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Vegetables and Pulses Outlook

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Vegetable and Pulse Sector at a Glance

In 2014, the United States produced about 129 billion pounds of commercial vegetables and pulses (including mushrooms), with a value of $19 billion and area harvested of about 6.5 million acres. Further, the vegetable sector (here includes melons), which encompasses hundreds of independent markets within the food marketing system, accounted for about 10 percent of U.S. crop cash receipts. Despite ongoing drought and water shortages in California, where about 40 percent of vegetables and pulses are grown, total U.S. output volume rose 5 percent from last year as harvested area expanded. The two leading crops produced during that period were potatoes (44.7 billion pounds) and tomatoes (32.6 billion pounds), which combine to account for 62 percent of total volume of production. Expanded production was offset by robust export volumes, which served to reduce domestic availability.

Global markets are important outlets for U.S. vegetable and pulse production. Fresh and frozen vegetable exports, as a share of production, remain relatively steady at approximately 7 and 8 percent, respectively. Dry peas and lentils have been particularly integrated with global markets and the percent of use imported from other countries has grown rapidly since 2010.

In 2014, total amount of vegetables and pulses available for consumption for each person in the U.S. reached 385 pounds—unchanged from last year and 1 percent below the 2009-11 average. When this amount is adjusted for losses and converted to daily cups, each American consumed, on average, 1.6 cups per day—well below the 2010 *Dietary Guidelines*' daily recommendations of 2.5 cups, for a 2,000-calorie diet. The 2010 *Dietary Guidelines for Americans* recommend increasing intake of vegetables and fruits since they are a good source of many nutrients that are under consumed in the United States. The *Dietary Guidelines for Americans* are jointly issued and updated every 5 years by the U.S. Department of Agriculture and the Department of Health and Human Services. The *Scientific Report of the* 2015 Dietary Guidelines *Advisory Committee* was released in January 2015. The comment period for the 2015 guidelines has been extended to May 8, 2015.

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Approved by the World Agricultural Outlook Board.

Industry Overview

Table 1—U.S. vegetable industry at a glance, 2011-14[1]

Item	Unit	2011	2012	2013	2014p	Percent Change 2013-14
Area harvested	1,000 ac.	5,619	6,613	6,120	6,524	6.6
Vegetables:						
Fresh (excl melon)	1,000 ac.	1,421	1,434	1,425	1,406	-1.3
Processing	1,000 ac.	1,052	1,136	1,053	1,090	3.5
Potatoes	1,000 ac.	1,079	1,139	1,051	1,050	-0.1
Dry beans, peas and lentils	1,000 ac.	1,934	2,776	2,474	2,841	14.8
Other[2]	1,000 ac.	133	130	116	138	18.8
Production	Mil. cwt	1,209	1,293	1,222	1,288	5.3
Vegetables:						
Fresh (excl melon)	Mil. cwt	372	379	364	368	0.9
Processing	Mil. cwt	341	365	344	385	11.8
Potatoes	Mil. cwt	430	465	435	447	2.8
Dry beans, peas and lentils	Mil. cwt	30	48	45	50	9.9
Other[2]	Mil. cwt	36	35	34	39	14.6
Crop value	$ mil.	18,002	18,266	19,739	19,395	-1.7
Vegetables:						
Fresh (excl melon)	$ mil.	9,778	8,933	10,579	10,041	-5.1
Processing	$ mil.	1,794	2,027	2,126	2,203	3.6
Potatoes	$ mil.	3,848	4,223	4,017	4,045	0.7
Dry beans, peas and lentils	$ mil.	1,059	1,523	1,315	1,292	-1.8
Other[2]	$ mil.	1,524	1,561	1,701	1,814	6.7
Unit value[3]	$/cwt	14.89	14.13	16.15	15.06	-6.7
Vegetables:						
Fresh (excl melon)	$/cwt	26.29	23.60	29.04	27.32	-5.9
Processing	$/cwt	5.26	5.55	6.18	5.72	-7.3
Potatoes	$/cwt	9.20	9.41	8.65	9.71	12.3
Dry beans, peas and lentils	$/cwt	34.79	31.46	28.94	25.86	-10.6
Other[2]	$/cwt	42.80	44.00	50.53	47.03	-6.9
Trade						
Imports	$ mil.	10,324	10,582	11,406	11,702	2.6
Vegetables:						
Fresh (excl melon)	$ mil.	5,570	5,593	6,367	6,377	0.1
Processing[4]	$ mil.	2,722	2,831	2,882	3,079	6.8
Potatoes & products	$ mil.	1,124	1,154	1,176	1,165	-0.9
Dry beans, peas and lentils	$ mil.	219	218	217	266	22.6
Other[5]	$ mil.	688	787	764	816	6.8
Exports	$ mil.	5,987	6,299	6,740	6,997	3.8
Vegetables:						
Fresh (excl melon)	$ mil.	1,960	1,925	2,146	2,169	1.1
Processing[4]	$ mil.	1,396	1,489	1,651	1,803	9.3
Potatoes & products	$ mil.	1,501	1,643	1,675	1,704	1.7
Dry beans, peas and lentils	$ mil.	545	727	757	798	5.4
Other[5]	$ mil.	585	517	511	523	2.2
Per capita use	Pounds	382.6	392.5	384.7	384.9	0.0
Vegetables:						
Fresh (excl melon)	Pounds	141.8	145.1	140.6	141.5	0.6
Processing	Pounds	112.6	114.4	110.5	113.3	2.6
Potatoes & products	Pounds	110.3	114.8	116.0	111.2	-4.2
Dry beans, peas and lentils	Pounds	6.5	6.9	7.1	7.6	7.6
Other[2]	Pounds	11.4	11.3	10.5	11.3	7.6

[1] Total rounded. [2] Includes sweet potatoes and mushrooms.

[3] Ratio of total value to total production. [4] Includes canned, frozen, and dried. Excludes potatoes, pulses, and mushrooms. [5] Other includes mushrooms and vegetable seed.

All trade data are on a calendar-year basis. Note: Hundredweight (cwt), a unit of measure equal to 100 pounds.

Sources: USDA, Economic Research Service, using data from USDA, National Agricultural Statistics Service, *Crop Production, Acreage, Agricultural Prices, Crop Values, Mushrooms,* and *Potatoes;* and from U.S. trade data from U.S. Department of Commerce, U.S. Census Bureau.

Vegetables and Pulses: Production Trends

In 2014, the United States produced about 129 billion pounds of commercial vegetables and pulses (including mushrooms), with a value of $19 billion and area harvested of about 6.5 million acres. The two leading crops produced during that period were potatoes (44.7 billion pounds) and tomatoes (32.6 billion pounds) which combine to account for 62 percent of total volume production. Expanded production was offset by robust export volumes.

Fresh-market vegetables

In 2014, the United States produced about 36.8 billion pounds of fresh vegetables (excluding potatoes, sweet potatoes, and mushrooms), with a value of $10 billion and area harvested of about 1.4 million acres. The three largest crops, in terms of production, were onions, head lettuce, and tomatoes, which combined accounted for 40 percent of the total production. Production volume increased during this period for nearly half of the listed commodities—onions, tomatoes, carrots, cabbage, celery, leaf lettuce, onions, peppers, and pumpkins. In contrast, production output for fresh-market sweet corn, cucumbers, snap beans, head and romaine lettuce among others decreased as area harvested declined.

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

Commodity	Average 2009-11	2012	2013	2014	Change 2013-14
	---------- *Million pounds* ----------				*Percent*
Artichokes[1]	97.9	105.9	95.9	94.9	-1
Asparagus	67.7	62.0	62.0	56.8	-8
Beans, snap	472.8	434.0	425.2	368.4	-13
Broccoli	1,868.2	2,007.6	2,066.4	2,024.0	-2
Cabbage	2,170.2	1,975.2	2,175.0	2,235.9	3
Carrots	2,242.1	2,362.7	2,425.5	2,537.9	5
Cauliflower	679.0	654.2	657.2	697.8	6
Celery	1,978.6	1,975.2	1,800.3	1,839.3	2
Corn, sweet	2,742.9	2,791.0	2,856.1	2,534.6	-11
Cucumbers	827.1	818.2	760.3	689.5	-9
Garlic[1]	394.5	431.9	386.7	386.8	0
Lettuce					
Head	4,998.8	5,097.6	4,515.0	4,443.8	-2
Leaf	1,226.3	1,282.5	1,265.0	1,298.4	3
Romaine	2,596.2	2,825.6	2,662.0	2,467.9	-7
Onions[1]	7,443.2	7,149.5	6,965.4	7,280.6	5
Peppers, bell[1]	1,593.0	1,568.7	1,443.3	1,534.6	6
Peppers, chile[1]	453.8	431.5	421.0	462.5	10
Pumpkins[1]	1,478.2	1,746.5	1,628.9	1,910.8	17
Spinach	611.9	536.0	561.9	591.9	5
Squash[1]	688.2	736.9	614.9	574.5	-7
Tomatoes	3,033.8	2,866.0	2,639.1	2,728.0	3
Selected total	37,664.4	37,858.7	36,427.1	36,758.9	1

[1] All uses.

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

As with production volume, the top three crops in terms of total farm value are tomatoes, head lettuce, and onions, which collectively accounted for 32 percent of total farm value and respectively, created $1.1 billion, $1.1 billion, and $934 million of farm value. Despite ongoing drought and water storage, California continued to be the leading State for fresh-market vegetables, accounting for 54 percent of production and 61 percent of farm value.

Processing-Market Vegetables

Production of vegetables for processing market (excluding potatoes and mushrooms) totaled 38.5 billion pounds in 2014—up 12 percent from 2013. Out of the 11 major crops surveyed, 8 crops—snap beans, lima beans, sweet corn, cucumbers for pickles, green peas, and tomatoes—registered increased output compared with 2013. Notably, production of tomatoes used for canned products, such as sauces, paste, soup, juice, and ketchup, rose 16 percent to 29.3 billion pounds as area, yields, and prices increased. Water shortages in California, where 95-97 percent of processing tomatoes are grown, did not inhibit production which has continued to expand. According to USDA, National Agricultural Statistics Service's (NASS) January 15 *California Processing Tomato* report, U.S. processors anticipate contracting a record 15.0 million short tons in 2015. If this amount is realized, this will be the largest tomato crop on record—surpassing 2014's amount by 11 percent.

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

Item	Average 2009-11	2012	2013	2014	Change 2013-14
	Million pounds				*Percent*
Canning:					
Tomatoes	26,095.3	26,357.5	25,263.0	29,274.6	16
Sweet corn	2,587.1	2,471.8	2,245.3	2,343.2	4
Snap beans	1,040.6	911.7	850.2	889.5	5
Cucumbers	1,054.7	960.1	946.3	963.5	2
Green peas	273.0	260.7	248.0	237.4	-4
Spinach	23.2	39.6	44.0	44.0	0
Lima beans	9.0	9.3	17.1	11.0	-35
Asparagus	6.9	4.4	4.4	4.0	-9
Subtotal	31,089.8	31,015.2	29,618.3	33,767.2	14
Freezing:					
Sweet corn	3,141.6	3,446.9	2,858.4	2,792.4	-2
Snap beans	455.6	549.7	483.3	473.0	-2
Green peas	461.3	553.8	464.1	488.3	5
Spinach	150.7	111.0	133.4	136.6	2
Lima beans	93.0	112.7	80.2	89.8	12
Asparagus	9.3	9.7	9.8	13.5	38
Subtotal	4,311.6	4,783.8	4,029.2	3,993.6	-1
Dual use:					
Carrots	692.4	666.7	703.9	643.6	-9
Broccoli	42.8	39.6	69.6	69.0	-1
Cauliflower	17.7	14.8	9.0	7.5	-17
Subtotal	753.0	721.1	782.5	720.1	-8
Selected total	36,154.4	36,520.1	34,430.0	38,481.0	12

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

In contrast, production output for processed broccoli, cauliflower and carrots declined as area harvested declined. Spinach production for canning remained unchanged while spinach for freezing increased.

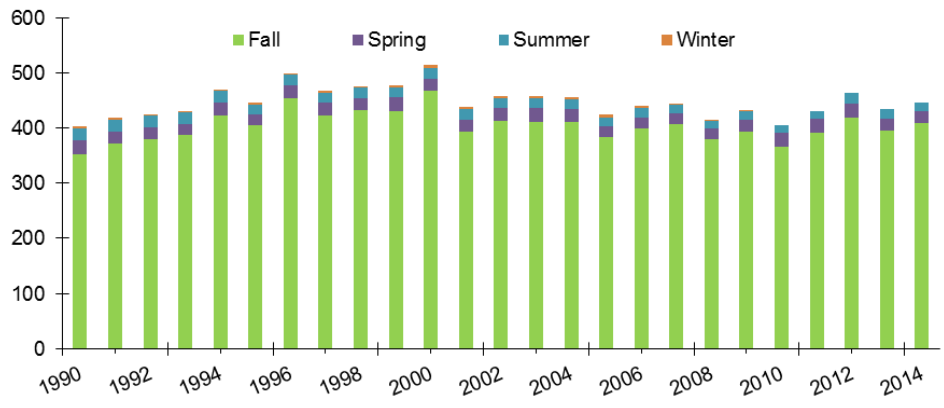
With gains in per-acre yields and upward trends in production, the value of production for processing vegetables rose 4 percent in 2014 to $2.2 billion. The top three crops in terms of processing vegetable farm value were tomatoes ($1.3 billion), sweet corn ($290 million), and cucumbers for pickling ($176 million). The top three processing vegetable states were California ($1.3 billion), Wisconsin ($158 million), and Minnesota ($135 million).

