IMPACT Center
WASHINGTON STATE UNIVERSITY

WASHINGTON AGRIBUSINESS

STATUS AND OUTLOOK

An annual report by Washington State University's School of Economic Sciences

Contents

PREFACE

W*ASHINGTON Agribusiness: Status and Outlook* is an annual publication prepared by Washington State University faculty in the School of Economic Sciences. It is intended to be a concise overview of Washington's current and near-term agricultural activity. The publication is broken into two primary sections. Section I reviews the status of various sub-sectors in agriculture and provides short-term projections or areas of focus moving forward. Section II provides specialty research focused on international trade of Washington agricultural products, animal health, etc. Section III provides Washington farm income statistics.

A version of this report will be available online through the School of Economic Sciences. Feedback on this issue and suggestions for future featured articles is most welcome. Specific questions regarding focus areas in the report should be directed to the managing editor who will work with the primary authors to provide responses.

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SECTION I. STATUS AND OUTLOOK

Situation and Outlook for Small Grains

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In December 2021 the Economics Research Service (ERS) of the United States Department of Agriculture (USDA) forecast total U.S. farm receipts for all commodities in 2021 to be in excess of $427 billion dollars. After adjusting for inflation this results in the highest farm sales figure since 2014. Total U.S. crop farm receipts are projected to exceed 2020 by 17.9 percent on a nominal basis, with farm receipts from sales of animals and animal products up 17.7 percent year-over-year. This contributes to a U.S. net farm income in 2021 exceeding 2020 income by about $22 billion. This represents a year-over-year income increase of 23.2 percent, and builds on a 19.9 percent increase in 2020 over 2019.[1]

Direct government payments to U.S. farmers were down over 40 percent in 2021, on a year-over-year basis, and totaled just $27.2 billion. Total government payments in 2020 totaled $45.7 billion, a 103.5 percent increase from the $22.4 billion paid out in 2019. The decrease in government payments is the result of lower supplemental and ad hoc disaster assistance for COVID-19 relief in 2021 compared with 2020. The 2020 government support included payments from the Coronavirus Food Assistance Programs (CFAP1 and CFAP2), as well as loans from the Small Business Administration's Paycheck Assistance Program (PPP).

In addition, payments under the Agriculture Risk Coverage (ARC) Farm Bill program are expected to be $95 million, a decrease of $1.2 billion from 2020 levels. Price Loss Coverage (PLC) payments were also down in 2021, totaling $2.1 billion, a decrease of $2.8 billion from last year. The ARC program is designed to protect producers for losses in revenue, while the PLC program only covers crop price declines (it does not compensate for lost production). Producers must decide between the two programs going into each production season. ARC and PLC payments received each year are tied to the previous year's revenue and price, respectively, for each covered crop. ARC payments were lower in 2021 because both commodity prices and yields were higher in 2020 compared to 2019 levels. PLC payments decreased in 2021 because of higher prices for covered commodities in 2020 compared with 2019.

Wheat

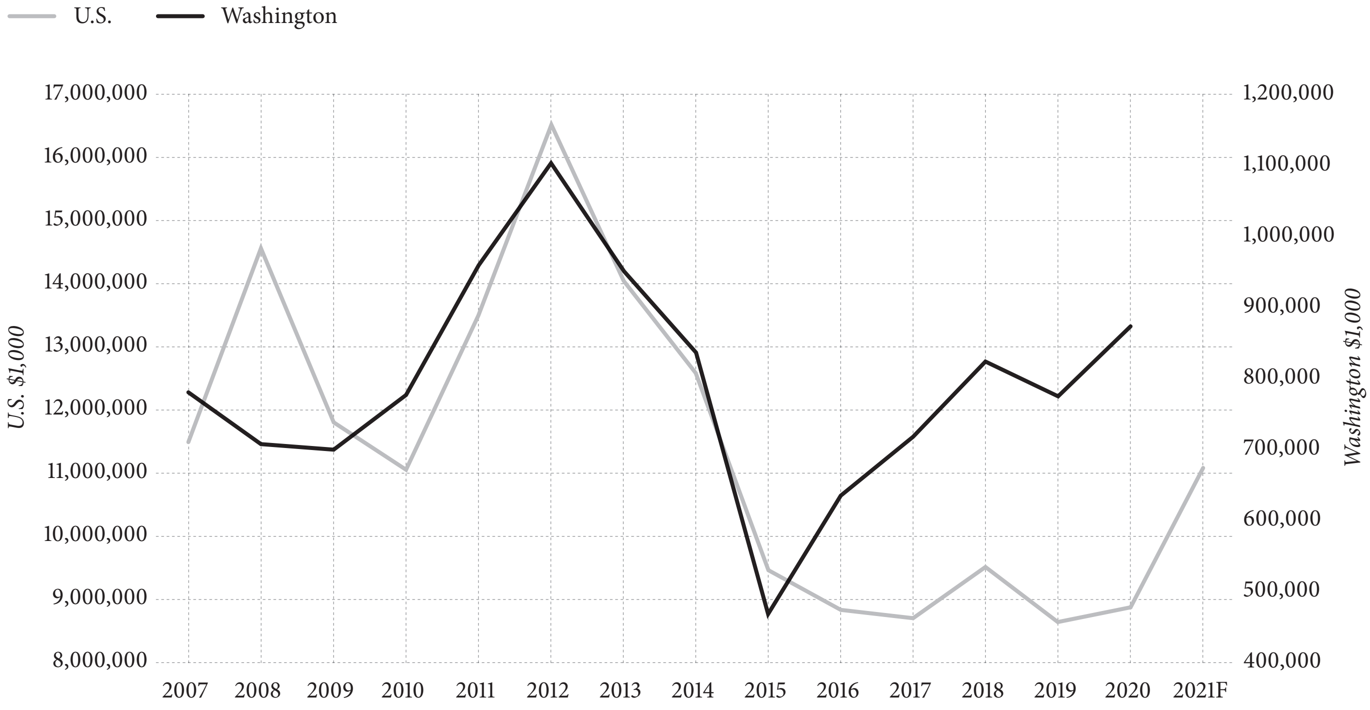
At the national level, wheat receipts rebounded in 2021, increasing $2.2 billion, or 25.0 percent. Based on USDA estimates, the increase in wheat prices helped offset the decline in total U.S. wheat production. Despite the large increase relative to 2020 sales, however, total wheat receipts are still well below the record levels realized in 2012. (Figure 1).

Two important components contributed to the improved wheat receipts for U.S. producers in 2021. First, the domestic balance sheet for U.S. wheat has tightened significantly (Figure 2); and second world wheat consumption exceeded world production in 2021, drawing down world stocks for the second year in a row, but only the third time over the last decade. (Figure 3).

Figure 4, Panel A shows the relationship between the U.S. wheat stocks-to-use ratio and domestic wheat prices over the last several crop years (the crop year for wheat runs from June 1 through May 31 the following year). Notice that the U.S. wheat stocks-to-use ratio is expected to be down significantly this crop year compared to earlier years. This corresponds with an increase in the average annual U.S. wheat price of almost $2 per bushel compared to last year, and the highest annual average price since the 2012/13 marketing year.

1 https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics/

Figure 1: *Farm Level Wheat Sales*



Source: United States Department of Agriculture, Economic Research Service. Farm and Income Wealth Statistics

Figure 2: *U.S. Wheat Balance Sheet (June/May) – Based on Dec 2021* WASDE *– USDA*

Marketing Year	**USDA 14/15**	**USDA 15/16**	**USDA 16/17**	**USDA 17/18**	**USDA 18/19**	**USDA 19/20**	**USDA Dec Est 20/21**	**USDA Dec Fore 21/22**
	(in million bushels, million acres)							
Beg Stocks	590	752	976	1,181	1,099	1,080	1,028	845
Imports	151	113	118	157	135	104	100	115
Acres Planted	56.8	55	50.1	46.1	47.8	45.5	44.5	46.7
Acres Harvested	46.4	47.3	43.8	37.6	39.6	37.4	36.8	37.2
% Harvested	81.7%	86.0%	87.4%	81.6%	82.8%	82.2%	82.8%	79.7%
Yield	**43.7**	**43.6**	**52.7**	**46.4**	**47.6**	**51.7**	**49.7**	**44.3**
Production	2,026	2,062	2,309	1,741	1,885	1,932	1,828	1,646
Total Supply	**2,768**	**2,927**	**3,402**	**3,079**	**3,119**	**3,116**	**2,957**	**2,601**
Food	958	957	949	964	954	962	961	962
Seed	79	67	61	63	59	60	64	66
Feed and Residual	114	149	160	51	88	97	95	135
Exports	864	778	1,051	901	937	969	992	840
Total Demand	**2,015**	**1,951**	**2,222**	**1,980**	**2,039**	**2,087**	**2,111**	**2,003**
Ending Stocks	752	976	1,181	1,099	1,080	1,028	845	598
Stocks to Use	**37.32%**	**50.03%**	**53.15%**	**55.51%**	**52.97%**	**49.21%**	**40.32%**	**29.86%**
Avg. Farm Price	**$5.99**	**$4.89**	**$3.89**	**$4.72**	**$5.16**	**$4.58**	**$5.05**	**$7.05**

