	1,603.8	1,121	-30.1
Lentils, all	**6,566.2**	**6,716.1**	**3,221.7**	**2,106.4**	**2,546**	**20.9**
Canada	1,965.4	2,365.4	1,118.2	836.2	943	12.8
Spain	748.8	513.4	345.9	230.6	261	13.0
Mexico	698.8	571.0	318.7	225.7	296	31.1
Sudan	368.2	725.0	231.2	11.9	212	1684.7
India	1,133.8	470.3	0.0	0.0	0	NA
Other countries	1,651.1	2,070.9	1,207.7	802.0	834.6	4.1
Total exports	**14,214.2**	**16,433.2**	**8,515.6**	**5,852.5**	**6,018.0**	**2.8**

Note: Cwt = hundredweight which equals 100 pounds.
1/ This table excludes planting seed trade.
2/ Dry pea and lentil percent change from July–February 2021/22 to July–February 2022/23.
Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of the Census.

Dry Peas and Lentils (continued)

Return to dry peas and lentils section

Table E20. U.S. dry edible peas and lentils: Import volume by class 1/

Commodity	July–June 2019/20	July–June 2020/21	July–June 2021/22	July–February 2021/22	July–February 2022/23	Change/2 2021/22–2022/23
	Thousand cwt (bags)					Percent
Imports by class						
Peas, all	**1,822.4**	**1,460.0**	**4,422.4**	**3,182.0**	**1,593.2**	**-50**
Peas, yellow	946.9	704.1	3,133.2	2,368.1	704.4	-70
Peas, other	364.4	427.8	616.0	412.2	213.0	-48
Peas, split	457.3	259.9	548.1	308.4	479.9	56
Peas, green	50.0	66.6	123.9	92.0	193.2	110
Peas, Austrian winter	3.8	1.6	1.2	1.2	2.6	110
Lentils, all	**1,020.5**	**945.7**	**1,233.1**	**748.2**	**820.5**	**10**
Lentils, other	538.9	532.9	728.6	441.7	436.6	-1
Lentils, red	327.7	251.4	285.6	158.7	260.2	64
Lentils, green	153.9	161.4	218.8	147.8	123.7	-16
Total imports	**2,842.9**	**2,405.7**	**5,655.6**	**3,930.1**	**2,413.7**	**-39**
All by origin country						
Peas, all	**1,822.4**	**1,460.0**	**4,422.4**	**5,504.4**	**2,462.2**	**-55**
Canada	1,141.8	789.8	2,990.4	2,784.5	1,275.6	-54
Russia	357.2	420.4	366.9	2,015.9	847.5	-58
New Zealand	146.8	128.1	84.8	201.2	313.8	56
Turkey	2.4	0.2	392.6	54.3	25.0	-54
Ukraine	-	0.6	447.6	0.9	0.3	-63
Other countries	174.1	120.9	140.2	447.6	0.1	-100
Lentils, all	**1,020.5**	**945.7**	**1,233.1**	**1,142.9**	**1,290.8**	**13**
Canada	855.4	783.3	1,069.2	576.2	650.7	13
India	33.1	56.0	73.2	500.3	561.1	12
Turkey	75.3	63.8	52.8	35.2	50.2	42
Mexico	18.8	14.7	11.4	20.6	20.5	-1
United Kingdom	12.2	6.6	8.3	6.4	7.5	18
Other countries	25.8	21.2	18.1	4.3	0.8	-82
Total imports	**2,842.9**	**2,405.7**	**5,655.6**	**6,647.4**	**3,753.0**	**-44**

Note: Cwt = hundredweight which equals 100 pounds.
1/ This table excludes planting seed trade.
2/ Dry pea and lentil percent change from July–February 2021/22 to July–February 2022/23.
Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of the Census.