Potato Markets

The 2014 fall potato harvest is estimated to be 3.3 percent larger than 2013 and is the second-highest production level observed in the last 10 years. At 408.3 million hundredweight (cwt) 2014 fall production contributes 91.4 percent of all potatoes harvested in 2014 as compared to 90.9 percent in 2013. The gain in fall harvested potatoes offsets an 8.6 percent (1.4 million cwt) decline in summer production, combines with a slight, 2.1 percent (0.47 cwt) increase in spring production, and results in production for 2014 totaling 446.7 million cwt, up from 434.7 in 2013.

Production gains for fall and spring crops are attributable to yield improvements; yields increased over 2013 estimates by 3.3 percent and 4.6 percent, respectively. Only summer yields declined, down 11.3 percent or 41 cwt per acre to 322 cwt. Notably, year-to year yields increased in several major potato producing States including Colorado (up 6.7 percent), Idaho (up 2.4 percent), Maine (up 3.5 percent), Oregon (up 6.4 percent), and Washington (up 2.5 percent). Gains in aggregate average yield per acre may mask reported sizing issues. Industry insiders report that the 2014 fall crop had a lower-than-average share of large tubers and that the crop is "heavy" with small tubers. Cartons of U.S. No.1 40, 50, and 60 count cartons are currently selling for premium over prices received for similar sizes in the previous year.

Figure 1
U.S. potato production, by season



Notes: Cwt=hundredweight (100 pounds); Winter Production data not available after 2009.
Source: USDA, National Agriculture Statistics Service, *QuickStats* Data Portal.

Cultivation conditions, as well as, seed potato variety selection affect yields and tuber quality. In 2014, use of Russet Burbank and Norkotah varieties for fall production is down year-to-year by 2.4 and 1.7 percent respectively, while Ranger and Umatilla varieties posted slight increases. In aggregate, the five most popular fall potato varieties were planted to 72.4 percent of all fall acres, a decline from the 2013 coverage of 74.7 percent.

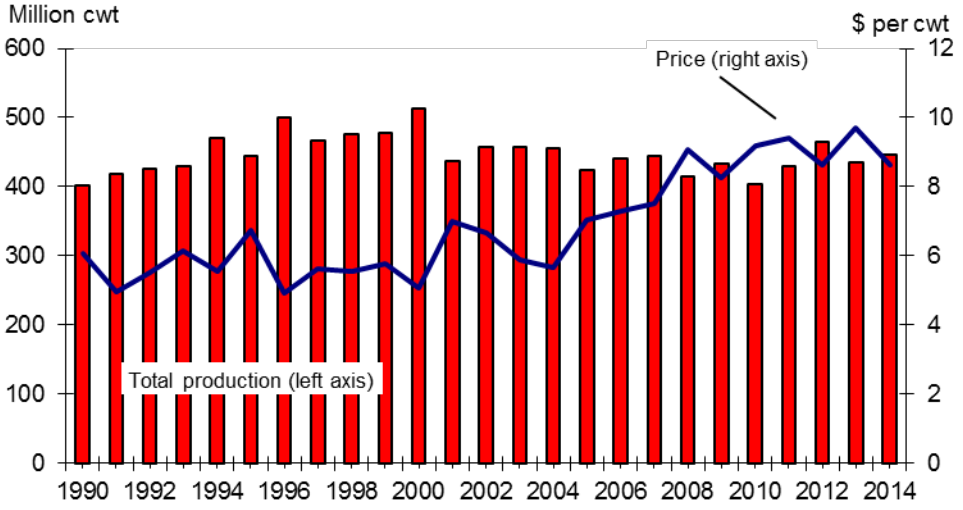
Area harvested for fall and spring potatoes is estimated to be 2,800 acres less than the 1.0 million acres harvested in 2013. An increase in summer harvested area of 1,400 acres is offset by losses in other seasons and results in a year-to-year decline is all potato harvested area of 1,400 acres.

Fall area harvested declined for 10 of 17 States reporting; double-digit declines are noted for Ohio (down 16.7 percent), Nebraska (down 19.1 percent), and Pennsylvania (down 21.1 percent). Gains in fall harvested area are recorded for California, Colorado, Washington, Montana, and Idaho; up 16.4; 9.5; 3.1; 1.8; and 1.3 percent, respectively. Collectively, these states account for 60.7 percent of all fall harvested area whereas States posting year-to-year production declines account for 37.7 percent of all fall area harvested in 2014.

All Potato Price Weakens, Below 5-Year Average

Expanded aggregate production, an increased proportion of smaller-sized tubers, and lower feed grain prices put downward pressure on the 2014 all potato price. At an average of $8.62 per cwt, the 2014 all potato price is $1.09 below the 2013 price, a year-to-year decline of 11.2 percent. The 2014 price is also below the 5-year average price of $9.04 per cwt.

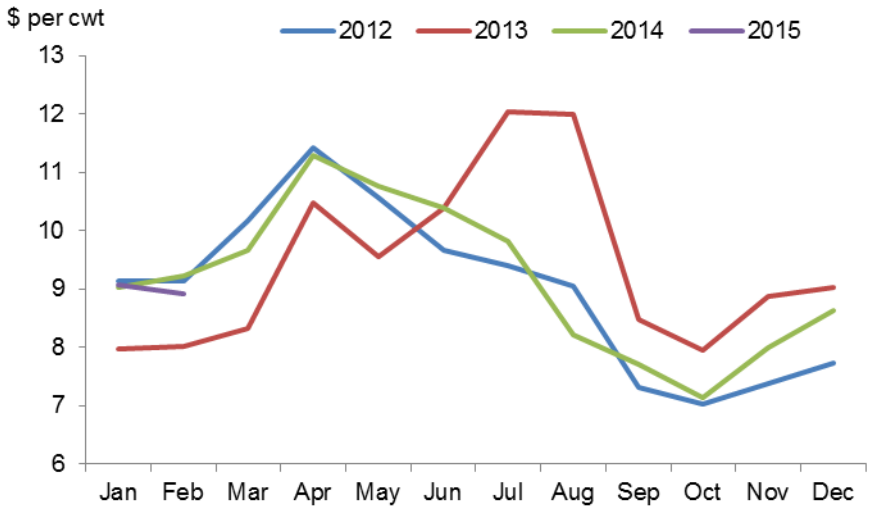
Figure 2
U.S. potato production and price



Note; Cwt = hundredweight(100 pounds).
Sources: USDA, National Agricultural Statistics Service, *Crop Production* and *Agricultural Prices*.

A comparison of monthly price patterns for the 2012, 2013 and 2014 calendar years indicates that early 2014 prices, which were buoyed by strong prices for the 2013/14 fall crop, experienced the typical seasonal April peak ($11.29/cwt) and then continued a price decline pattern akin to the 2012 season. In October 2014, all potato prices began to recover though December 2014 and into January 2015. The February 2015 all potato price, at $8.91/cwt, is down from the nearby January price ($9.07), a departure from 2012, 2013, and 2014 price patterns, when prices rose from January through April.

Figure 3
U.S. monthly all potato prices

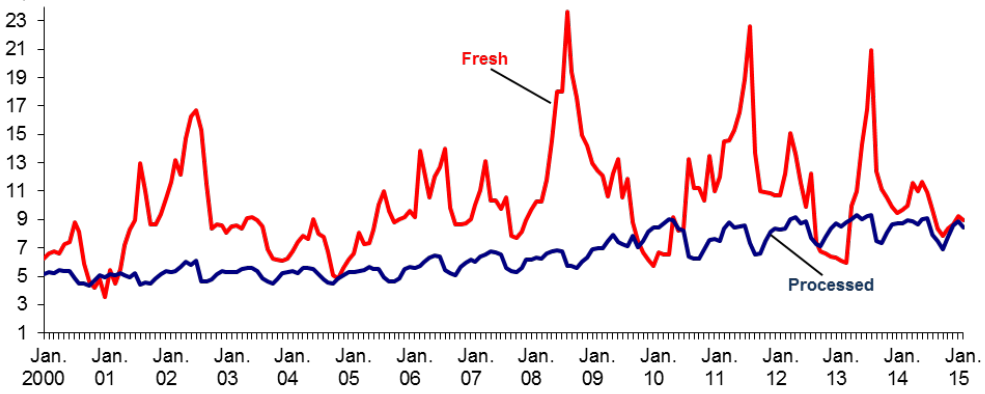


Note; Cwt = hundredweight(100 pounds). Source: USDA, National Agricultural Statistics Service, *Quick Stats* Database.

Sizing issues and the related discounting of high-tuber count cartons is currently putting downward pressure on fresh prices, which are down in January and February, relative to fresh prices observed a year earlier. Processed prices are up slightly in the first few months of 2014. Fresh and processing prices for 2014 will not be available for comparison to the 2013 estimates of $12.48 and $8.56, respectively, until later in the year. Current expectations are for these prices to be lower for 2014 than in 2013.

The most recent USDA NASS *Potato Stocks* report indicates that the 13 major potato producing States held 130 million cwt of potatoes in storage on April 1, 2015, approximately 10.5 million more potatoes were held in stocks on that date as compared to the same point in time in 2014. Part of the increase in stocks is likely attributable to increased production. However production is estimated to have increased by just 3.9 percent in 2014; the April 1, 2015 stocks figure is nearly 9 percent higher than the previous year's estimate. April 1, 2015 stocks are 25.7 percent higher in Colorado 6.4 percent in Idaho, 11.1 percent in Montana, 7.9 percent in Oregon, and 11.5 percent in Washington, all relative to 2014 figures.

Figure 4
Monthly U.S. prices for fresh and processed potatoes
$ per cwt



Note; Cwt=hundredweight (100 pounds).
Source: USDA, National Agricultural Statistics Service , *QuickStats* Data Portal.

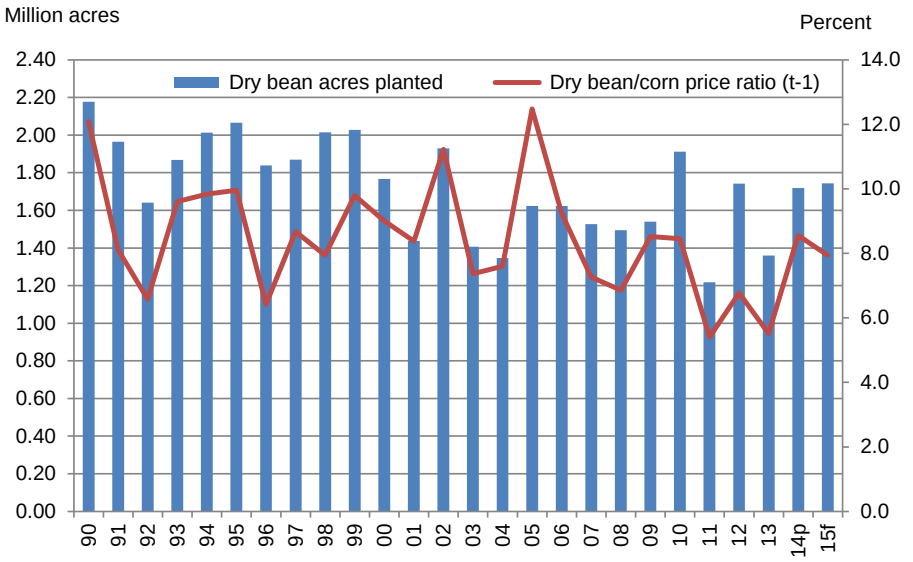
Processors in the 9 major processing States used 144 million cwt of potatoes, up 2.6 percent and 3.7 million cwt from April 2014. Processing use rose in all States except for Maine. Dehydrated use was virtually unchanged at 27.1 million cwt. The NASS *Cold Storage* report for April 2015 indicates that 9 percent more total frozen products were held in storage on March 31, 2015 as compared to the same date in 2014. An estimate of stocks of french fries in all warehouses, is projected to be up 19 percent in the Pacific region, and 6 percent in the West North Central Region; Mountain Region fry stocks are down 13 percent for the same period. In general, freezer stocks appear to have been built up over the last several months, possibly in anticipation of expanded french fry exports subsequent to the resolution of a labor dispute at West Coast ports. The labor dispute involved thousands of dockworkers and resulted in partial port shutdowns and intermittent work stoppages. The labor dispute lasted 9 months and affected 29 ports from San Diego to Seattle.

Dry-Pulse Markets

In 2014, the United States produced almost 5 billion pounds of dry pulse crops including dry beans, dry peas, and lentils with a value of $1.3 billion and area harvested of 2.8 million acres. Area planted for 2015 dry pulse crops is expected to be about 6.5 percent larger than the 2014 crop and similar in size to the 2012 area planted.

The 1 year-lagged dry edible bean price and corn price ratio is positively correlated with dry bean acreage planted. When dry bean prices are high relative to corn prices, acreage of dry beans typically increases the following year. The price ratio did not change much between 2013 and 2014; prices of both corn and dry beans fell. The relative price therefore was similar and the one year price ratio carried forward into 2015 does not show much change.

Figure 5
Dry bean acres planted and lagged bean/corn price ratio, 1990-2015



Sources: USDA, Economic Research Service (price ratio) and USDA, National Agricultural Statistics Service (acres planted).