Source: United States Department of Agriculture, World Outlook Board

Figure 3: *World Wheat Supply*

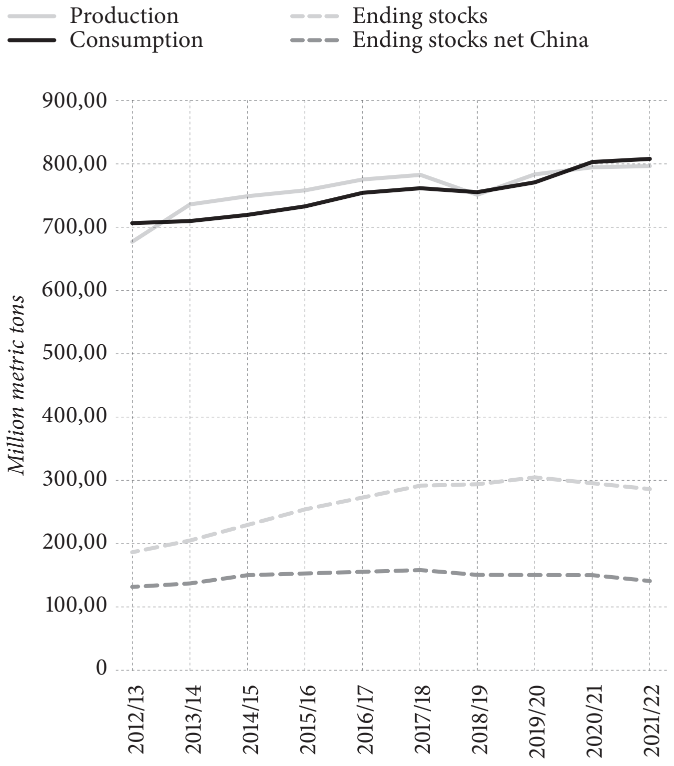
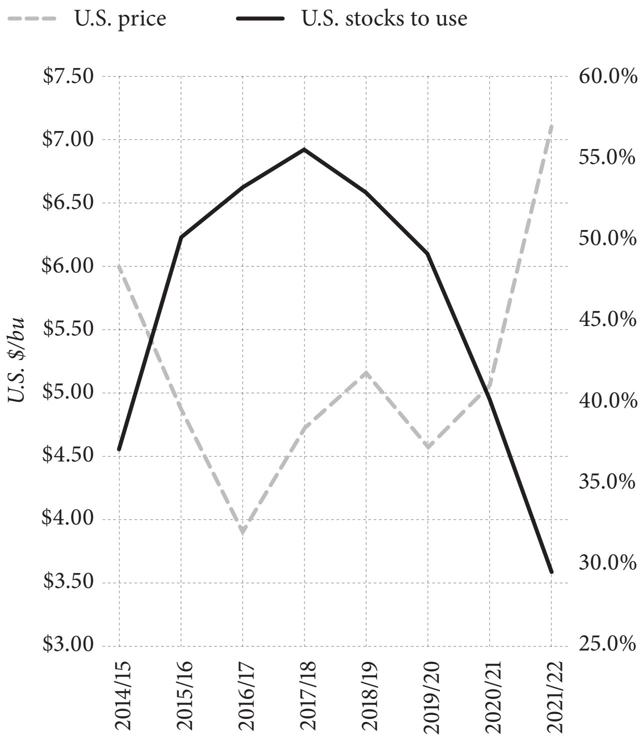


Figure 4 Panel B shows the U.S. wheat price compared to world wheat stocks-to-use net of Chinese stocks (the Chinese hold about half of world stocks, but have historically not been major traders of wheat, so the stocks they hold are less important in influencing U.S. prices). As world consumption has exceeded world wheat production over the last couple of years, the stocks-to-use ratio for the world market has fallen, and we see a relationship between U.S. prices and world stocks-to-use similar to that in Figure 4 Panel A. In fact, the world stock-to-use ratio has a stronger influence on U.S. wheat prices than the domestic balance sheet, due to the importance of world wheat trade to the U.S. market. On average, the U.S. exports about 45 percent of all the wheat produced domestically. In Washington it is closer to 90 percent. As a result, domestic wheat prices are quite sensitive to the global wheat situation.

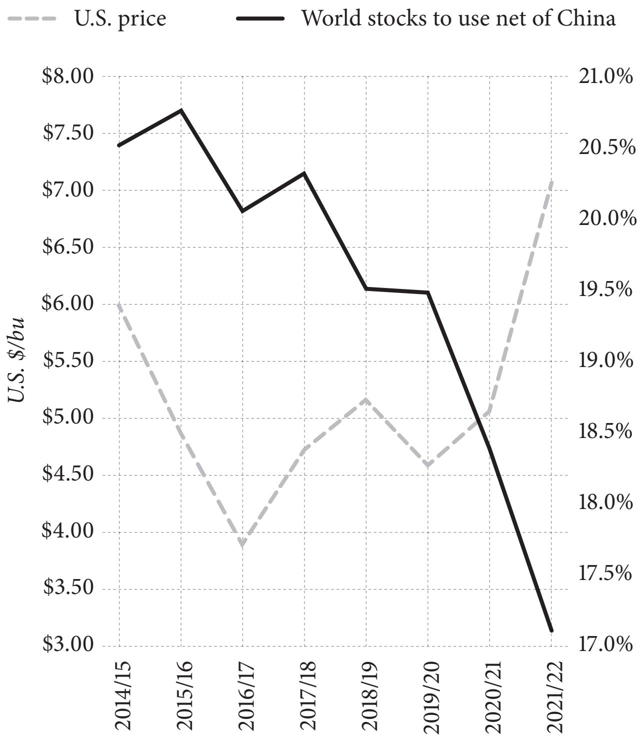
Despite an improved domestic wheat balance sheet and a more positive world supply/demand picture, U.S. wheat exports are lagging significantly this year compared to recent years, and the picture has become increasingly negative as we have advanced through the 2021/22 marketing year. As of mid-December 2021, USDA forecast total U.S. wheat exports for the marketing year will be down

Figure 4.A: *U.S. Wheat Stocks to Use vs. U.S. Price*



Source: United States Department of Agriculture, World Outlook Board

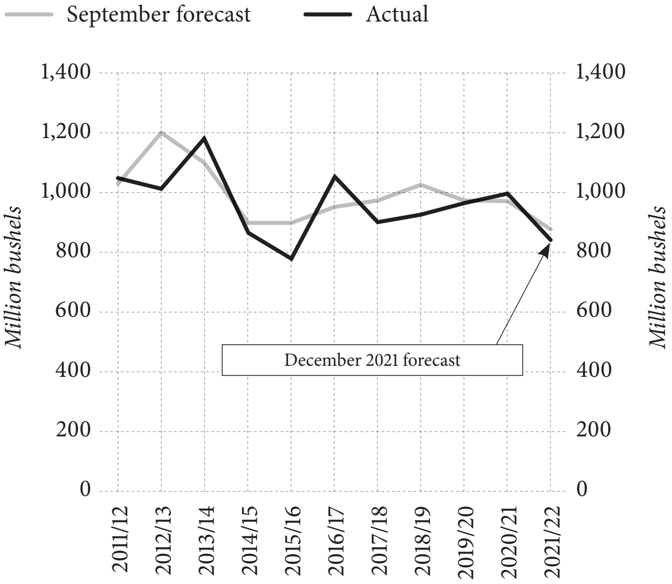
Figure 4.B: *World Wheat Stocks to Use vs. U.S. Price*



Source: United States Department of Agriculture, Foreign Ag Service over 15 percent compared to last year, and, if realized, will represent the smallest export volume in 7 years, and the second lowest in over a decade.

Figure 5 shows total U.S. wheat exports each year compared to the USDA export forecast in September each year (September 1 is the start of the second quarter of each marketing year). Notice that most years, the USDA