Appendix F: Chickpeas

Return to chickpeas section

Table F21. U.S. chickpea: Export volume by class 1/

Commodity	September–August 2019/20	September–August 2020/21	September–August 2021/22	September–February 2021/22	September–February 2022/23	Change/2 2021/22–2022/23
	Thousand cwt (bags)					*Percent*
Exports by class						
Chickpea, all	**3,427.7**	**2,811.9**	**1,170.1**	**757.8**	**908.3**	**19.9**
Chickpeas, garbanzo	3,427.7	2,811.9	1,170.1	757.8	908.3	19.9
Total exports	**3,427.7**	**2,811.9**	**1,170.1**	**757.8**	**908.3**	**19.9**
All by destination country						
Chickpea, all	**3,427.7**	**2,811.9**	**989.3**	**757.8**	**908.3**	**19.9**
Canada	574.3	580.0	282.1	184.5	303.2	64.3
Spain	606.8	290.1	167.5	160.2	222.7	39.0
Pakistan	1,258.8	924.8	106.3	71.5	87.9	23.1
Italy	123.4	187.9	71.4	57.1	18.8	-67.1
Turkey	40.5	63.6	61.4	60.3	61.8	2.4
Algeria	41.9	80.4	53.1	38.3	14.4	-62.3
United Arab Emirates	114.4	151.3	34.2	24.5	43.3	76.8
Sri Lanka	56.1	124.7	30.4	29.3	3.6	-87.8
South Korea	36.2	47.6	25.8	17.9	4.9	-72.8
Portugal	169.6	7.1	12.8	8.2	1.0	-87.8
Other countries	405.8	354.3	144.3	105.9	146.7	38.5
Total exports	**3,427.7**	**2,811.9**	**989.3**	**757.8**	**908.3**	**19.9**

Note: Cwt = hundredweight which equals 100 pounds.
1/ This table excludes planting seed trade.
2/ Dry pea and lentil percent change from July–February 2021/22 to July–February 2022/23.
Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of the Census.

Chickpeas (continued)

Return to chickpeas section

Table F22. U.S. chickpea: Import volume by class 1/

Commodity	September–August 2019/20	September–August 2020/21	September–August 2021/22	September–February 2021/22	September–February 2022/23	Change/2 2021/22–2022/23
	Thousand cwt (bags)					*Percent*
By class						
Chickpea, all	**915.7**	**1,019.9**	**1,171.0**	**549.8**	**688.1**	25
Chickpeas, garbanzo	683.1	632.9	710.6	356.9	537.7	51
Chickpeas, kabuli	232.6	387.0	460.4	192.9	150.5	-22
Total imports	**915.7**	**1,019.9**	**1,171.0**	**549.8**	**688.1**	**25**
All by origination country						
Canada	366.6	539.1	631.8	298.0	398.0	34
Mexico	293.2	200.5	260.7	120.5	151.6	26
Australia	87.9	68.9	82.5	32.8	51.7	58
India	70.2	82.7	72.3	33.5	43.1	29
Argentina	48.5	21.1	36.0	14.4	35.7	148
Turkey	26.6	99.1	70.1	43.8	4.0	-91
Trinidad And Tobago	0.1	0.1	3.1	1.5	1.4	-6
Other countries	22.5	8.4	14.4	5.3	2.6	-50
Total imports	**915.7**	**1,019.9**	**1,171.0**	**549.8**	**688.1**	**25**

Note: Cwt = hundredweight which equals 100 pounds.
1/ This table excludes planting seed trade.
2/ Dry pea and lentil percent change from July–February 2021/22 to July–February 2022/23.
Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of the Census.

Chickpeas (continued)

Return to chickpeas section

Table F23. U.S. chickpeas: Area, yield, production, price, and crop value, 2019–23

Year	Planted area	Harvested area	Production	Crop value	Yield per acre	Season average price
	-------- 1,000 acres --------		*1,000 cwt*	*Million dollars*	*Cwt per acre*	*Dollars per cwt*
2019	453	405	6,256	116.29	15.5	16.50
2020	254	251	4,087	88.57	16.3	22.20
2021	368	349	2,846	102.23	8.2	36.20
2022	353	342	3,658	122.28	10.7	33.60
2023F	341					

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

Table F24. U.S. large chickpeas: Area, yield, production, price, and crop value, 2019–23

Year	Planted area	Harvested area	Production	Crop value	Yield per acre	Season average price
	-------- 1,000 acres --------		*1,000 cwt*	*Million dollars*	*Cwt per acre*	*Dollars per cwt*
2019	348	313	4,865	93.54	15.5	17.80
2020	212	210	3,396	74.91	16.2	23.30
2021	308	296	2,442	89.19	8.3	36.50
2022	273	263	2,586	88.83	9.8	34.50
2023F	227					

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

Table F25. U.S. small chickpeas: Area, yield, production, price, and crop value, 2019–23

Year	Planted area	Harvested area	Production	Crop value	Yield per acre	Season average price
	-------- 1,000 acres --------		*1,000 cwt*	*Million dollars*	*Cwt per acre*	*Dollars per cwt*
2019	105	91	1,391	22.75	15.2	15.00
2020	42	41	691	13.66	16.9	20.20
2021	59	54	404	13.04	7.6	33.30
2022	80	79	1,072	33.44	13.6	30.70
2023F	114					

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

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