Table 4--Annual U.S. production of dry pulse crops

Commodity	Average 2009-11	2012	2013	2014	Change 2013-14
	---------- *Million pounds* ----------				*Percent*
Dry Beans					
Pinto	1,020.1	1,353.4	848.6	983.4	16
Navy (pea)	378.2	490.6	340.2	442.1	30
Great Northern	119.9	122.2	151.5	235.1	55
Black	356.3	373.9	254.5	399.7	57
Dark Red Kidney	82.4	90.5	83.8	116.0	38
Light Red Kidney	85.8	80.2	84.5	120.6	43
Baby Lima	29.7	30.2	17.8	30.0	69
Large Lima	34.4	22.7	18.9	19.0	1
Blackeye	56.4	54.6	63.9	43.3	-32
Garbanzo	186.2	333.2	355.9	280.8	-21
Small Red	63.9	83.8	54.8	70.8	29
Pink	49.7	61.2	47.6	36.6	-23
Small White	5.7	3.3	2.3	4.2	83
Other[1]	94.5	85.8	130.3	131.4	1
Dry Peas and Lentils					
Dry edible peas	1,232.80	1,087.20	1,562.00	1,715.50	10
Lentils	641.10	530.20	501.90	336.70	-33
Australian Winter Peas	20.00	16.70	22.80	22.50	-1

[1] Bean classes included vary.

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

The 2015 dry bean planting intentions reported by USDA National Agricultural Statistics Service in the March 2015 *Prospective Plantings* indicate that national dry bean acreage will increase just 1 percent over the previous year. If planting intentions are realized, acreage will be down in Nebraska, Idaho, and Washington but rise in Michigan and Minnesota. The decrease in Washington is driven largely by reduced acres planted to Garbanzo beans which are expected to drop 22 percent in the State compared to 2014. Nationally the long-running upward trend in Garbanzo bean acreage continues to moderate in 2015 with a decrease of 8 percent projected for 2015. In contrast, an upward trend in dry edible pea area is expected. If realized, acres planted to dry peas will be greater than 1 million acres for the first time. Likewise, acres planted for dry lentils are expected to increase, rebounding 37 percent in 2015 to 385,000; similar to levels in 2013.

Vegetables and Pulses: Trade Patterns

Greater integration with world markets is a long-running trend in U.S. vegetable and dry pulse markets as the imported share of total supply has risen steadily. Between 2010 and 2014, over 25 percent of fresh and frozen vegetable use was supplied by imported product while 15 percent of the dry bean markets and 75 percent of the dry pea and lentil markets were supplied by imports. Dry peas and lentils have been particularly integrated with global markets and the percent of use imported has grown rapidly since 2010. At the same time, global markets are important outlets for U.S. vegetable and pulse production. Fresh and frozen vegetable exports, as a share of production, remain relatively steady at approximately 7 and 8 percent, respectively.

Fresh Vegetables

The U.S. remains a net importer of fresh vegetables. Including potatoes and mushrooms, the value of fresh vegetable imports exceeded exports by almost $4.3 billion in 2014. Since 2010, approximately 25 percent of fresh vegetables utilized in the U.S. have been imported each year, compared to less than 15 percent in the early 1990s and 19 percent between 2000 and 2010. Overall import volume of fresh vegetables (including potatoes) rose 6 percent in 2014 compared to the previous year. Mexico and Canada are the largest suppliers and fresh vegetable imports from both countries increased in 2014. Over 10 billion pounds of fresh vegetables were imported from Mexico in 2014, including over 1.6 billion pounds of fresh greenhouse tomatoes. A growing sector in United States fresh vegetable markets and in import volume is vegetables grown under cover (e.g. in greenhouses or shadehouses). Imports of tomatoes, cucumbers, and peppers (bell and chile) cultivated using these production systems continues to increase, with almost 97 percent of volume coming from North American Free Trade Agreement (NAFTA) partners in 2014.

Exports of fresh vegetables, including potatoes, to all countries fell approximately 3 percent in 2014 and volumes are down sharply (39 percent) in the first 3 months of 2015 compared to the same period in 2014. Potatoes continue to dominate fresh vegetable exports followed by onions and lettuce. Since 2011, when data on certified organic exports first became available for these three vegetable markets, shares remain small but have grown steadily for potatoes (reaching 1 percent in 2014) and onions (reaching 7 percent in 2014). In contrast, certified organic lettuce exports which were over 80 million pounds in 2011 (12 percent of fresh lettuce exports) fell to 60 million pounds (9 percent) in 2014.

Despite logistical challenges posed by the West Coast ports' dockworker dispute, farm-weight equivalent for all potato exports (fresh and processed) for calendar year 2014 are estimated to be up 2.4 percent from 2013. The competitive position of U.S. potato products may be inhibited by the appreciating value of the U.S. dollar, relative to Canadian and EU currencies and high prices through much of 2014 dampened exports of fresh potatoes to Mexico and Canada. Fresh potato exports in the 2014 calendar year are down 12.6 percent or 418,316 metric tons. European Union (EU) potato production for 2014 was up significantly from 2013 and increases competition for U.S. potato products in select markets.

Table 5--Vegetable and dry pulse trade shares averaged by decade

	1990-1999	2000-2009	2010-2014
Percent of Use Imported[1]			
Fresh vegetables	13.2	18.9	26.6
Canned vegetables	7.0	12.7	14.5
Frozen vegetables	16.7	26.9	35.6
Potatoes	4.7	11.8	14.1
Dry beans	4.4	12.1	15.0
Dry peas and lentils	23.1	39.8	75.4
Percent of Supply Exported[2]			
Fresh vegetables	7.5	7.2	6.9
Canned vegetables	6.3	8.1	13.0
Frozen vegetables	7.7	7.7	8.0
Potatoes	7.8	10.7	15.0
Dry beans	19.5	19.4	24.6
Dry peas and lentils	44.1	48.6	51.4

[1] Percent of annual utilization imported. [2] Percent of annual production exported.

Source: USDA Economic Research Service

Table 6--Imported vegetables grown under cover, 2011-14

Item	2011	2012	2013	2014	Change 2013-14
	---------- *million pounds* ----------				*Percent*
Mexico					
Cucumbers	100.6	127.8	117.8	149.0	26
Peppers (bell)	346.6	394.9	359.1	393.2	9
Peppers (chile)	105.8	101.6	61.2	38.5	-37
Tomatoes	1,146.6	1,293.6	1,394.8	1,627.1	17
Canada					
Cucumbers	94.0	99.3	128.8	124.2	-4
Peppers (bell)	111.0	129.5	156.7	169.1	8
Peppers (chile)	91.2	145.8	60.8	0.3	-100
Tomatoes	299.4	290.2	278.7	294.8	6
Other countries					
Cucumbers	6.3	7.0	6.7	9.2	38
Peppers (bell)	48.0	37.8	36.6	50.7	38
Peppers (chile)	7.9	9.9	7.6	8.5	12
Tomatoes	25.3	21.2	26.7	24.8	-7
Total					
Cucumbers	200.9	234.1	253.3	282.4	11
Peppers (bell)	505.6	562.2	552.5	613.0	11
Peppers (chile)	205.0	257.3	129.6	47.3	-63
Tomatoes	1,471.3	1,605.1	1,700.2	1,946.7	14

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

Processing Vegetables

The United States continues to be a net importer of processed canned, frozen, and dried vegetables (including mushrooms and potatoes). Import value, which totaled $3.1 billion in 2014, exceeded export value by $1.3 billion. The gain in import value continues to be driven by dried and dehydrated vegetables including herbs (up by an average of 55 million pounds per year since 2007). Starch, flour from roots, hot pepper mixes, ginger root, and garlic dominate the dried and dehydrated imports. Canned and frozen vegetable imports were flat in 2014 compared to the previous year.

U.S. exports of processed vegetables also rose during 2014 to $1.8 billion. The top five foreign destinations during this period included Canada (with 36 percent of all processed vegetables volume), followed by Mexico (8.8 percent), Japan (8.4 percent), Italy (6.9 percent), and Taiwan (2.7 percent). Exports of frozen potatoes, up 3.2 percent, offset a 2.9-percent decline in other frozen products. Strong gains are posted by dehydrated, chip, and starch sectors and combine for an estimated 6.1-percent increase in processed-potato exports (farm-weight equivalent).

Dry Pulses

The United States is a net exporter of dry pulse crops with a $117 million trade surplus in 2014. Compared with the previous calendar year, the value of dry pulse exports is down 39 percent in the first 3 months of 2015 and the value of dry pulse imports is down 27 percent.

Dry bean exports were particularly robust in the previous 3 crop years reaching almost 11 million bags (cwt) each year. During the first 7 months of the current dry bean marketing year (September 2014-March 2015), U.S. exports of dry beans increased 18 percent (over the same period in the previous year) to reach 5.8 million bags. Despite an overall gain in export volume, shipments to Mexico have been declining and volume moved to Canada was greater than Mexico in 2013/14. Movement into Mexico was lower for black, pinto and navy beans. At the same time, U.S. dry bean exports to Canada, historically the second largest market, jumped 33 percent on the strength of increased movement of navy beans and garbanzo beans. Navy (pea) bean shipments to the United Kingdom were up 54 percent in 2013/14 to reach 103 million pounds.

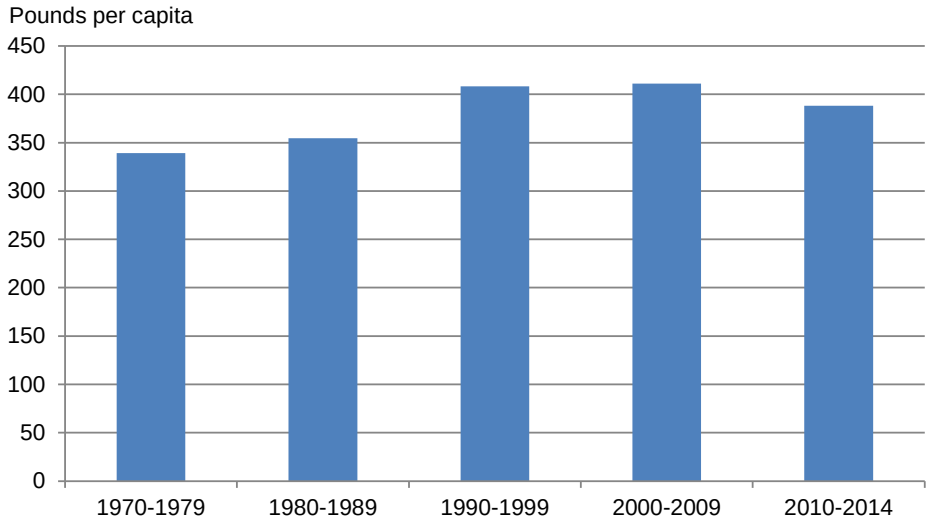
Dry peas and lentils are also net export markets. During the first 9 months of the current marketing year for these crops (July 2014-March 2015) export volume is up 25 percent to 1.2 billion pounds compared to the same nine -month period in the previous year. In the 2013/14 crop year dry edible pea imports reached 284 million pounds; exceeding 200 million pounds for the first time. Yellow peas represent over half the total and were up 97 percent over 2012/13. Canada remains the primary source for U.S. dry pea imports. Dry lentil imports were also up in 2013/14 but by a more modest 20 percent. Even with the higher import levels, the U.S. remained a net exporter of dry peas and lentils with a 2013/14 trade surplus of $251 million.

Vegetables and Pulses: Per Capita Disappearance

Per Capita Vegetable and Pulse Use Unchanged; Potato Use Down

The rise in U.S. domestic production in vegetables and pulses volume did not translate to higher domestic use, in part, due to increased demand for potatoes and tomatoes from export markets. According to preliminary data, per capita disappearance (also called availability and use) of vegetables and pulses in the United States totaled 385 pounds in 2014—unchanged from last year. Average per capita use since 2009-11 remains around 380 pounds compared to over 420 pounds per person in 2000-04. Disappearance data measure supplies of commodities moving through production and trade channels for domestic use. The data do not directly measure food intake though they serve as a popular proxy for consumption trends over time.

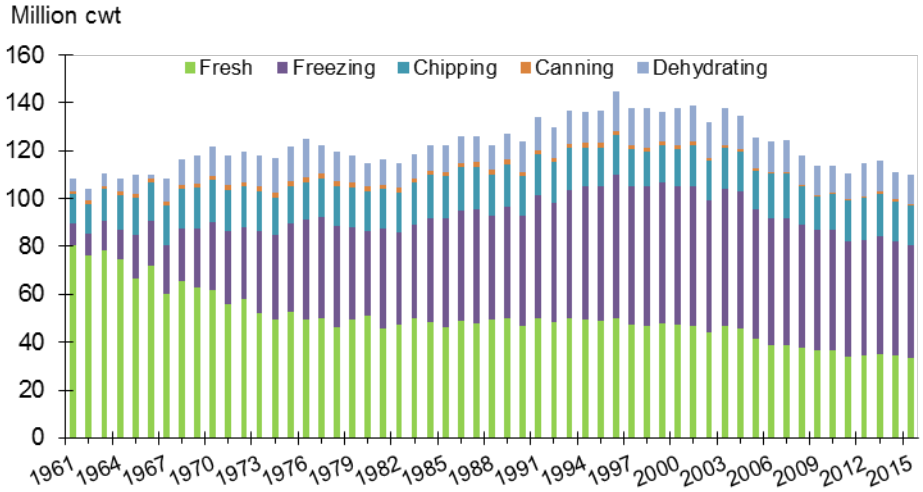
Figure 6
Average per capita U.S. vegetable and pulse utilization, 1970-2014[1]



[1] 2014 data are preliminary. Includes potatoes, sweet potatoes, and mushrooms.
Source: USDA, Economic Research Service.