Figure 5: *U.S. Wheat Exports – World Outlook Board Forecasts*



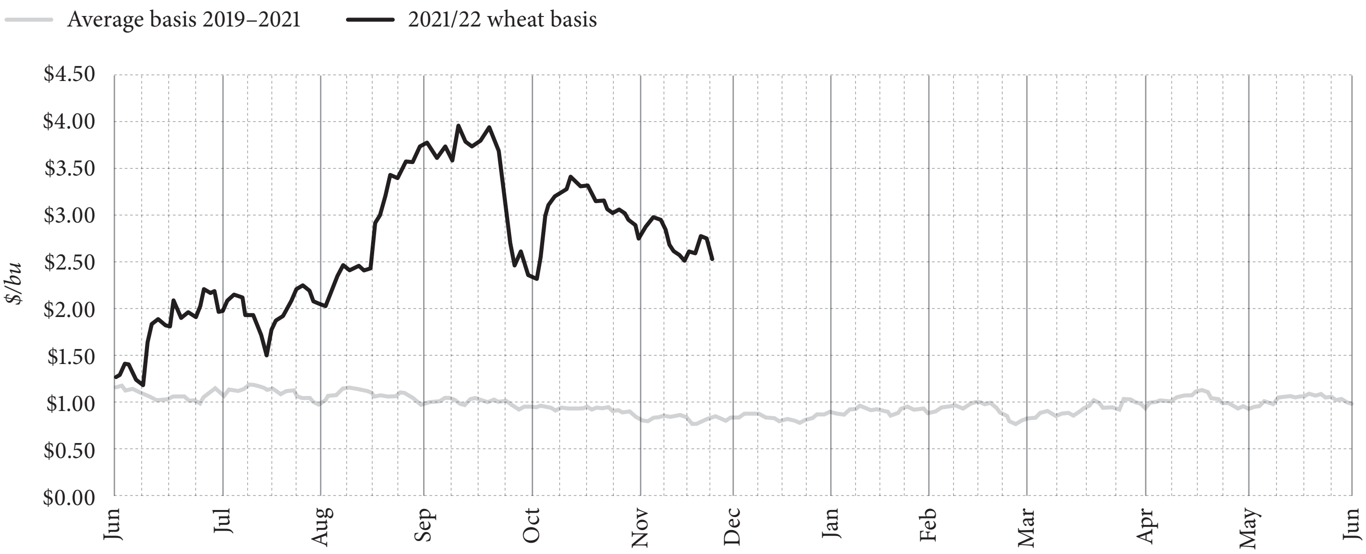
Source: USDA, World Outlook Board

is overly optimistic relative to actual exports early in the marketing year. This appears to be the case again this year, and given the recent trend in export pace, the December 2021 USDA estimate may also prove too high.

Most wheat grown in Washington is Soft White wheat. Because this class of wheat is considered higher-than-average quality, and in demand with relatively high-income foreign consumers, it is generally priced at a significant premium over other domestically grown wheat. Through the first half of the 2021/22 marketing year the Soft White wheat premium has been particularly strong.

The reference price for Soft White wheat tends to be the Soft Red wheat futures price traded in Chicago. In other words, the prices offered to Washington producers for Soft White are determined by the market value of Soft Red wheat. This price relationship is referred to as the basis, and is generally calculated as the Soft White wheat cash price minus the futures price for the Soft Red wheat contract closest to expiration. Figure 6 shows the basis in Portland, Oregon (the export point for most Washington wheat) through the first couple of quarters this marketing year compared to the average basis the previous two years. In general, we would not expect this strong of a basis relationship to be sustained across crop years (prices will generally drift back towards their historic relationship unless there is a dramatic change in either the production or consumption of one wheat class relative to the others). Note that the Portland premium had already gone from about $4 per bushel in early September 2021 to $2.50 per bushel in December. If we have generally favorable growing conditions for both

Figure 6: *Portland White Wheat Basis*



Source: United States Department of Agriculture, National Agricultural Statistics Service the Soft White and Soft Red crops this coming spring, we would expect the price relationship to return to its more normal situation going into next summer's harvest. Thus, while Washington wheat producers have enjoyed excellent prices compared to the national market price through the first half of the marketing year, it is unlikely the current price relationships can be maintained into next year.

A primary contributor to the abnormal price premiums realized by Washington producers was the poor crop harvested in 2021 as a result of the severe drought. While average wheat yields across the entire U.S. were down relative to the previous 5 years, Washington farmers were particularly impacted. On a national average basis wheat yields across all classes of wheat were down in 2021 by almost 11 percent. Washington wheat yields, however, were down 46 percent on a year-over-year basis. Since Washington wheat producers contributed a smaller percentage to the overall U.S. crop compared to an average year, it allowed Washington prices to appreciate relative to national average prices. As we return to a more normal year, Washington market share price relationships will also return to their more normal pattern.

As a result of yield losses, the total 2021 Washington wheat crop (including all classes) was down 48 percent compared to 2020. It was also down 42 percent compared to the previous 4 year average.

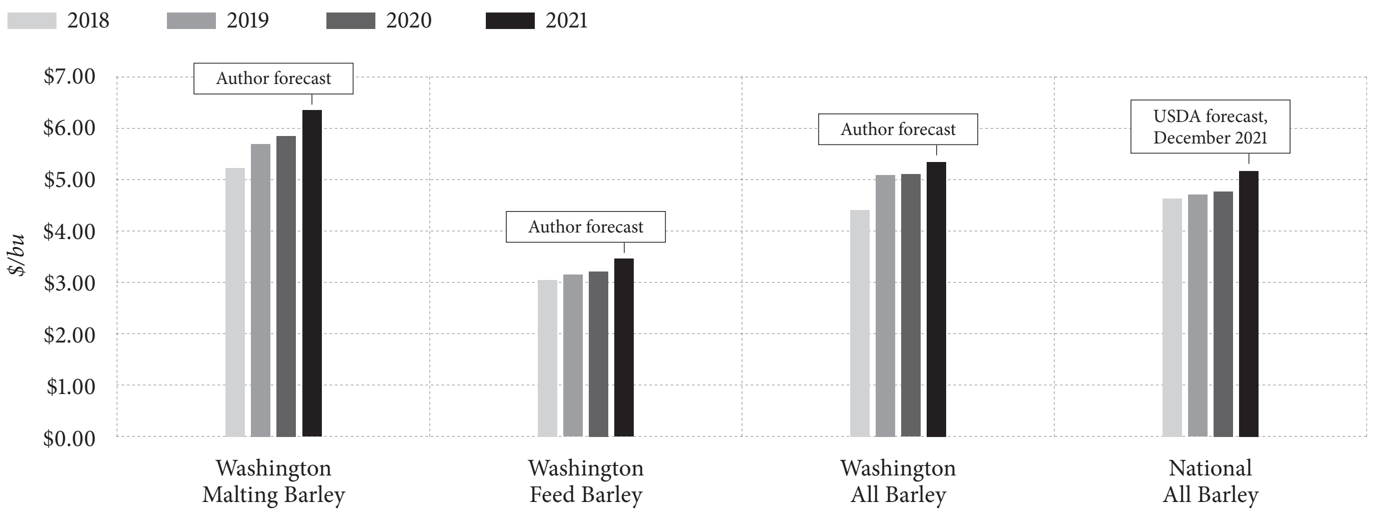
In 2020 (the most recent data available from USDA) wheat sales by Washington farmers totaled $872 million. This represented an increase of about 19 percent from 2019. That being said, even with the significant price improvement relative to 2020, the smaller production will likely result in total wheat sales for 2021 below total revenue from Washington wheat sales in 2020. However, most Washington wheat farmers will get some income support through their crop insurance policies. The most common crop insurance policy is a revenue policy that, even with very high prices, will still make payments for the 2021 crop based on significant yield losses.

Barley

Total U.S. barley production declined 31 percent in 2021 compared to 2020. While planted barley acres remained steady in 2021, both harvested acres and yields declined significantly. Harvested U.S. acres were down almost 14 percent year-over-year, and national average yields almost 22 percent. As a result, the barley carryout for the 2021/22 marketing year (i.e., the barley that will be left over on May 31, 2022) is down 11 million bushels relative to last year, and currently estimated at 60 million. This has led the USDA to project higher average barley prices this marketing year. As of last December, the USDA was forecasting U.S. barley prices for 2021/22 averaging $5.15 per bushel, compared to $4.75 per bushel last year (this is not the price for malt quality barley, but a hybrid price estimate across both feed and malt barley).

Figure 7 shows the relationship between national average barley prices and prices in Washington, as well as prices broken out by feed and malting barley. In general, Washington producers receive a premium over national average prices for the classes of barley they produce. The

Figure 7: *Barley Prices*



Source: United States Department of Agriculture, National Agricultural Statistics Service and Author's forecast.

Washington price forecasts for 2021 in Figure 7 are the author's estimates given the historical relationship between national and Washington prices, and the current USDA forecast for the 2021/22 malting year for all barley.

Similar to the national picture, Washington barley producers reduced acres in 2021, continuing the trend established a couple of years ago. Figure 8 shows planted and harvested barley acres in Washington over the last few years, as well as total Washington barley production. Planted barley acres in 2020 declined 5.5 percent compared to 2019, and then fell another 8 percent in 2021.

In 2020, Washington barley yields were outstanding, averaging 90 bushels per acre compared to a national average of 77.5 bushels per acre. However, just like wheat, Washington barley yields in 2021 were severely impacted by the drought. National average barley yields fell to 60.4 bushels per acre in 2021, but Washington yields were off 58 percent compared to 2020, coming in at 38 bushels per acre. As a result, total barley production in Washington was also off 58 percent. Similar to wheat, improved prices for Washington barley producers in 2021 will not offset the production problems, and total barley revenue this marketing year will likely trail last year.