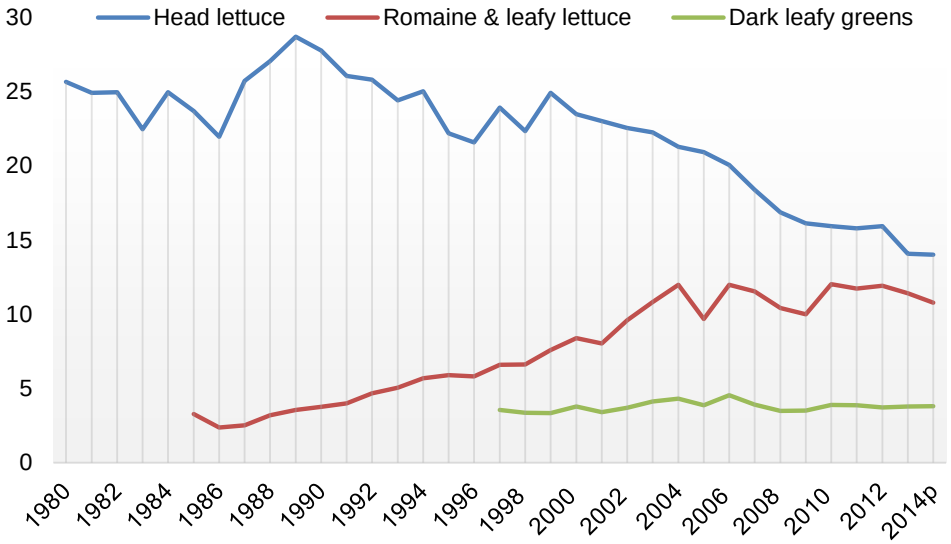
The decline in total vegetable and pulse use between 2000-04 and 2014 was mainly driven by potatoes, followed by head lettuce and sweet corn. At 111.2 pounds per person, the preliminary per capita total potato consumption estimates for 2014 was down 4.8 pounds from the 2013 estimate of 116.0 pounds per person. Fresh potato availability, during this period, declined by an annual average of 2.9 percent while potatoes for processing, such as frozen french fries and chips, declined annually by 1.1 percent. Likewise, head lettuce and sweet corn combined decreased 38 percent during this period from 49 to 35 pounds per person. Changing consumer tastes and preferences, relative effort of preparation, and other factors have been attributed with affecting reduced domestic demand for fresh and processed potatoes. These factors, as well as, changes in food price and income levels; availability of food through domestic production and trade channels, and more influence the consumption of all vegetables and pulses (Wells, 2012).

Figure 7
U.S. per capita consumption of potatoes, by use



Notes: Cwt= hundredweight(100 pounds) ; 2015 figure is a projection.
Source: USDA, Economic Research Service.

Figure 8
U.S. per capita use of lettuce and dark leafy greens



Notes: Dark leafy greens include collards, kale, mustard greens, spinach and turnip greens.
Source: USDA, Economic Research Service.

Fresh Vegetables—Per capita use of fresh vegetables (including potatoes and mushrooms) reached 183.4 pounds in 2014—fairly steady since 2009-11 averaging around 184 pounds. Since 2013, per capita use increased notably for bell peppers, carrots, and sweet potatoes while decreasing for sweet corn and cucumbers. As compared to a decade ago, per-capita use of fresh-market vegetables is down 8 percent. Per capita use of potatoes averaged 34.4 pounds in 2014 compared with 46 pounds in 2000-04 due to lower domestic production and increased exports. For similar reasons, per capita use of most fresh vegetables declined, notably, head lettuce (38 percent), cabbage (15 percent), sweet corn (13 percent) and celery (12 percent). For example, drop in lettuce, in part, is attributed to consumers switching to dark-green and leafy products like collard greens, kale, mustard greens, and romaine lettuce, which were tracked later in the data series (starting in 1985 for romaine lettuce and mid-1990s for the rest) also trended upward.

In terms of share, potatoes, tomatoes, onions, and head lettuce (out of the 32 commodities covered in the fresh vegetable data series) account for a 48-percent share of fresh vegetables available for consumption in 2014, down from 56 percent in 2000-04.

Table 7--Fresh-market vegetables: Per capita disappearance (net domestic use)[1]

Selected items	Average 2009-11	2012	2013	2014p	Percent change
	Pounds/person, fresh weight				
Artichokes, all	*1.6*	1.5	1.3	1.4	12
Asparagus	1.3	1.4	1.4	1.6	17
Bell pepper	10.2	10.7	10.0	10.6	6
Broccoli	5.9	6.3	6.9	6.7	-3
Cabbage	7.1	6.3	6.9	7.1	2
Carrots	7.5	7.9	8.0	8.5	6
Cauliflower	1.4	1.2	1.3	1.5	13
Celery	6.1	6.0	5.5	5.5	1
Cucumbers	6.6	8.7	8.9	7.9	-11
Eggplants	0.8	0.8	0.8	0.8	-4
Garlic, all	2.4	2.3	2.0	1.9	-4
Greens[2]	2.0	2.1	2.3	2.1	-9
Head lettuce	15.9	15.9	14.1	14.0	0
Romaine/ leafy lettuce	11.2	11.9	11.4	10.8	-5
Onions, bulb	19.4	20.0	18.6	18.5	0
Snap beans	1.8	1.6	1.6	1.5	-10
Spinach	1.8	1.6	1.6	1.7	5
Squash	4.4	4.6	4.4	4.5	2
Sweet corn	8.9	8.7	8.9	7.9	-11
Tomatoes[3]	20.4	20.8	20.2	20.6	2
Others[4]	5.6	4.9	4.5	6.3	40
Subtotal	142.4	145.1	140.7	141.4	1
Mushrooms 3/	2.5	2.7	2.7	2.7	0
Potatoes 3/	34.1	34.4	34.8	34.4	-1
Sweet potatoes, all	7.5	7.3	6.7	7.5	13
Total	184.0	186.8	182.1	183.4	1

p = preliminary. [1] Disappearance (use) 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, lima beans, and pumpkins.

Source: USDA, Economic Research Service.

Vegetables for processing—in 2014, per capita processed-vegetable use (including canned, frozen, and dehydrated vegetables but excluding potatoes and mushrooms) totaled 111.9 pounds—up 2 percent from 2014 but down 5 percent from 2009-11 average. Relative prices and changing consumer taste and preferences contributed to decreased use of sweet corn, cucumbers, green peas, and snap beans, which drove down aggregate per capita use estimates between 2009-11 and in 2014.

Per capita use of processing vegetables, including processing potatoes, declined 9 percent between 2000-04 and 2014 due to mainly a drop processing potatoes use followed by sweet corn, tomatoes, pickles, and snap beans. In contrast, per capita use of chili peppers and onion for dehydration rose during this period though not enough to offset the downward trend.

In terms of share, processing potatoes and tomatoes accounted for a 75-percent share of vegetables for processing in 2014, similar to the average 2000-04s share.

Table 8--Vegetables for processing: Per capita disappearance (net domestic use)[1]

Selected items	Average 2009-11	2012	2013	2014p	Percent change
	Pounds/person, fresh weight				
Canning					
Asparagus	0.1	0.1	0.1	0.1	-36
Beets	0.4	0.6	0.6	0.6	-1
Cabbage	1.0	1.2	1.0	1.0	-1
Carrots	0.8	0.8	0.8	0.7	-9
Chile peppers[2]	6.6	7.2	7.0	7.2	3
Cucumbers[3]	4.6	3.0	3.2	3.5	10
Green peas	1.1	0.8	0.9	0.7	-15
Snap beans	3.8	2.9	2.9	2.8	-3
Spinach	0.1	0.1	0.1	0.1	-1
Sweet corn	8.7	5.8	5.8	5.8	0
Tomatoes	67.2	66.5	65.9	67.2	2
Other canning	0.7	1.9	1.9	1.8	-7
Subtotal	95.2	90.9	90.0	91.5	2
Freezing					
Asparagus	0.1	0.1	0.1	0.1	-6
Broccoli	2.5	2.6	2.5	2.6	4
Carrots	1.5	1.2	1.7	1.2	-28
Cauliflower	0.4	0.3	0.3	0.4	6
Green limas	0.3	0.4	0.3	0.3	-1
Green peas	1.6	1.9	1.5	1.6	4
Snap beans	1.8	1.9	2.1	1.8	-16
Spinach	0.7	0.6	0.7	0.8	9
Sweet corn	7.8	9.8	7.0	7.7	10
Other freezing	4.7	3.5	3.3	3.5	6
Subtotal	21.4	22.3	19.5	19.8	2
Processing					
Mushrooms for processing	1.2	1.3	1.1	1.0	-4
Onions for dehydrating	1.5	1.3	1.0	2.0	112
Potatoes for processing 4/	76.7	80.5	81.2	76.7	-6
Total	196.0	196.1	192.8	191.1	-1

p = preliminary. [1] Disappearance (also called use and availability) is a proxy for calendar year consumption. [2] Fresh and all processing uses of chiles. [3] For pickling. [4] Includes french fries and other frozen potato products, chips, and others.

Source: USDA, Economic Research Service.

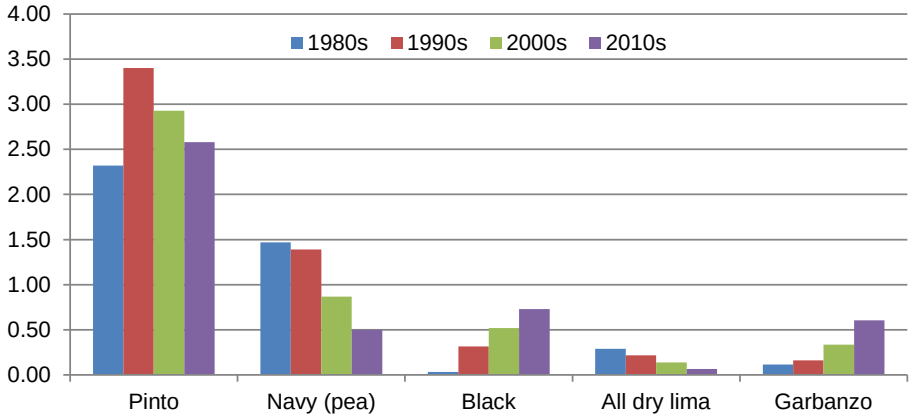
Dry Pulse Crops—Per capita availability for dry pulse crops continues to rise; reaching 7.7 pounds per person in 2014. Early projections for 2015 indicate further increases in per capita estimates, driven by growth in both dry beans and dry peas. Lentil per capita use is projected to continue declining into 2015. Volumes in dry pulse markets are relatively small; a large percentage change in per capita use may represent only a minor adjustment in pounds. Year-to-year changes can be driven by short-term production or inventory adjustments in both domestic and international markets. When averaged by decade, some long-term trends in per capita use of dry beans become more apparent in selected classes.

Table 9--Dry pulse crops: Per capita disappearance (net domestic use)[1]

Selected items	Average 2009-11	2012	2013	2014p	Percent change
	Pounds/person				
Dry Beans	6.24	6.29	5.77	6.36	10
Pinto	2.62	2.74	2.32	2.64	14
Navy (pea)	0.69	0.67	0.36	0.07	-81
Great Northern	0.26	0.16	0.19	0.34	79
Black	0.60	0.71	0.82	0.86	5
All Kidney	0.48	0.42	0.18	0.52	189
All Dry Lima	0.11	0.06	0.05	0.01	-80
Blackeye	0.19	0.07	0.22	0.12	-45
Garbanzo	0.41	0.63	0.85	0.70	-18
Small Red	0.24	0.21	0.13	0.13	0
Pink	0.16	0.16	0.10	0.13	30
Small White	0.02	0.02	0.01	0.01	0
Other[2]	0.50	0.35	0.39	0.51	31
Dry Peas and Lentils	1.10	0.60	1.30	1.30	0
Dry edible peas	0.45	0.22	0.78	1.12	44
Lentils	0.64	0.36	0.56	0.17	-70
Total	7.34	6.89	7.07	7.66	10.2

p = preliminary. [1] Disappearance (use) is a proxy for calendar year consumption. Totals may not add due to rounding. [2] Bean classes included vary. Source: USDA, Economic Research Service.

Figure 9
U.S. per capita use, dry beans, selected classes, 1980-2014



Source: USDA, Economic Research Service.

Meeting the Dietary Guidelines and Challenges

In 2014, total amount of vegetables and pulses available for consumption for each person in the U.S. reached 385 pounds—unchanged from last year and 1 percent below the 2009-2011 average. When this amount is adjusted for losses and converted to daily cups, each American consumed, on average, 1.6 cups per day—well below the 2010 *Dietary Guidelines*' daily recommendations of 2.5 cups, for a 2,000-calorie diet.

Increasing consumption of vegetables as a part of healthy diet has been a mainstay of Federal dietary guidance. Vegetables make important contributions to the American diet and are a good source of many nutrients, such as dietary fibers, vitamins, and minerals. Despite public campaigns and increased public awareness of the importance of increasing vegetable intake, Americans have not fully adopted the Federal *Dietary Guidelines*' recommendations. In order to meet the current *Guidelines'* recommendation, Americans would need to increase their vegetable intake, at minimum, by more than 50 percent. An increase of this magnitude would require significant upward adjustments to domestic production and trade.

One way to boost availability is to reduce food loss/waste from its current level. For instance, a recent ERS study by Buzby, Wells, and Hyman (2014) estimated that in 2010, about 133 billion pounds of food went uneaten in the United States at the retail and consumer levels. Losses attributable to the vegetable group are estimated at 25 billion pounds, the second highest category of loss. Of that 25 billion pounds of lost vegetables, 72 percent of the loss occurred at the consumer level of the supply chain.

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California Drought

California Dominates Domestic Vegetable Production

Vegetables play a dominant role in California agriculture. From 2012-14, almost 43 percent of U.S. vegetable, potato, and sweet potato sales value came from California production. In 2014, 24 percent of California's $33 billion in crop sales were commercial vegetables (55 percent of all U.S. vegetable sales). Potato and sweet potato sales were less concentrated in California with almost $190 million sales value (5 percent of U.S. total for potatoes) and $150 million sales value (21 percent of U.S. total for sweet potatoes) value, respectively.

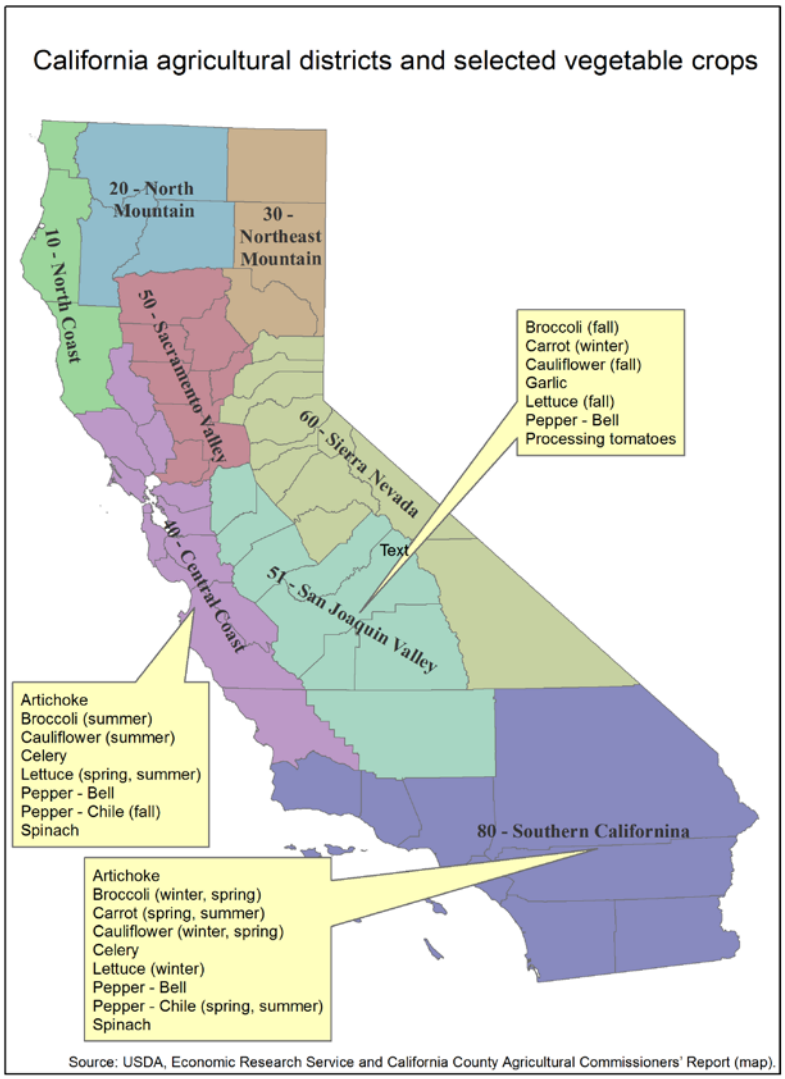


Table 10--Vegetables: Production volume, selected crops

	U.S. volume			California volume			California share
	2011-13 Avg.	2014	Change	2011-13 Avg.	2014	Change	2014
	Million lbs		Percent	*Million lbs*		Percent	Percent
Artichokes*	101	95	-5.6	101	95	-5.6	100
Asparagus*	78	74	-4.9	37	34	-8.7	46
Fresh	63	57	-9.8	37	34	-8.7	60
Snap beans, fresh	439	368	-16.2	59	46	-21.9	13
Broccoli*	1,999	2,093	4.7	1,904	2,013	5.7	96
Fresh market	1,950	2,024	3.8	1,854	1,944	4.8	96
Processing market	50	69	39.4	50	69	39.4	100
Cabbage	2,055	2,236	8.8	517	689	33.1	31
Carrots*	2,325	2,538	9.2	1,927	2,096	8.8	83
Cauliflower*	667	705	5.8	586	627	7.1	89
Fresh market	650	698	7.3	569	620	8.8	89
Processing market	16	8	-53.9	16	8	-53.9	100
Celery*	1,904	1,839	-3.4	1,802	1,741	-3.4	95
Cucumbers, fresh	766	690	-10.0	76	68	-10.0	10
Garlic*	413	387	-6.3	404	380	-6.1	98
Head lettuce, fresh*	4,860	4,444	-8.6	3,636	3,219	-11.5	72
Leaf lettuce, fresh*	1,247	1,298	4.1	1,072	1,104	3.0	85
Romaine lettuce, fresh*	2,767	2,468	-10.8	2,104	1,778	-15.5	72
Onions, dry, summer*	6,306	6,489	2.9	1,623	1,986	22.4	31
Bell peppers*	1,547	1,535	-0.8	861	924	7.3	60
Chile peppers*	415	463	11.4	251	319	27.2	69
Potatoes	44,322	44,669	0.8	1,503	1,569	4.4	4
Pumpkins	1,132	1,314	16.1	183	192	5.0	15
Squash	685	575	-16.2	119	104	-12.8	18
Spinach*	566	592	4.5	359	416	15.9	70
Fresh market	566	592	4.5	359	416	15.9	70
Sweet corn, fresh	2,760	2,535	-8.2	608	542	-10.8	21
Sweet potatoes	2,608	2,958	13.4	628	523	-16.8	18
Tomatoes, open field	28,309	32,003	11.0	25,610	29,038	13.4	91
Fresh market	2,839	2,728	-3.9	1,156	1,018	-12.0	37
Processing market*	25,471	29,275	14.9	24,454	28,020	14.6	96

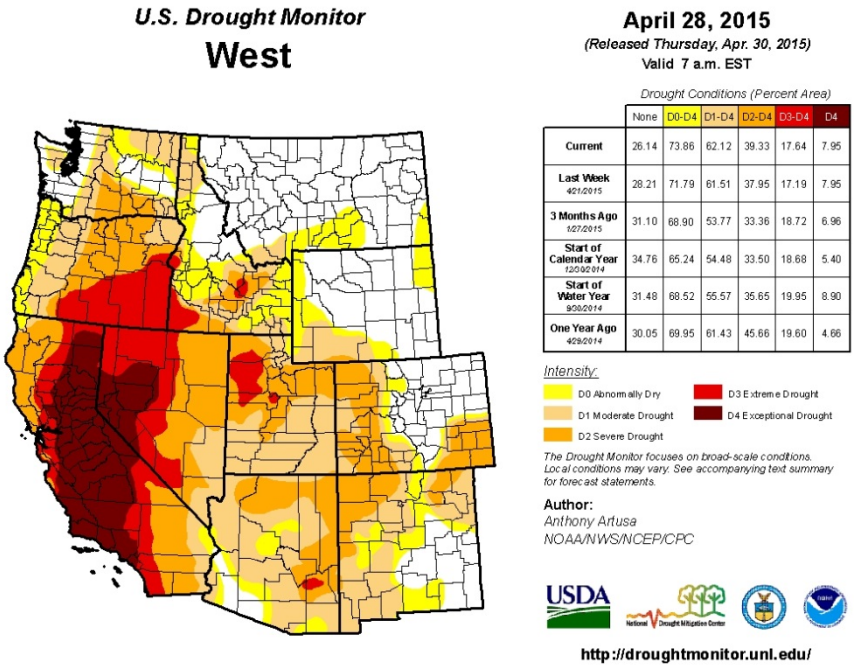
* = California ranks No. 1 in U.S. production.

Source: USDA, National Agricultural Statitistics Service, *Vegetables 2014 Summary* (January 2015), *Vegetables 2008-2012 Final Estimates* (August 2014).

Integral to California's vegetable production are the Central Coast, San Joaquin Valley, and Southern California districts. According to data from the March 2015 California Agricultural Commissioners' Report, in 2012 and 2013 (the years with most recent data available), these three districts averaged 40, 30, and 26 percent of California vegetable production, respectively. Vegetables are produced throughout the year, with production of many crops moving seasonally among the various regions. Ninety-two percent of harvested vegetable acreage in the Central Coast district and 88 percent in the Southern California district is for the fresh market, according to NASS's 2012 Census of Agriculture, while vegetable production in the San Joaquin Valley is more equally divided between the fresh and processing markets (48 percent and 52 percent, respectively).

California Drought Continues

Long-term moisture deficits across most of California remain at near-record levels. Based on measurements in the U.S. Drought Monitor as of April 28, 2015, dry conditions extended across every county in the State with severe, extreme, or exceptional drought in a majority of counties. On January 17, 2014, the Governor of California declared a statewide drought emergency (see the ERS California Drought: Farm and Food Impacts topic page for more discussion: http://www.ers.usda.gov/topics/in-the-news/california-drought-farm-and-food-impacts.aspx



Source: U.S. Drought Monitor, produced jointly by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration; U.S. Department of Agriculture; and University of Nebraska/Lincoln, National Drought Mitigation Center.

Impacts of the extended drought on production have been mitigated by the irrigation that supplies virtually 100 percent of California vegetable acres. Although data is not available specifically for vegetable crops, according to NASS, of the 2,443 California irrigated horticultural operations growing crops in the open in 2013, 1,458 (60 percent) were sourcing water from wells to supply 56 percent of the water applied that year. An additional 1,069 operations (44 percent) were sourcing water from off-farm sources to apply 37 percent of the 2013 gallons used. The remaining operations were sourcing water from onfarm water supplies other than wells. A majority (54 percent) of operations using off-farm water supplies were already using conservative application methods such as drip, trickle, or low flow micro irrigation (USDA/NASS Farm and Ranch Irrigation Survey, 2013).

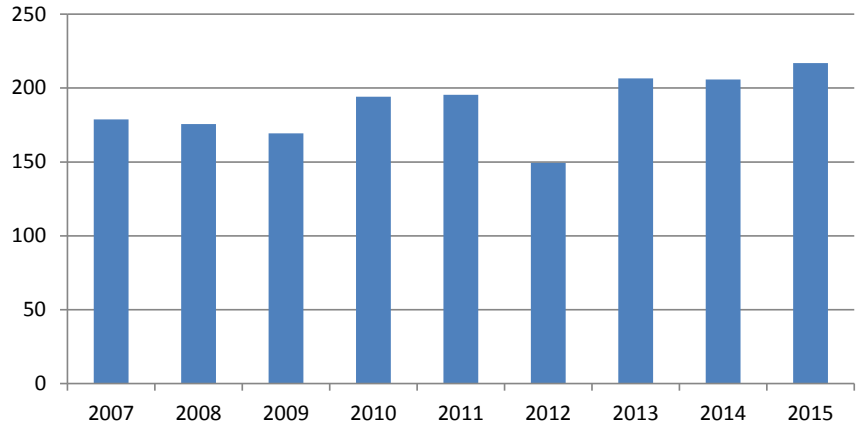
A small number of California horticultural operations reported discontinued irrigation between 2012 and 2013 due to a shortage of surface water (24 operations) or a shortage of ground water (16 operations). If water supplies continue to tighten, the rising cost of irrigation will put increased pressure on vegetable, and other California, farms as producers move to find new sources of water, invest in additional water conserving technologies, or simply bid up the cost of remaining water supplies.

Little Change Observed in Food Prices

While droughts in California are generally associated with higher prices for produce, the effects do not occur immediately, as weather conditions and planting decisions adjust. Even over time, adjustments in trade patterns and import volume can offset some drought impacts on price. The Bureau of Labor Statistics (BLS) fresh vegetable Producer Price Index for 2013 and 2014 is higher than the low values realized in 2012 (when supplies were large) but are not much higher than 2010-11 levels.