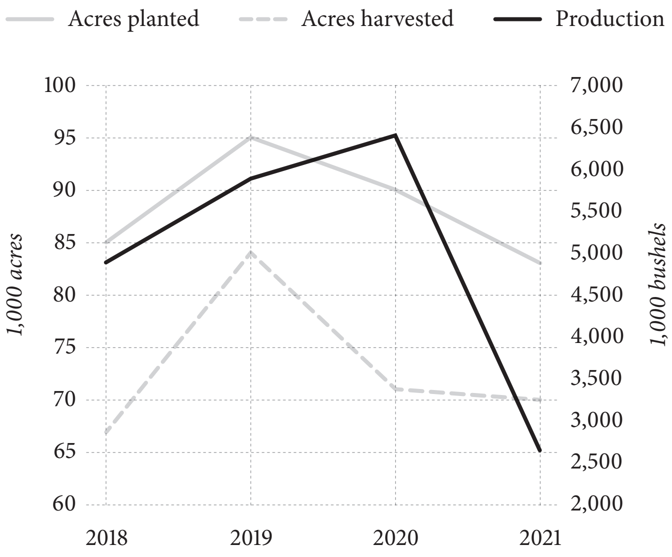
Summary

Prices for both wheat and barley are expected to be up significantly for the 2021/22 marketing year. However, poor crop conditions in Washington during the 2021 growing season will more than offset the price improvement, so revenue from small grain producers in Washington will still be below 2020/21 marketing year levels. The good news is that the higher prices do allow producers to do some forward pricing of their 2022 crop at prices much more attractive than those offered the last several years.

Wheat stocks projected to exist at the end of the current marketing year are encouraging from a price perspective, but exports have not been keeping pace with expectations through the first half of the marketing year. Should wheat exports continue to disappoint we may see some price set backs as we move through the spring months.

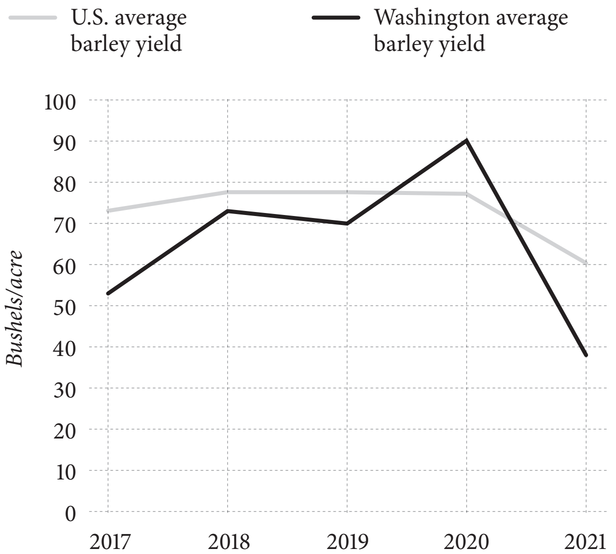
Less than 6 percent of U.S. barley production is typically exported, so barley prices do not face the same risk as wheat prices when the export pace does not support the USDA marketing year export forecast. An important determinate for barley prices in the spring months will be the national acreage figure. If barley acres decline again on a year-over-year basis, then barley prices going forward will continue to find some support. However, total U.S. planted barley acres have been quite consistent the last few years, and the supply-side price variations have been driven by actual harvested acres and yields.

Figure 8: *Washington Barley Acres and Production*



Source: United States Department of Agriculture, National Agricultural Statistics Service

Figure 9: *Barley Yields*



Source: United States Department of Agriculture, National Agricultural Statistics Service

2021 Washington Tree Fruit Outlook

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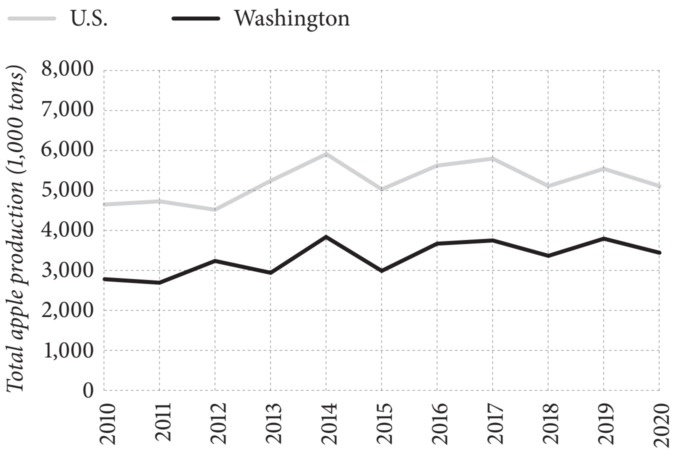
WASHINGTON remains the single largest producer of apples, pears, and cherries in the nation. The 2021 Washington tree fruit outlook analyzes the production trends and market conditions.

Note that we use two different words to denote year. To denote production related numbers, we use year, indicating the year when most of the horticultural management took place and the year when the fruit was harvested. For example, we write "In 2021, Washington State total production was 3,458 thousand tons…", meaning the total production during months August throughout November of 2021 was 3,458 thousand tons. When stating sales figures, we use marketing season. For example, we write "During the marketing year 2020–2021, Red Delicious represented 19 percent…" This refers to apples that were harvested in September 2020 and were sold since harvest time until the end of the season in July 2021.

Figure 1: *Total Apple Production, United States and Washington State, 2010–2020*



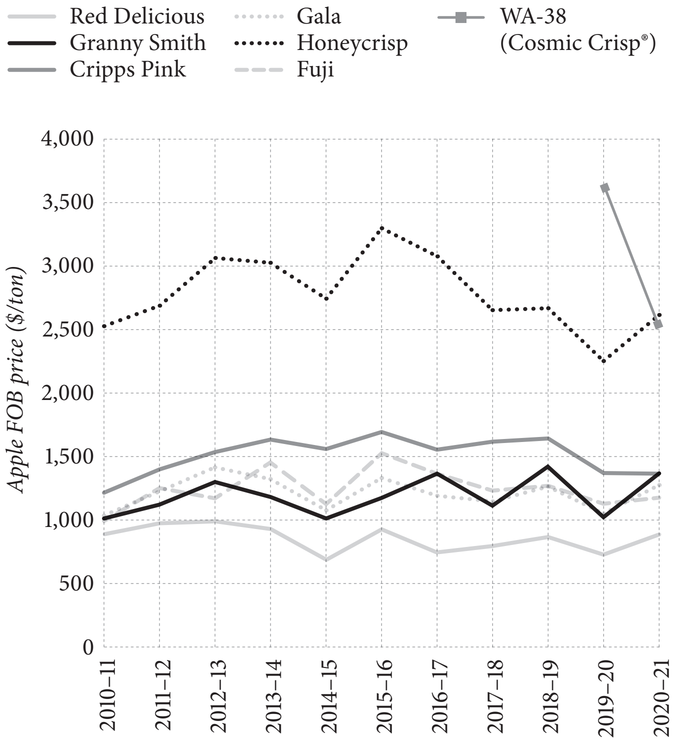
Source: United States Department of Agriculture, 2021

Apples

In 2020, Washington State total apple production was at 3,458 thousand tons, representing 67 percent of all total apple production in the United States at 5,127 thousand tons. In 2020, total Washington apple production was above the 10-year average (2010–2020) at 3,315 thousand tons, but below the 2014 record production at 3,825 thousand tons. During 2010–2020, yield per acre in Washington increased 9 percent, from 18 tons per acre in 2010 to 20 tons per acre in 2020. Similar to previous years, the 2020 yield per acre in Washington State was above the United States average at 17 tons per acre. During 2010-2020, apple-cultivated surface in Washington State increased 14 percent, from 153 thousand acres in 2009 to 175 thousand acres in 2020. In the same year, 75 percent of all Washington apple production was sold in the fresh market.

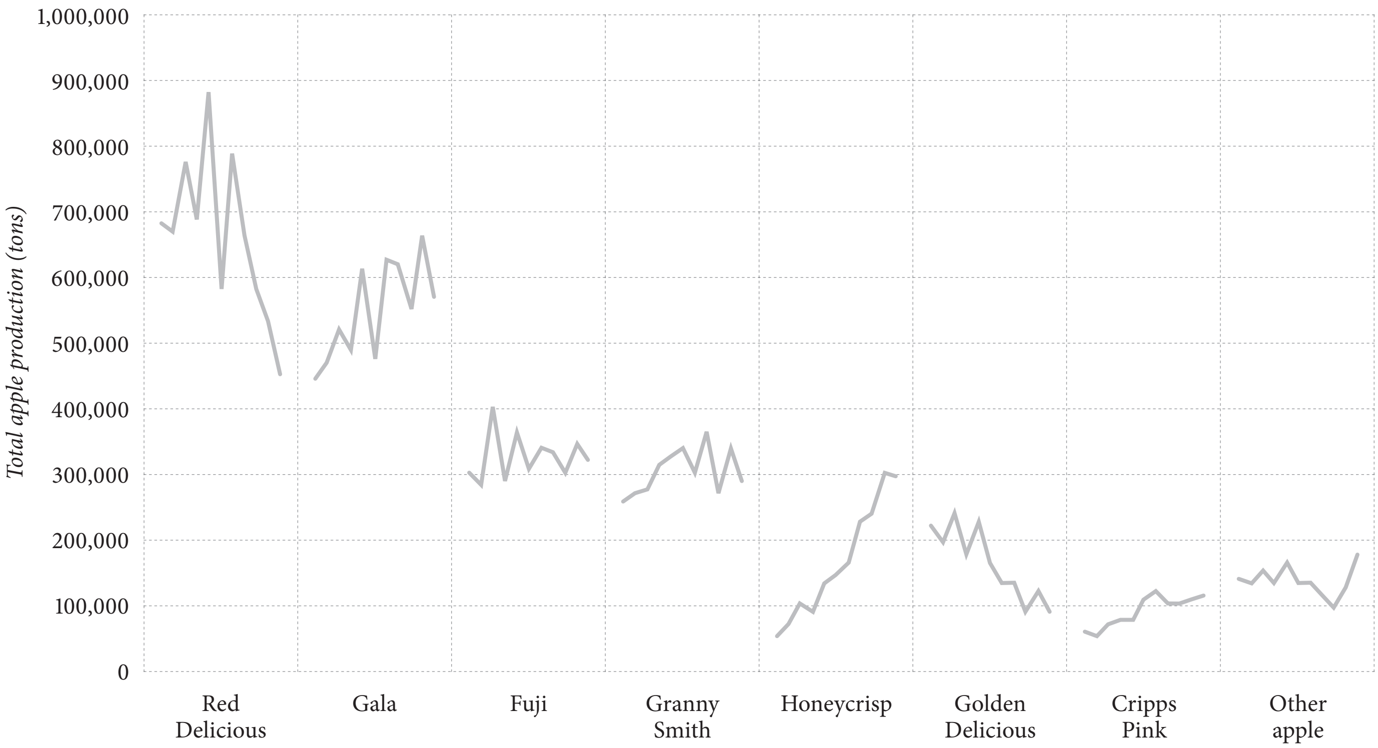
For marketing year 2020–2021, the Honeycrisp variety exhibits the highest price received by growers in Washington State. The Free on Board (FOB) price for Honeycrisp was $2,618 /ton ($52.35/40-lb box), although there were other apple varieties sold at prices closer, but not higher, than Honeycrisp prices. For example, the price for the variety WA-38 (Cosmic Crisp®) was $2,526/ton ($50.51/40-lb box) and the price for the variety Envy was $2,084/ton ($41.68/40-lb box). These varieties, such as Honeycrisp