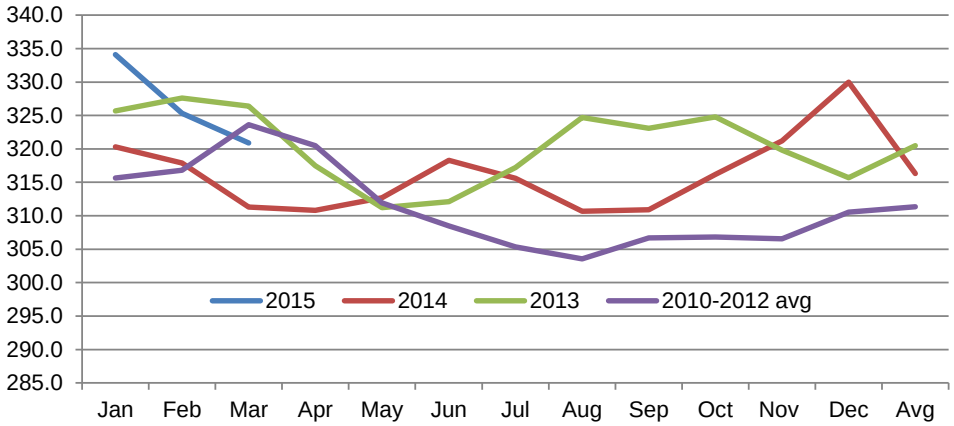
At the retail level, according to BLS data, the fresh-vegetable Consumer Price Index has trended downwards through early 2015 after reaching a high of 334 in January. According to the ERS California drought topic page (http://www.ers.usda.gov/topics/in-the-news/california-drought-farm-and-food-impacts/california-drought-food-prices-and-consumers.aspx), the current outlook for 2015 is for normal to slightly lower than average retail food price inflation, with supermarket prices expected to rise 2.0 to 3.0 percent over 2014 levels. Despite drought conditions in California, the strength of the U.S. dollar and lower oil prices could have a mitigating effect on fresh fruit and vegetable prices in 2015. As of March, ERS predicts fresh fruit prices will rise 2.5 to 3.5 percent and fresh-vegetable prices 2.0 to 3.0 percent in 2015, close to the 20-year historical average.

Figure 10
Annual average fresh vegetable Producer Price Index, 1982=100



Source: U.S. Department of Labor, Bureau of Labor Statistics

Figure 11
Fresh vegetable monthly Consumer Price Index, 1982-84=100



Source: U.S. Department of Labor, Bureau of Labor Statistics

Import Share of Domestic Use Grows

Although California is the dominant producer of domestic vegetable supplies in the United States, the share of imports in domestic use continues to grow in response to multiple factors. Imports can help fill supply gaps resulting from adverse weather or other supply disruptions. Other factors influencing the growth in vegetable imports include increased awareness of the importance of vegetables in a healthy diet, desire for year-round supplies of a variety of fresh vegetables, and increased demand for new products. Twenty-eight percent of fresh vegetables for domestic use were imported in 2014 compared to 18 percent between 2000-2010, 12 percent between 1990-99, and only 9 percent between 1980-89.

Table 11--Import share of domestic use for selected products for vegetables and pulses, 3-year average and 2014

Commodities	Import share of domestic use	
	2011-13 average	2014P
	Percent	
Fresh-market		
Total (excluding potatoes, mushrooms,and sweet potatoes)	26	28
Artichokes	79	80
Broccoli	16	18
Cabbage	7	8
Carrots	15	15
Cauliflower	10	11
Celery	6	6
Garlic	54	53
Lettuce, head	5	7
Lettuce, leaf & romaine	4	4
Peppers, bell	55	58
Spinach	3	4
Processing		
Total, canning (excluding potatoes and mushrooms)	15	14
Total, freezing (excluding potatoes)	35	38
Broccoli, processing	94	93
Cauliflower, processing	86	90
Peppers, chile (all uses)	83	81
Spinach, freezing	46	48
Tomatoes, processing	6	6

P = Premilinary.
Source: USDA, Economic Research Service, *Vegetables and Pulses Yearbook* (March 2015).

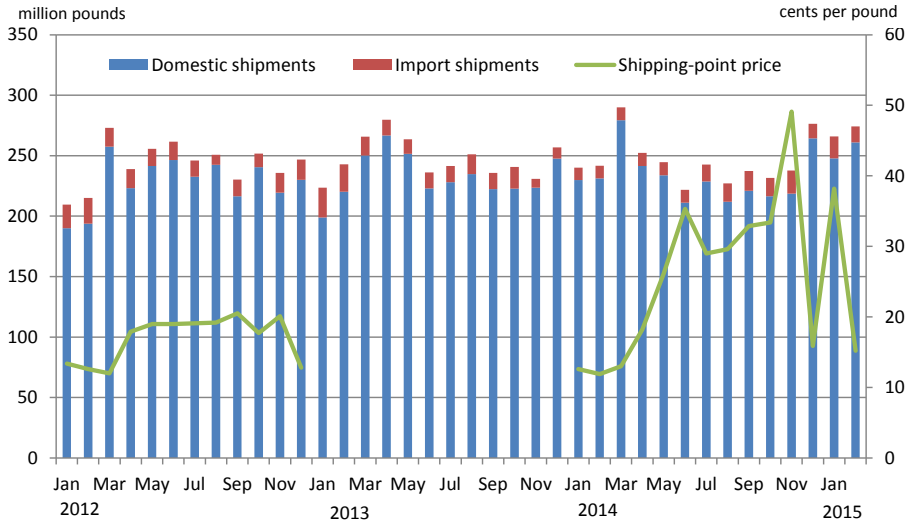
Decreased Lettuce Production in San Joaquin Valley

There are some reports of fewer plantings for short-season crops such as lettuce, particularly in the San Joaquin Valley where groundwater is less available and water allocations have been curtailed. Land may be diverted to other vegetable crops or left fallow. Acres planted to head lettuce in Fresno County fell 27 percent between 2012 and 2013 while acres planted to leaf lettuce increased 4.5 percent (California Agricultural Commissioners' Report). The San Joaquin Valley typically serves as a "shoulder region" for lettuce as production moves between the Central Coast and Southern California. Based on data from the 2012 Agriculture Census, less than 5 percent of the California lettuce crop was grown in San Joaquin Valley with two-thirds produced in the Central Coast and 30 percent in Southern California.

It is too soon to determine price impacts attributable to drought as multiple other market factors are also impacting production volumes. The shipping-point price for head lettuce was moving upward in early 2014, leveled off midway through the year

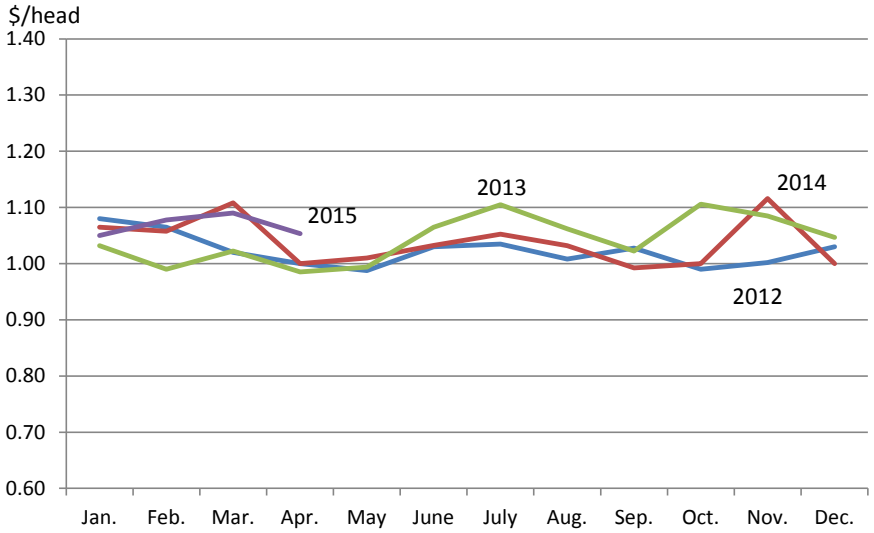
and has been quite volatile since then. In contrast, the advertised retail price for iceberg lettuce has been remarkably steady.

Figure 12
U.S. fresh iceberg lettuce: Shipments and shipping-point price, 2012-15 [1]



[1] Shipments include iceburg lettuce not for processing. Prices are weighted average U.S. prices. Source: USDA, Agricultural Marketing Service, *Market News* (shipments) and USDA, National Agricultural Statistics Service (prices). Price reports suspended during 2013.

Figure 13
Advertised retail prices, iceberg lettuce, 2012-2015



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

Produce Microbial Food Safety Practices Surveys

In January 2011, the Food Safety Modernization Act (FSMA) was signed into law. FSMA affects all stages of the food production-to-marketing system including onfarm regulation of produce. Fruit and vegetable growers and processors may soon have a new opportunity to raise understanding of their industry as FSMA moves through the Federal rulemaking process.

ERS is undertaking research looking at the impact of the growth of food safety demands on the produce industry, but data on extent and diversity of current practices are limited. A baseline of where the industry is before FSMA is implemented is necessary for this research. NASS is proposing to undertake a set of Produce Microbial Food Safety Practices Surveys. This is an opportunity to get a "pre-FSMA" look at produce food safety practices, including those that may already exceed FSMA requirements before the rules must be implemented. The only prior NASS survey on produce food safety practices was done in 1999 and is outdated.

Detailed information about food safety practices of U.S. produce growers and post-harvest operators will be collected through nationally representative surveys. Questions for growers will be added to the NASS Chemical Use surveys in 2015 (fruit) and 2016 (vegetables) once approved by the Office of Management and Budget. A separate NASS survey for post-harvest practices will be enumerated in 2015 for all produce. Survey responses will provide information on food safety practices, some food safety costs, and food safety awareness.

NASS will provide ERS with data from the produce surveys for research but without any information that could identify a particular operation. ERS will publish results only in aggregate form, ensuring that no individual producer or operation can be identified. The research will examine the effects of FSMA across fresh produce supply chains. Depending on response rates, ERS will compare food safety practices for different size farms or post-harvest operations.

Response to the surveys is very important for the produce industry to:

- document practices that are already in place and the growth in adoption of these practices since 1999.
- provide a benchmark of practices prior to implementation of FSMA for comparison purposes. Without documented knowledge of where the industry started from it will be hard to identify the impact of FSMA.
- provide information that could be used to guide future research or training efforts. While the FSMA Produce rule and Preventative Controls rule (among others) are well along in the rulemaking process, guidance documents and implementation strategies continue to be developed.
- help ensure that policymakers, organizations and businesses have up-to-date facts to make informed decisions that affect the produce industry.

All information NASS collects will be kept strictly confidential, as required by Federal law. ERS researchers are also required to adhere to NASS confidentiality rules. Results will be available in aggregate form only, ensuring that no individual operation or producer can be identified. Those who respond to the survey can feel confident sharing information about their activities and in doing so will contribute firsthand knowledge and facts about produce food safety in the United States.

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Vegetables and Pulses Data

Vegetable and Pulses Data provides users with comprehensive statistics on fresh and processed vegetables and pulses in the United States, as well as global production and trade data for these sectors. It harmonizes and integrates data from the ERS market outlook program with data collected by different Federal and international statistical agencies to facilitate analyses of economic performance over time, and across domestic and foreign markets.

The data are currently organized in four sections:

Outlook Tables, in Excel and PDF format, contain recent data on fresh and processing vegetables, acreage, production, prices, and U.S. trade, as well as data on potatoes, sweet potatoes, mushrooms, and dry pulse crops. Tables are grouped into 6 subsections. Eventually, data contained in the Vegetables and Pulses Outlook tables will be encompassed in the Data by Category and Data by Commodity series.

Yearbook Tables, in Excel and a single PDF file, contain a time series of annual data for U.S. farm acreage, production, prices, trade, per capita use, and more. Eventually, data contained in the Vegetables and Pulses Yearbook tables will be encompassed in the Data by Category and Data by Commodity series.

Data by Category (e.g. price, trade production) provides current import and export data, producer and retail price indexes, and a few retail prices.

Data by Commodity provides current import and export data for more than 40 individual fresh and processed vegetable and pulse commodities.

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Web Sites

A. Vegetables and Pulses Outlook: The home page of this report. http://www.ers.usda.gov/topics/crops/vegetables-pulses/market-outlook.aspx

B. ERS Vegetables and Pulses Data: The home page for Vegetables and Pulses data. http://www.ers.usda.gov/data-products/vegetables-and-pulses-data.aspx

C. Vegetables and Pulses Topics Page: This ERS site contains some background information on the U.S. vegetable and dry pulses sectors, special articles, and links to more vegetable and pulses information. http://www.ers.usda.gov/topics/crops/vegetables-pulses.aspx

D. Organic Production: This site contains ERS collected data from USDA-accredited State and private certification groups. http://www.ers.usda.gov/data-products/organic-production.aspx

E. USDA AMS Market News: Agricultural Marketing Service's web site containing fresh shipments, f.o.b. and terminal market prices, weekly truck rates, annual reports, and more. http://www.marketnews.usda.gov/portal/fv

F. USDA FAS Trade Data—GATS: This online application allows the user to freely access and download detailed U.S. export and import data. http://www.fas.usda.gov/gats/default.aspx

G. NASS Vegetables: Links to USDA, National Agricultural Statistics Service's annual reports on vegetables & melons. http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1183

H. FAS Fruit and Vegetable Analysis Page: USDA, Foreign Agricultural Services page with special articles, country horticultural reports, presentation and charts, data, and links. http://www.fas.usda.gov/commodities/fruits-and-vegetables

United States Department of Agriculture

Economic Research Service

Situation and Outlook

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Vegetables and Pulses Outlook: Special Article

Commodity Highlight: Sweet Potatoes

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Approved by the World Agricultural Outlook Board.

U.S. Sweet Potato Production Surges

U.S. sweet potato production has increased substantially over the last 15 years. In 2000, total U.S. production was 13.8 million hundredweight (cwt) and close to the 10-year (1990-99) average of 12.42 million cwt. In subsequent seasons, sweet potato production increased by an average of 6.1 percent per season, ultimately resulting in record high production (29.6 million cwt) for the 2014 marketing year. Sweet potatoes are grown across the country, but they are best suited for cultivation in Southern States which have warmer climates and longer frost-free growing seasons relative to other regions of the United States. In particular, North Carolina's climate and soil conditions are ideal for sweet potato production. Since 1971, this State has been the No. 1 sweet potato producer and, in 2014, North Carolina produced 53 percent of all sweet potatoes grown in the country.