Figure 2: *FOB Price Comparison across the 7 Selected Apple Varieties, Washington State, 2010–2020*



Source: Washington State Tree Fruit Association, 2021

Figure 3: *Apple Variety Mix Evolution from 2010–2011 to 2020–2021, Washington State*



Source: Washington State Tree Fruit Association, 2021

(e.g., crisp in texture, optimal balance of sweetness and acid in flavor), exhibit textural and flavor attributes more appealing to consumers.

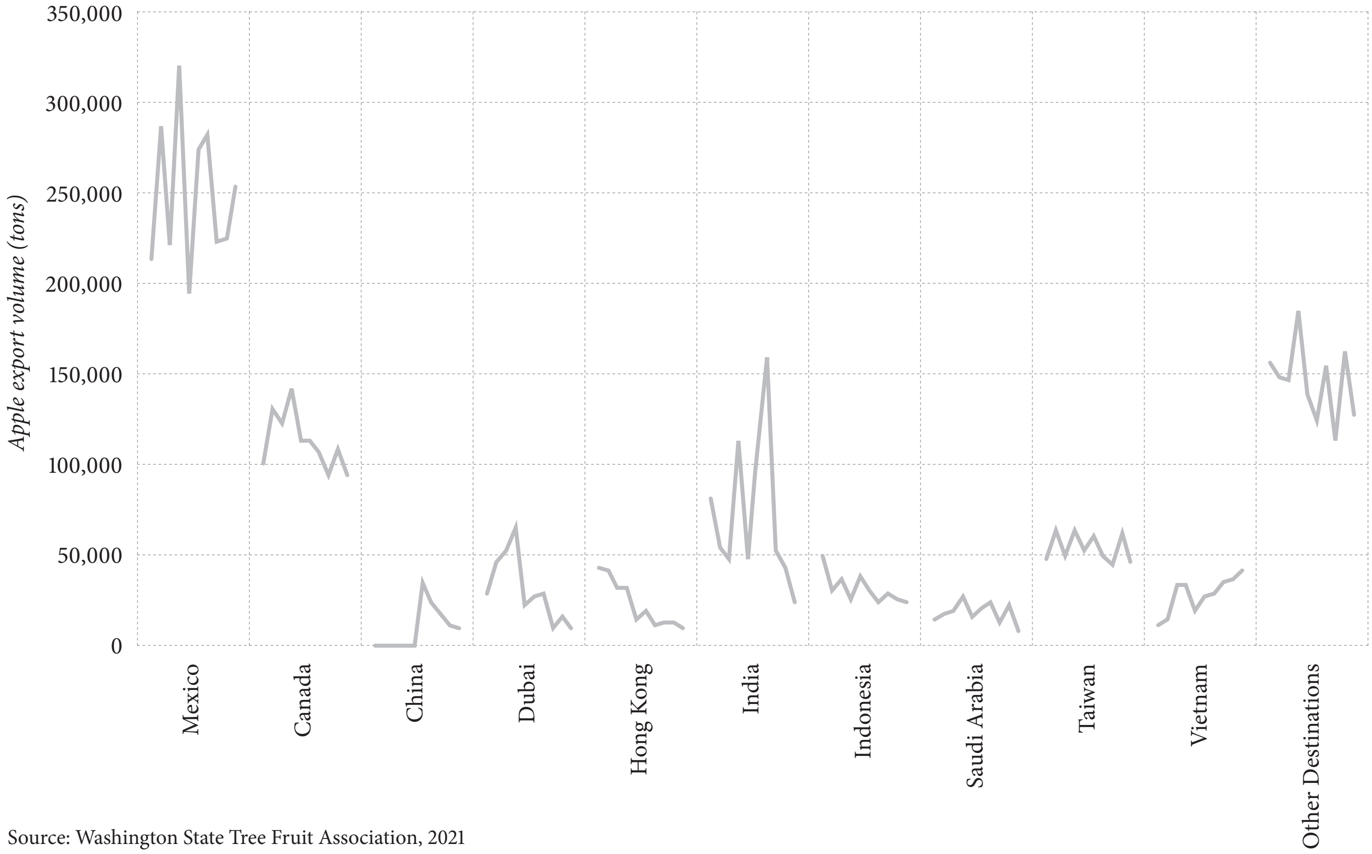
On average, in the year 2020–2021, prices received by growers for the main apple varieties in volume were at $1,432.5/ton ($28.65/40-lb box), higher by 19% than prices received in 2019-2020 at $1,205/ton ($24.10/40-lb box).

In terms of the variety mix, in 2020-2021, Gala represented 23 percent of the total volume of apples shipped, followed by Red Delicious at 19 percent, Fuji at 13 percent, Granny Smith and Honeycrisp at 12 percent of apples shipped from Washington state. Compared to 2010–2011, the volume of Red Delicious apples shipped in 2020–2021, decreased by 33 percent, Gala increased by 28 percent, Fuji increased by 7 percent, Granny Smith increased by 12 percent, Honeycrisp increased by 431 percent, Golden Delicious decreased by 57 percent, and Cripps Pink increased by 102 percent.

WA-38 (Cosmic Crisp®) were available in the market as of December 2019. The volume of these apples shipped in 2019–2020 was 6,919 tons (345,929 40-lb boxes). In 2019-2020, they sold at a record price of $3,641/ton ($72.81/40-lb box), which was 61 percent higher than the price for Honeycrisp at $2,260/ton ($45.20/40-lb box). Whereas in 2020–2021, the volume of apples shipping was 30,366 tons (1.52 million 40-lb boxes), and the prices of WA-38 (Cosmic Crisp®) were at $2,526/ton ($50.51/40-lb box), which was 4% lower than the price for Honeycrisp at $2,618/ton ($52.35/40-lb box).

Maintaining a steady share in established export markets and an increasing share in emerging markets is crucial for the economic sustainability of the Washington apple industry. During the marketing season 2020–2021, Washington State exported 31 percent of the apples produced. Main export destinations were Mexico (39 percent of total apple exports) and Canada (15 percent). The second largest export destination were Asian countries: Taiwan (seven percent), Vietnam (six percent), India (four percent), and Indonesia (four percent). The third block of important destinations was Latin American countries and the fourth block Middle Eastern countries.

Figure 4: *Washington Apple Exports Destination by Volume, from 2011–2012 to 2020–2021*



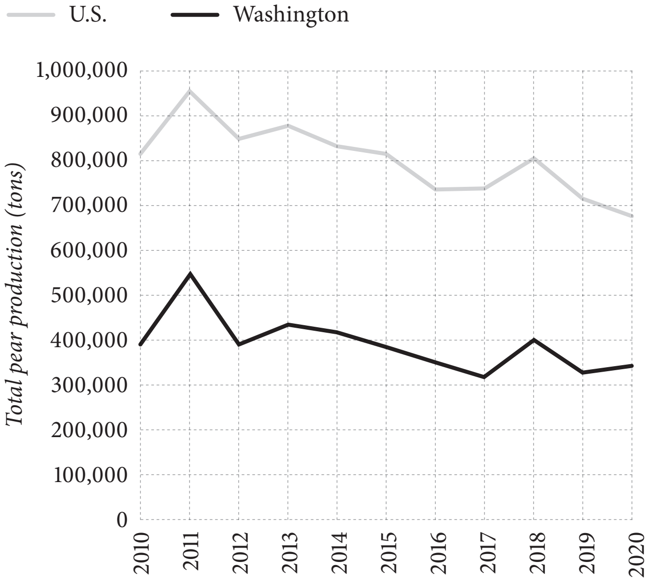
Source: Washington State Tree Fruit Association, 2021

Pears

Washington State remains the largest producer of pears by volume in the United States. In 2020, the total pear production in Washington State was at 347 thousand tons, representing 52 percent of total pear production in the United States at 672 thousand tons. In 2020, pear production in Washington was below the 10-year average, at 390 thousand tons, although the production in 2020 was 6 percent higher than the production in 2019. In 2020, the cultivated surface in Washington decreased by three percent from 20,400 in 2019 to 19,700 in 2020. This area represents 45 percent of the total bearing acres for pears in the United States. Yield per acre in Washington, at 17.6 tons/acre, is above the national average at 15.4 tons/acre. The overall (both fresh and processed market) FOB price received by the grower was at $509/ton. Seventy eight percent of Washington State pear production went to the fresh market.