Fifteen years ago, in 2000, North Carolina produced 5.6 million cwt of sweet potatoes; by 2014, production had expanded to 15.8 million cwt. The 185-percent increase in North Carolina's production has buoyed the U.S. sweet potato industry; however, other States make significant contributions and have also experienced gains. Over the same 15-year period, California production has increased by nearly 100 percent; Mississippi's production has increased by 155 percent.

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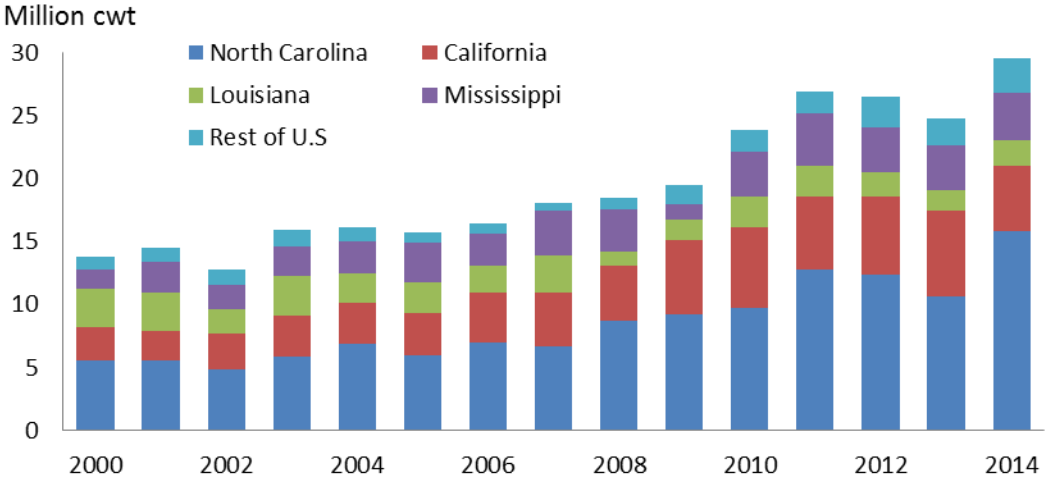
In 2000, California and Mississippi's combined harvest totaled 4.1 million cwt or approximately 30 percent of the U.S. total. In 2014, the two States still harvested 30 percent of total U.S. production but aggregate production had increased to 8.9 million cwt. Louisiana is the only State with significant sweet potato production that has seen production (down 1.1 million cwt) and its share of the U.S. market (down 35 percent) decline since 2000.

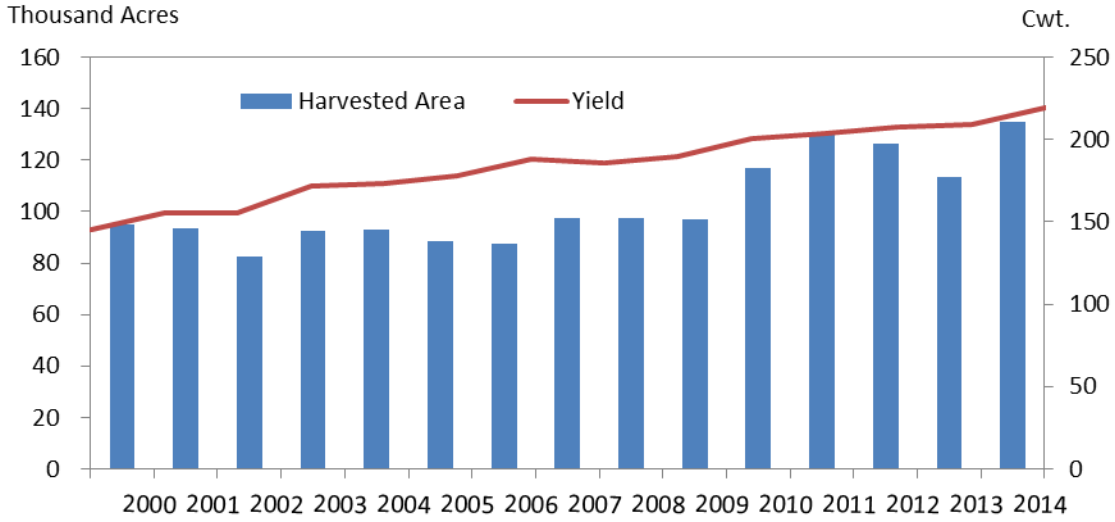
Figure 1
U.S. sweet potato production, by State: 2000-2014



Note: Cwt=hundredweight (100 pounds). Source: USDA, National Agricultural Statistics Service, QuickStats Data Portal.

The dramatic increase in aggregate sweet potato production—91 percent of which is accounted for by-North Carolina, California, Mississippi, and Louisiana—is attributable to yield and harvested area gains. Nationally, yields averaged 145 cwt per acre in 2000 and have increased an average of 3.3 percent per year through 2014, when the yields were estimated at 219 cwt per acre. Harvested area has risen as well; in 2000, 95,000 acres of sweet potatoes were harvested; by 2014 the figure had risen to 135,000 acres.

Figure 2
U.S. sweet potato havested area and yields: 2000-2014



Note: Cwt=hundredweight (100 pounds). Source: USDA, National AgriculturalStatistics Service, QuickStats Data Portal.

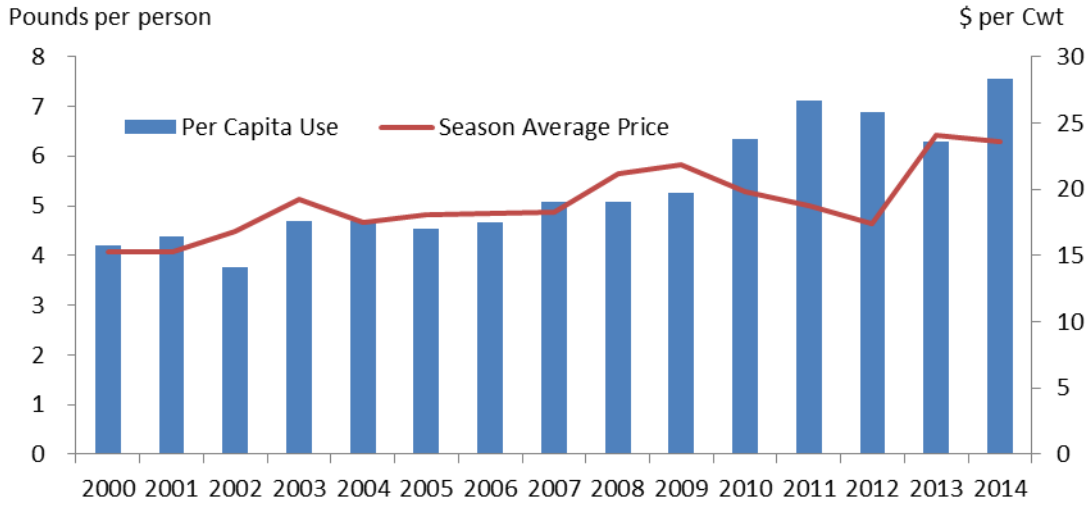
North Carolina leads the Nation in area harvested and total production; however, California typically posts the highest average yields. In 2014, California producers harvested an average of 275 cwt per acre; in North Carolina farmers realized 220 cwt per acre. Of the top sweet potato-producing States, Mississippi tends to have the lowest yields. Still, improved seeds and cultivation techniques have assisted growers in Mississippi to increase yields from 120 per acre in 2000 to an average of 175 cwt in 2014.

Domestic Prices Rise Along With Per Capita Consumption

The 2014 U.S. season average farm price for sweet potatoes, at $23.6 per cwt, is the second-highest on record and is just 50 cents below the record high, $24.1, received for the 2013 crop. Since 2000, the average sweet-potato price has posted year-to-year increases in 9 of 14 marketing years for an average annual gain of 3.8 percent over the period. With production steadily increasing, growth in utilization—including domestic consumption—has supported higher prices.

Between 2000 and 2014, U.S. consumption increased nearly 80 percent, from 4.2 pounds to 7.5 pounds per capita (Wells, Thornsbury, and Bond, 2014). Significant increases in per capita consumption have taken place since 2010, when the availability-based estimate of per capita use indicated a 1-pound per-person increase to 6.3 pounds per person as compared to the 2009 estimate of 5.3 pounds per person. Consumption estimates jumped again between 2010 and 2011, rising 0.8 pounds per person, before falling to 6.3 pounds per person in 2013. The current per capita estimate is 1.3 pounds per person higher than the 2013 estimate and is the highest per capita consumption estimate on record.

Figure 3
U.S. per capita sweet potato consumption and season average price: 2000-14



Note: Cwt=hundredweight (100 pounds). Source: USDA, Economic Research Service and UDSA, National Agricultural Statistics Service.

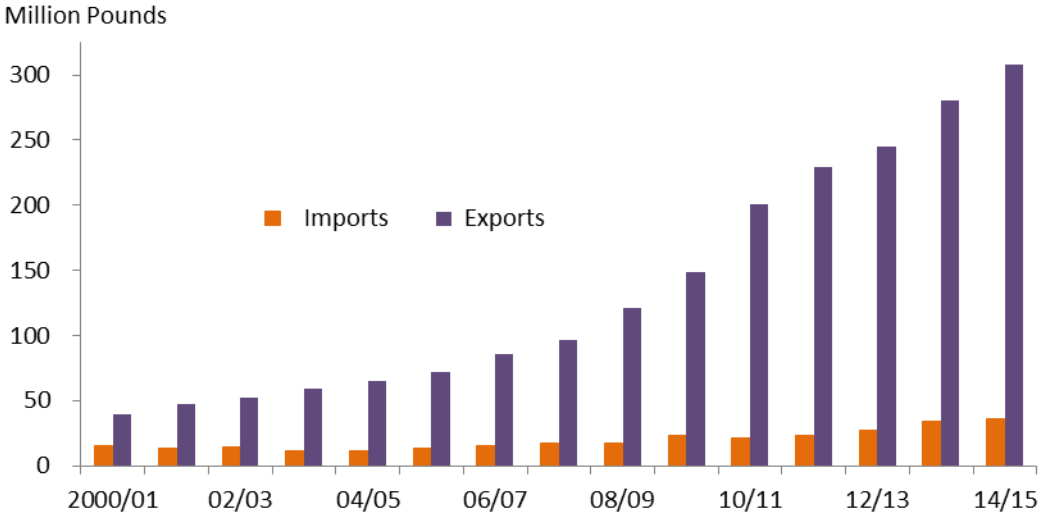
Growing consumer demand for sweet potatoes, as evidenced by rising per capita consumption, has been encouraged by the promotion of the tuber's health benefits. Researchers report that sweet potatoes are higher in beta carotene than many other vegetables, and they also serve as a source of potassium, fiber, and vitamins A and C (USDA, Agricultural Research Service, Nutrient Data Laboratory, 2014). "Because of their rich nutrition cache of protein, carbohydrates, vitamins and minerals, sweet potatoes have been considered . . . an ideal crop for feeding the world's hungry" (Palmer, 2009, p. 8).

Recognition of the relative health benefits of sweet potatoes has boosted fresh consumption, as well as, the utilization of processed sweet-potato products such as sweet potato chips, fries and pre-cut, cubed, mashed, and pureed sweet potatoes. The latter of which may be used as a sweetener in desserts or as an additive in other foods (Rockett, 2013). For example, to meet Federal nutrition guidelines, some schools have added sweet potato puree to pizza sauce to boost the vitamin A content (Hellmich, 2012). Sweet potatoes have also been used as a source for ingredients such as flour, starch, and pectin and used to make food products such as pasta (Huntrods, 2013). These types of products are used increasingly at home and abroad.

Sweet Potato Trade Boosts Utilization

In addition to support from increased domestic consumption, U.S. sweet potato prices have also been lifted by expanded exports, which serve to increase total utilization and reduce domestic supplies. Since 2000, when domestic production began its precipitous rise, U.S. exports of sweet potatoes have increased from 39.1 million pounds (fresh-weight equivalent) to the 308.9 million pounds projected for the 2014/15 marketing year. Exports for the 2013/14 marketing year (June-July) totaled 280.1 million pounds or roughly 11 percent of total supply; for the 2014/15 marketing year, exports are projected to utilize 9.4 percent of total supply.

Figure 4
U.S. sweet potato imports and exports: 2000/01-2014/15 1/



1/Data based on June-July marketing year; 2014/15 figure is a projection. Source: U.S. Census Bureau, Foreign Trade Statistics.

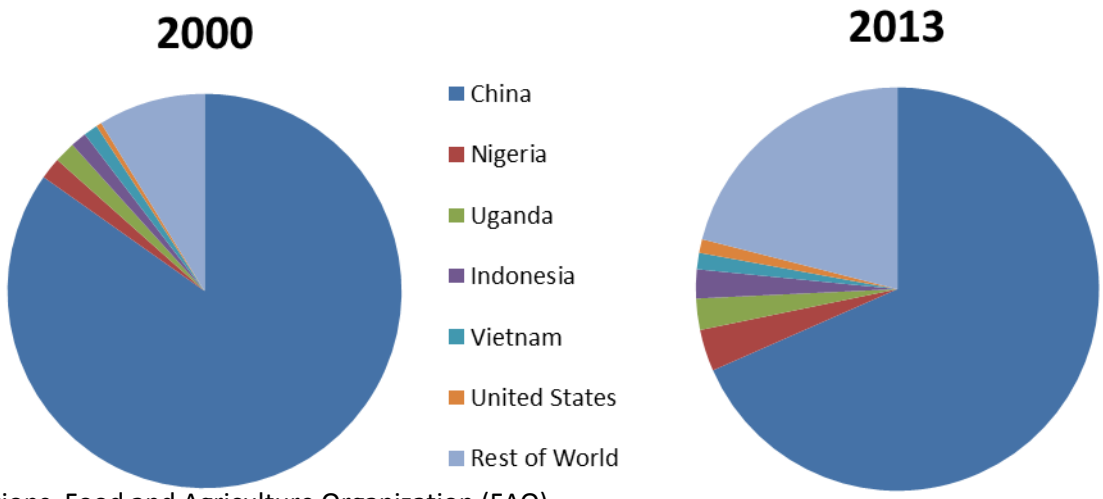
Traditionally Canada is the largest export market for U.S. sweet potatoes. However, exports of fresh or dried sweet potatoes to Canada declined through the 2010/11 and 2012/13 crop years, with a small recovery in the 2013/2014 crop year. The United Kingdom (UK) is a significant and growing export market for fresh or dried sweet potatoes. In 2013/2014, the UK became the largest export market for U.S. sweet potatoes by value of trade. In the 2013/2014 crop year, Canada and the UK represented 77 percent of U.S. sweet potato exports.

Concurrent with increased exports, though on a proportionally smaller scale, U.S. imports have generally been on the rise. U.S. sweet potato imports commonly originate from the Dominican Republic and China and nearly all imported product is fresh or dried. Imports of frozen sweet potatoes are minimal and typically represent less than 3 percent of the total volume of imports.

China Is Top Global Producer of Sweet Potatoes

While U.S. production has significantly increased, it still does not approach the volume of sweet potatoes produced globally. The sweet potato is widely cultivated in a number of developing countries, where it serves as a principal source of food and income for many of the world's poorest and most nutritionally insecure peoples. Data from the United Nations, Food and Agriculture Organization (FAO) indicates that over 95 percent of the sweet potato crop is produced in developing countries (UN/FAO, 2014).

Figure 5: Proportional sweet potato production, by country: 2000 and 2013



Source: United Nations, Food and Agriculture Organization (FAO).

By far, China produces more sweet potatoes than any other nation. In 2013, the most recent year for which UN/FAO production data were available, China produced over 70.5 million metric tons, or 68.4 percent of the estimated world production. China's production in 2013 was down significantly from 2000, when 117.9 million metric tons of sweet potatoes were cultivated, or approximately 84.8 percent of total world production. Other nations, primarily in Asia and Africa, are significant producers of sweet potatoes. The top six sweet potato-producing nations include Nigeria, with a 2013 harvest estimated at 3.5 million metric tons or 3.3 percent of total world production; Uganda with 2.5 million metric tons or 2.5 percent of total world production; and Indonesia and Vietnam, with production totaling 2.3 and 1.3 percent of world production, respectively. With 2013 production of 1.1 million metric tons, or roughly 1 percent of total world production, the United States is the sixth largest sweet potato-producing nation in the world.

Summary

In the past 15 years, the U.S. sweet potato industry has experienced a period of significant expansion. While North Carolina, California, and Mississippi, have posted the largest production gains, all producers have benefited from the price-bolstering effects of rising export volumes and domestic demand for sweet potatoes. Indeed, sweet potato prices have increased more than 50 percent between 2000 and 2014, and attained a new record high for the 2013/14 marketing year. Per capita consumption and trade trends indicate that demand for sweet potatoes will be sustained into the near future. If the sweet potato industry can continue to offer new value-added products and further promote the health benefits of sweet potatoes, future growth looks promising, both domestically and abroad.

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United States Department of Agriculture

Economic Research Service

Situation and Outlook

VGS-355-SA2

May 1, 2015

Vegetables and Pulses Outlook: Special Article

Longrun Outlook: Projections for Vegetable and Pulse Markets[1]

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Approved by the World Agricultural Outlook Board.

The farm value of vegetables and pulses (including melons) is projected at $25.8 billion in 2024, up from $21.7 billion in 2014—an average growth rate of 1.8 percent per year. Contributing to this $4-billion increase over the next decade are $1.9 billion from fresh-market vegetables, $400 million from processing vegetables, $1 billion from potatoes, more than $500 million from pulses, and the rest from sweet potatoes and mushrooms. Vegetable farm receipts as a share of total U.S. horticultural farm receipts will remain around 36 percent by the end of the coming decade, compared to 46 percent for fruits and nuts, and 18 percent for nursery and other specialty crops.

The average farm value of domestic vegetable production amounted to $4,303 per acre in 2014. This value is projected to expand at a 1.6-percent annual pace over the next 10 years, reaching $5,035 per acre in 2024. Prices received by vegetable crop producers are expected to rise 1.2 percent annually on average through 2024, which is less than the general consumer inflation rate. This reflects the role of vegetable imports in keeping the domestic supply of vegetables growing at a 1.2-percent annual rate. Imports also help hold vegetable consumption at around 415 pounds per capita in the projection period.

Production Projected to Exceed 139 Billion Pounds in a Decade

U.S. production of all vegetables and pulses (including melons), which totaled 131.3 billion pounds in 2014, is projected to reach 139 billion pounds in 2024—an average 0.6 percent annual increase. This growth is based on a 0.4 percent rise in yield (pounds per acre) and a 0.2 percent expansion of production acres per year, which is projected to be 5.13 million acres by 2024, up from 5.04 million acres in 2014. While production of fresh-market vegetables is anticipated to grow by only 0.1 percent per year, processing vegetables grow at a 0.8-percent pace, potatoes at 0.3 percent, and pulses at 3.6 percent annually.

[1]Andy Jerardo is an economist with the International Demand and Trade Branch, Market and Trade Economics Division, Economic Research Service, USDA.

Table 1--Long-term projections of horticulture production and crop value, 2014-24

Crop group	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
						-- 1000 acres --					
Production area:											
Fruits, nuts, vegetables	9,240	9,249	9,268	9,289	9,311	9,334	9,359	9,386	9,414	9,444	9,475
Fruits and nuts	4,202	4,213	4,225	4,238	4,252	4,266	4,281	4,296	4,313	4,330	4,347
Vegetables	5,038	5,036	5,043	5,051	5,059	5,069	5,079	5,090	5,101	5,114	5,128
Farm production:						*-- Billion pounds --*					
Fruits and tree nuts	61.7	62.5	62.8	63.0	63.2	63.5	63.8	64.0	64.3	64.6	64.9
All vegetables	131.3	132.1	132.8	133.6	134.4	135.1	135.9	136.8	137.6	138.4	139.3
Fresh market	42.6	42.7	42.7	42.8	42.8	42.9	42.9	42.9	43.0	43.0	43.1
Processing	35.7	36.0	36.3	36.6	36.9	37.2	37.5	37.8	38.1	38.4	38.7
Potatoes	44.3	44.4	44.5	44.7	44.8	44.9	45.1	45.2	45.4	45.5	45.6
Pulses[1]	5.0	5.1	5.3	5.5	5.7	5.9	6.1	6.3	6.6	6.8	7.1
Farm value:						*-- Billion $ --*					
Fruits and tree nuts	25.5	26.2	26.8	27.5	28.3	29.0	29.8	30.6	31.4	32.2	33.1
All vegetables[2]	21.7	22.1	22.5	22.8	23.2	23.7	24.1	24.5	24.9	25.4	25.8
Fresh market	12.4	12.6	12.8	13.0	13.1	13.3	13.5	13.7	13.9	14.1	14.3
Processing	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.3
Potatoes	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1
Pulses	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.8
Prices received by farmers						2011=100					
Fruits, nuts, vegetables	114.9	116.5	118.5	120.5	122.6	124.7	126.8	128.9	131.1	133.3	135.5
Fruits and tree nuts	125.0	126.6	129.4	132.3	135.2	138.3	141.3	144.4	147.6	150.8	154.1
Vegetables	103.0	104.2	105.5	106.7	108.0	109.2	110.5	111.8	113.0	114.3	115.6

[1] Includes dry beans, dry edible peas, and lentils.

[2] Estimated from production value or farm cash receipts.

Sources: USDA, Economic Research Service.

The faster projected production pace of processing vegetables (including pulses) than the fresh-market crop is partly due to the greater export demand for processed vegetables, including pulses, over the past decade. Also, exports of processed vegetables in the past decade rose by nearly 10 percent per year and exports of pulses grew faster at 13 percent since 2004. By contrast, exports of fresh-market vegetables expanded 6 percent per year in the same period.

The 0.1-percent annual production growth outlook for fresh-market vegetables is partly due to an uneven growth pattern in the past decade and the current severe drought in the San Joaquin Valley of California. While other states such as Arizona and Florida may boost fresh-market production to supplant crop declines in California, increased vegetable production in greenhouses as well as more imports from Mexico and Canada will likely limit effects of the production disruption and price volatility in California. Indeed, the share of imports in domestic vegetable consumption is expected to exceed 26 percent in 10 years, up from 19 percent in 2014.

Per Capita Consumption Averages 415 Pounds Through 2024

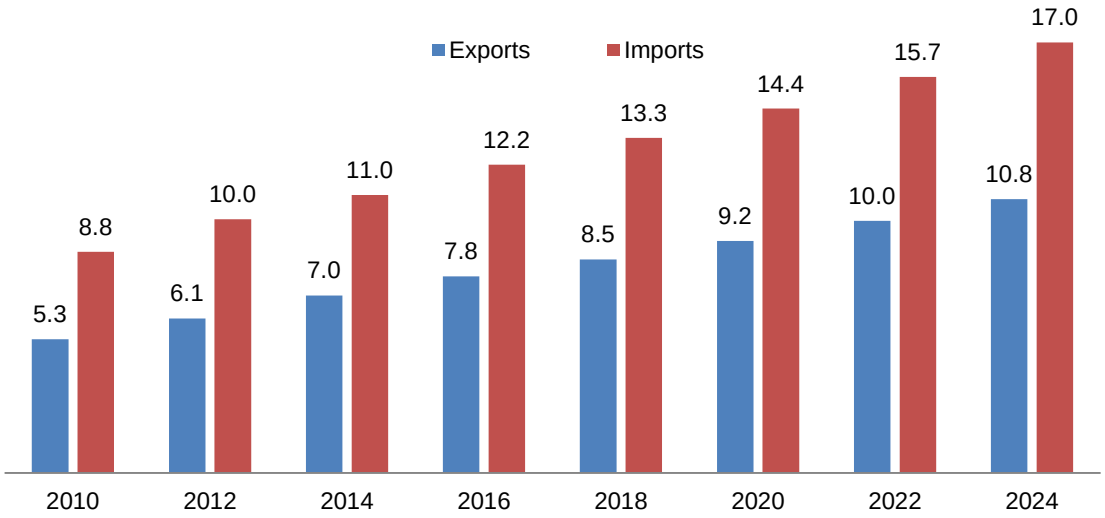
The domestic supply of vegetables, melons, and pulses is projected to reach 177 billion pounds in 2024, up from 157 billion pounds in 2014, representing a 1.2-percent annual gain. After accounting for net imports and population growth, per capita consumption of vegetables will range between 414 and 416 pounds from 2015 to 2024. Domestic consumption of vegetables is expected to increase from 134 billion pounds in 2014 to 143 billion pounds in 2024—a 0.7 percent annual pace. Since the U.S. population is also anticipated to increase at this same rate, domestic vegetable consumption is projected to average 415 pounds per capita over the next 10 years.

Projected Vegetable Imports Slightly Outpace Exports

Although U.S. vegetable exports grew at a faster rate than imports over the past decade in volume and value terms. The value of imports is projected to increase at a 4.5-percent rate through 2024 as compared to 4.4 percent for exports. This small difference is attributed in part to a larger domestic consumption pace of 0.7 percent versus a production rate of 0.6 percent per year through 2024. The import share of vegetable consumption is also larger than the export share of vegetable production—26 versus 24 percent, respectively, in 2024. The strength of the U.S. dollar in 2015 likely to continue into 2016 will help boost imports and discourage exports initially in the decade ahead.

U.S. imports of vegetables are projected to exceed $17 billion in 2024, up from $11 billion in 2014, led by fresh vegetables. Exports, which are expected in the initial years to be affected by California's current drought and the dollar's higher value, are forecast at $10.8 billion in 2024, up from $7 billion in 2014. The estimated export value of processed vegetables was about twice that of fresh vegetables in 2014. While estimated exports of processed vegetables will outpace fresh vegetable exports in the next ten years as they have in the past decade (in value and volume terms), imports of fresh vegetables will increase faster than imported processed vegetables. U.S. import demand for fresh vegetables is driven to a large extent by off-season consumption during the cold-weather months, when production in the United States is seasonally low.

Figure 1
Vegetables and pulses: 2010-24



Source: USDA, Economic Research Service, using U.S. Census Bureau data.

For More Information

Vegetable supply and use projections and additional information about the long-term outlook for agricultural commodities and trade are reported in:

USDA Agricultural Projections to 2024, OCE-2015-1, February 2015 http://www.ers.usda.gov/publications/oce-usda-agricultural-projections/oce151.aspx