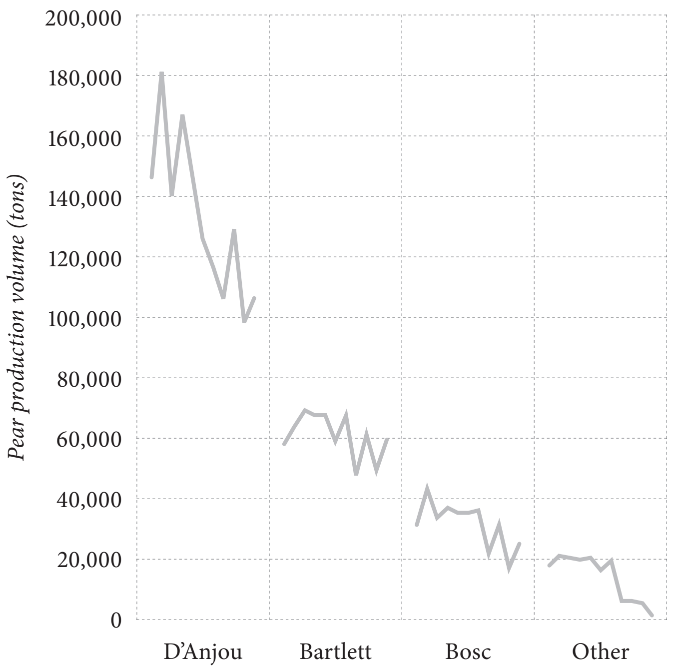
In 2020–2021, the most popular pear varieties grown in Washington State were D'Anjou with 54 percent of total production, followed by Bartlett with 30 percent, Bosc

Figure 5: *Total Pear Production, United States and Washington State, 2010–2020*



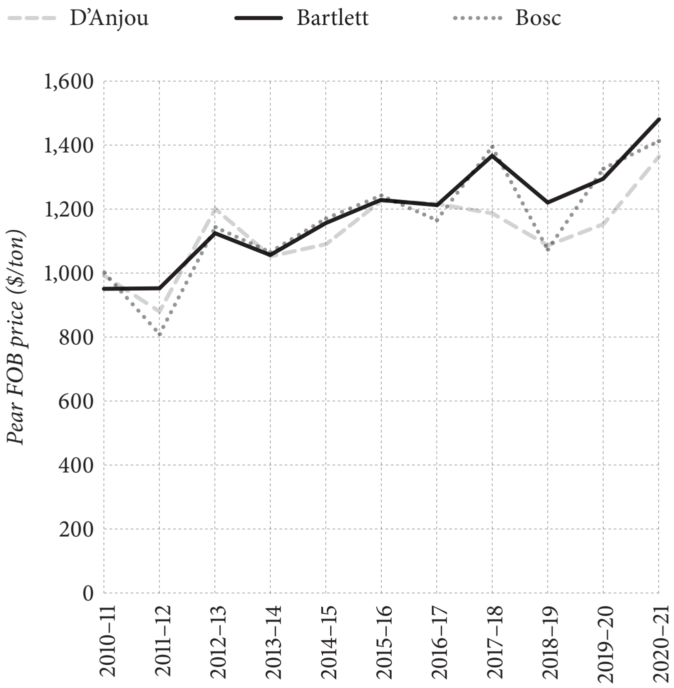
Source: United States Department of Agriculture, 2020

Figure 6: *Pear Variety Mix Evolution from 2010–2011 to 2020–2021, Washington State*



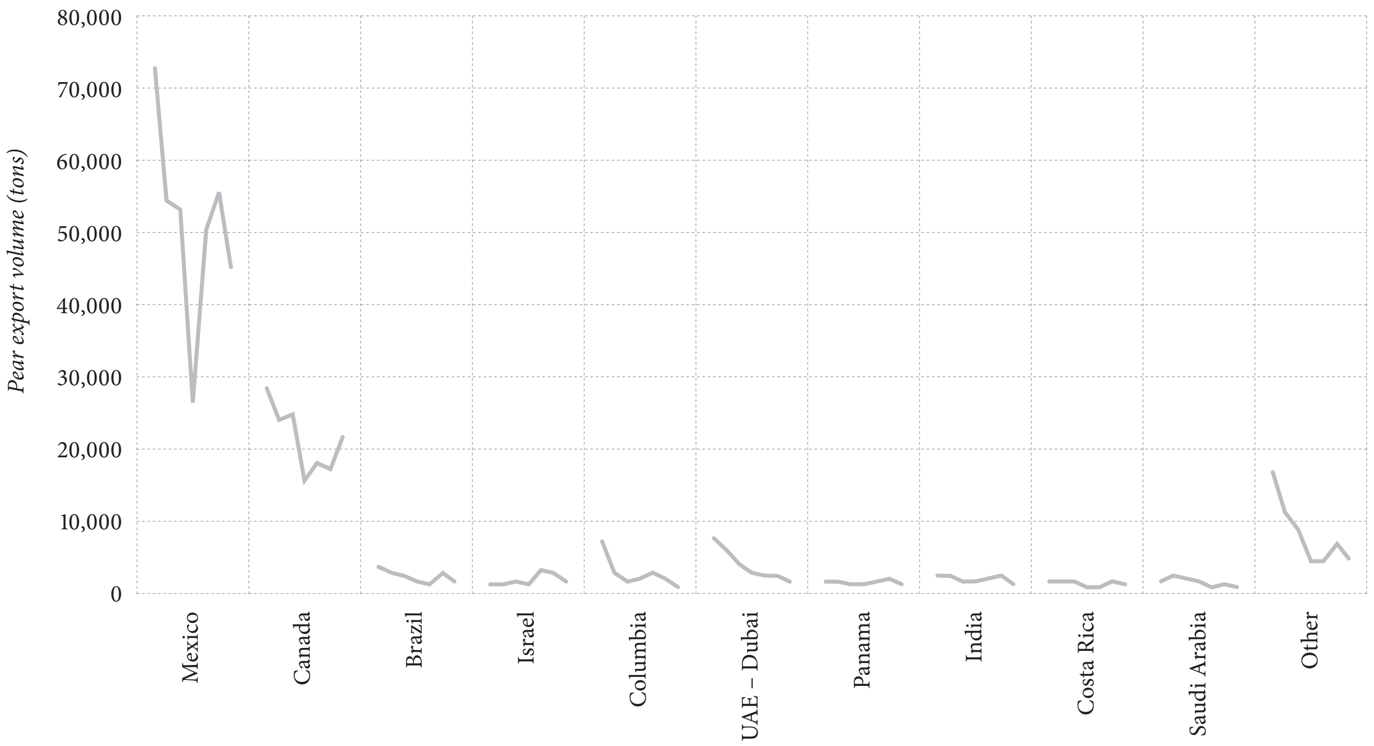
Source: Washington State Tree Fruit Association, 2021

Figure 7: *FOB Price Comparison across the Four Top Pear Varieties, Washington State, 2010–2021*



Source: Washington State Tree Fruit Association, 2021

Figure 8: *Washington Pear Exports Destination by Volume, from 2014–2015 to 2020–2021*



Source: Washington State Tree Fruit Association, 2021 with 13 percent, and all other varieties at three percent of the total volume of pears grown in Washington.

FOB prices received by growers differed across varieties. For the topmost popular varieties (e.g., D'Anjou, Bartlett, and Bosc), prices have remained stagnant for the last 10 years. The 10-year average price for Bartlett is $1,484/ton; Bosc, $1,418/ton; and D'Anjou, $1,365/ton.

During the marketing season 2020–2021, Washington State exported 24 percent of the pears produced. Main export destinations were Mexico (56 percent of total pear exports) and Canada (27 percent). The second largest export destination was Latin American countries: Brazil (2 percent), Colombia (1 percent), Panama (1 percent), and Costa Rica (1 percent). The third largest destination was the Middle East countries: Israel (2 percent), Dubai (2 percent), and Saudi Arabia (1 percent). Asian countries, with India at 1 percent, followed the Middle East, and other destinations represent 6 percent of the total Washington pear exports.

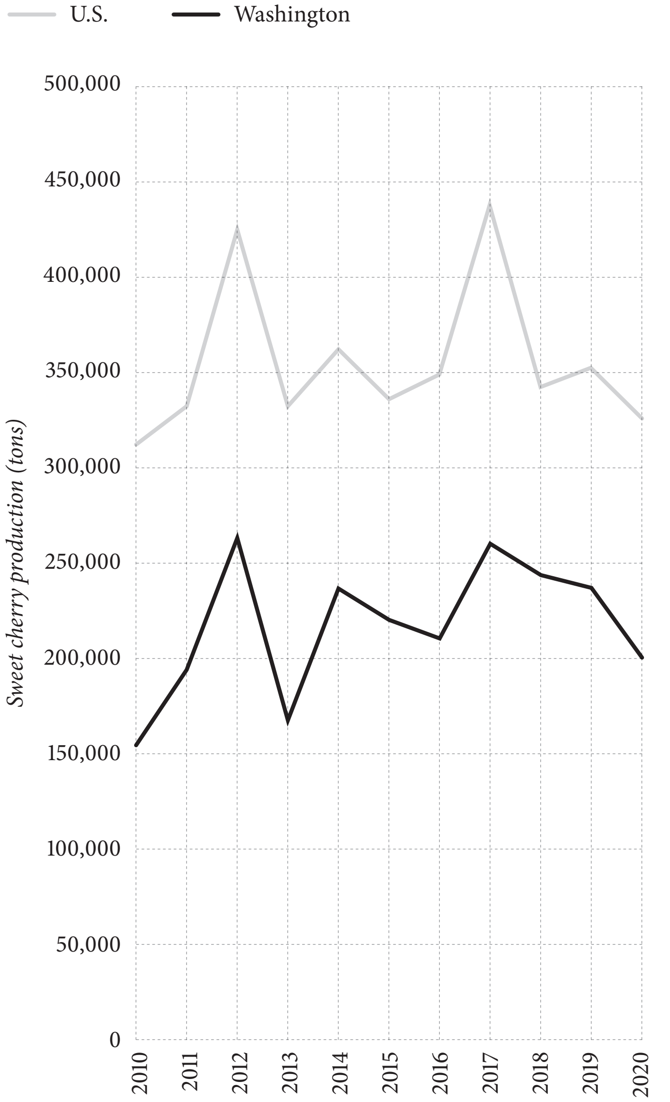
Cherries

In 2020, Washington State was the largest producer, in volume, of sweet cherries in the United States with 62 percent of total production. The Washington total sweet cherry production, in 2020, was at 202 thousand tons, 15 percent lower than 2019 production at 239 thousand tons. The Washington production volume in 2020 was higher than the 10-year average at 218.5 thousand tons and lower than the 2012 production peak at 264 thousand tons. Washington sweet cherry cultivated surface has seen a 18 percent increase during the last 10 years, from 34 thousand acres in 2010 to 40 thousand acres in 2020. During 2010–2020, the yield per acre increased 10 percent from 4.6 tons per acre in 2010 to 5.05 tons per acre in 2020. The Washington State yield per acre was above the United States average yield per acre at 3.82 tons per acre for 2020. That year, 81 percent of all Washington State sweet cherry production was destined for the fresh market. The sweet cherry FOB price received by Washington growers was $3,300/ton, above the average for the United States at $3,280/ton.

As of 2020, there were several varieties of sweet cherry grown in the Northwest (comprising the states of Washington, Oregon, Idaho, Utah, and Montana). Several varieties represent fifty nine percent of all the sweet cherries produced in the Northwest. Yet the highest in volumes continued to be Bing, with 10 percent of total production, and Sweethearts, with 9 percent of total production. These were followed by Skeenas, Rainier and Chelan (each with 6 percent) and Lapin with 3 percent of total sweet cherry production.

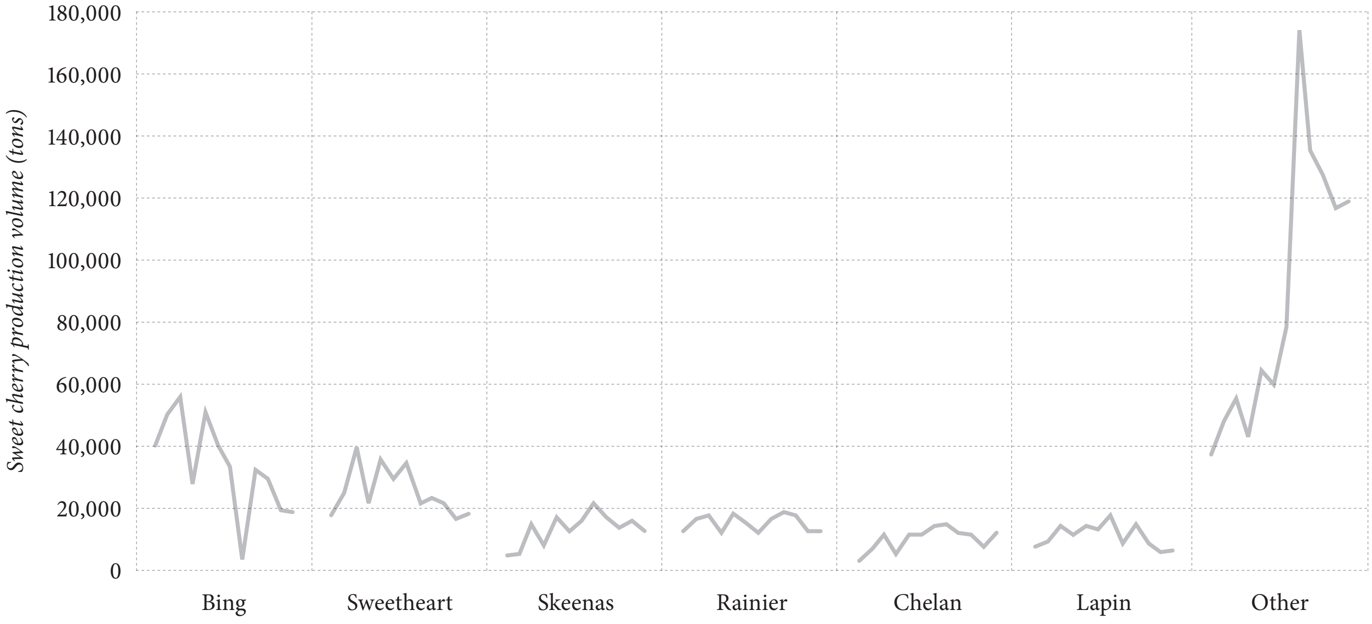
As of 2021, 29 percent of the total Northwest production of cherries was exported. The main destination was Canada with 35 percent of total volume exported, followed by China with 17 percent, Korea with 14 percent, Taiwan with 10 percent, Japan with 4 percent, Vietnam with 3 percent, and Hong Kong with 3 percent.

Figure 9: *Total Sweet Cherry Production, United States and Washington State, 2010–2020*



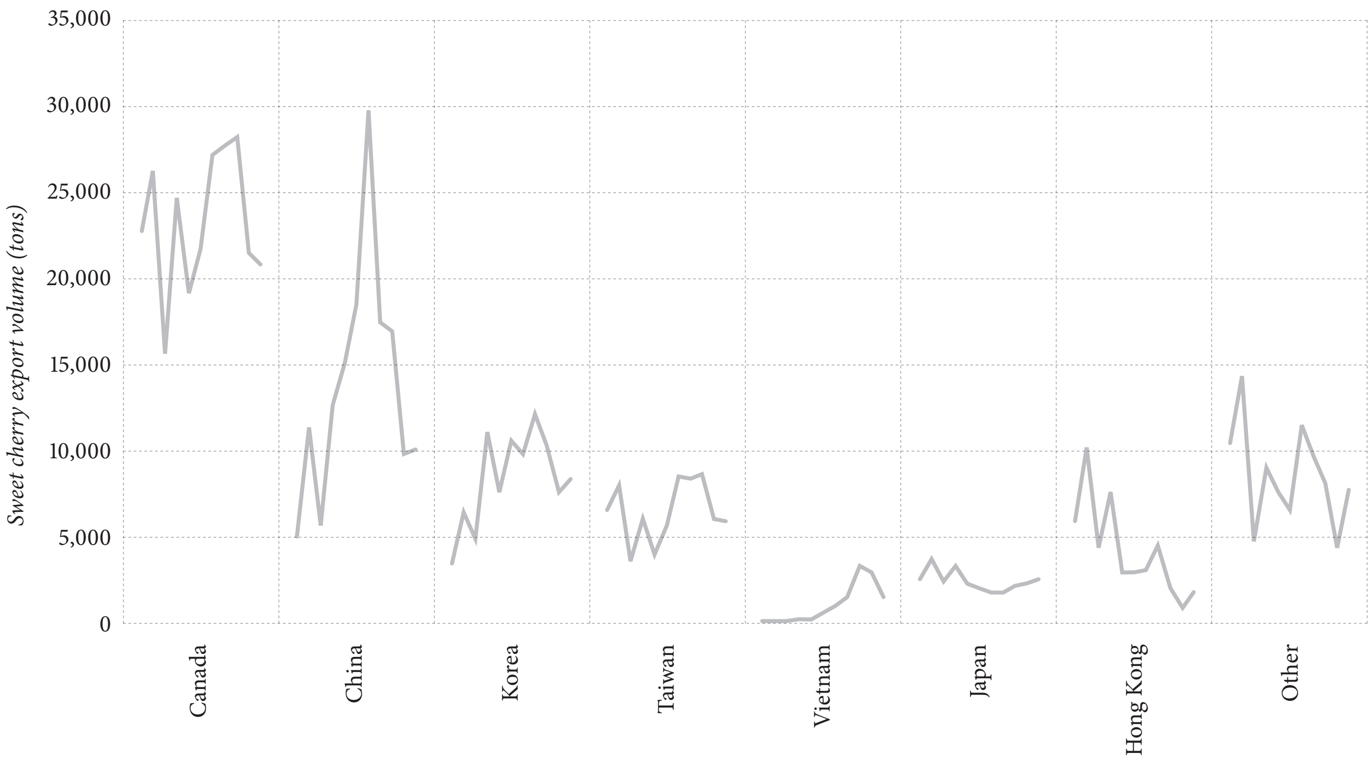
Source: United States Department of Agriculture, 2021

Figure 10: *Sweet Cherry Variety Mix Evolution from 2010–2021, Northwest States*



Source: Northwest Cherry Growers, 2021

Figure 11: *Northwest Sweet Cherry Exports Destination by Volume, from 2011–2021*



Source: Northwest Cherry Growers, 2021

Specialty Crops Situation and Outlook

Michael P. Brady (509) 335-0970

UNDER Section 101 of the Specialty Crops Competitiveness Act of 2004 (7 U.S.C. 1621 and section 10010 of the Agricultural Act of 2014, Public Law 113-79), specialty crops are "fruits and vegetables, tree nuts, dried fruits, horticulture, and nursery crops (including floriculture)." As is provided in more detail below, specialty crops play an outsized role in the agricultural economy, relative to their share of acreage. This is particularly true in what the USDA refers to was the "Fruitful Rim", which includes the Florida, Texas, and the West Coast from Arizona to Washington. Specialty crops also play a key role in making agriculture a more dynamic industry. Fresh market and direct sales provide opportunities for high margins that can make it possible for new entrants into farming at small scales to be financially feasible. This section provides an overview of trends in specialty crop production and markets. For more background on specialty crop production in general, see the 2014 publication of this report.

This section provides a detailed summary of prices and production of the major specialty crops in Washington State. The most recent year information available is 2020, and all information, except for wine grapes, is derived from USDA National Agriculture Statistics Service sources. Wine production and price trends are provided by the Washington State Wine Commission (www.washingtonwine.org). Previous year data for specialty crops is generally available in late-winter to early spring.

The Big Story for Specialty Crops in 2020

For specialty crops, the summer of 2020 was dominated by the challenges of COVID-19. Labor intensive harvesting and post-farm gate processing required navigating abrupt changes to worker density, masking, and infection outbreaks. It is difficult to capture this reality in aggregate production and price data, which is the focus of this report. In general, prices and production where in the range of what can be considered typical for most vegetables, wine grapes, and berries. Data are not yet available for the 2021 growing season that saw record setting heat and drought. After a pandemic and the extreme weather in 2020 and 2021, respectively, specialty crop producers in Washington are certainly hoping for a bit of return to normal in the 2022 growing season. There is reason for hope given that the current La Nina cycle makes a wet and cold winter—thus a larger snowpack—more likely.

Wine Grapes

The big story with wine grapes in 2020 was the countervailing effects of lower production and higher prices for reds. The result was that total revenue for Washington wine production was flat from 2019 at $250 million. White wine grape production has continued its multi-year drop in production from a peak in 2014 (Figure 2). White wine grape prices were also down in 2020, although this followed a significant jump from 2018 to 2019. Red production was down for all five of the most produced grapes (Figure 3). However, lower supply has meant higher prices (Figure 5). Given these dramatic shifts, and the challenges of extreme heat and smoke in the summer of 2021, there are a lot of questions going into 2022.

Figure 1: *Wine Grape Production and Price Trends*

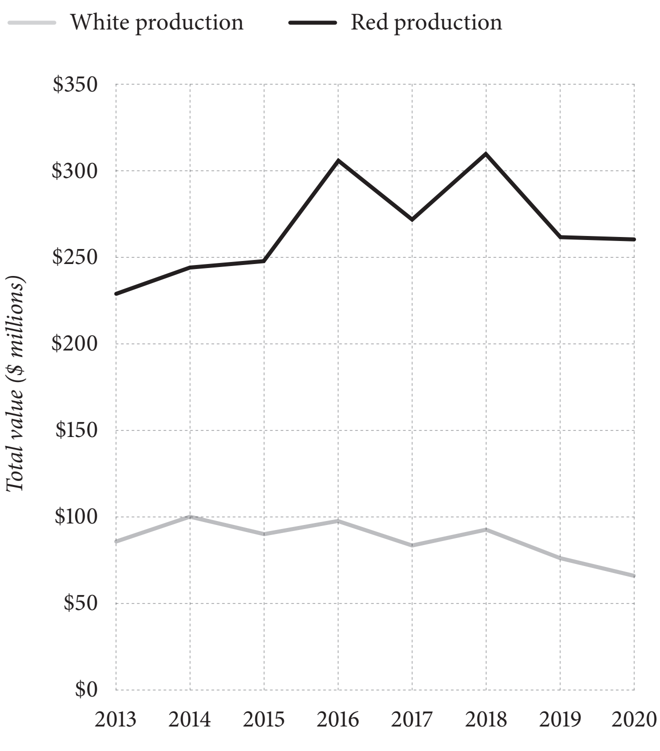


Figure 2: *White Wine Grape Production Trends*

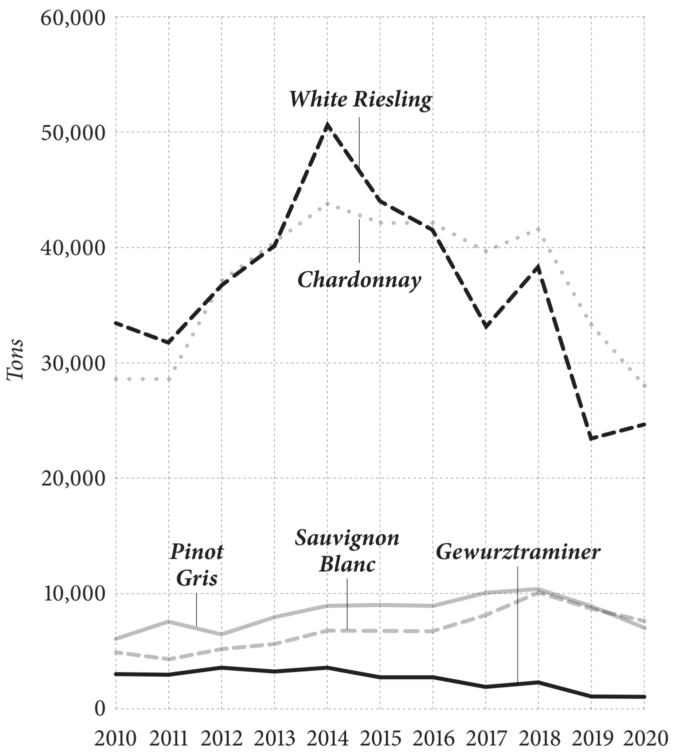


Figure 3: *Red Wine Grape Production Trends*

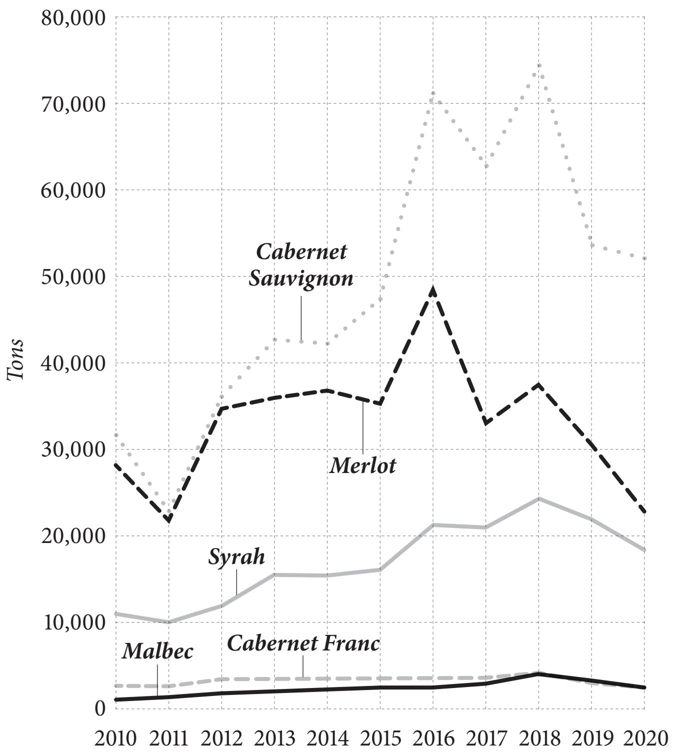


Figure 4: *White Wine Grape Price Trends*

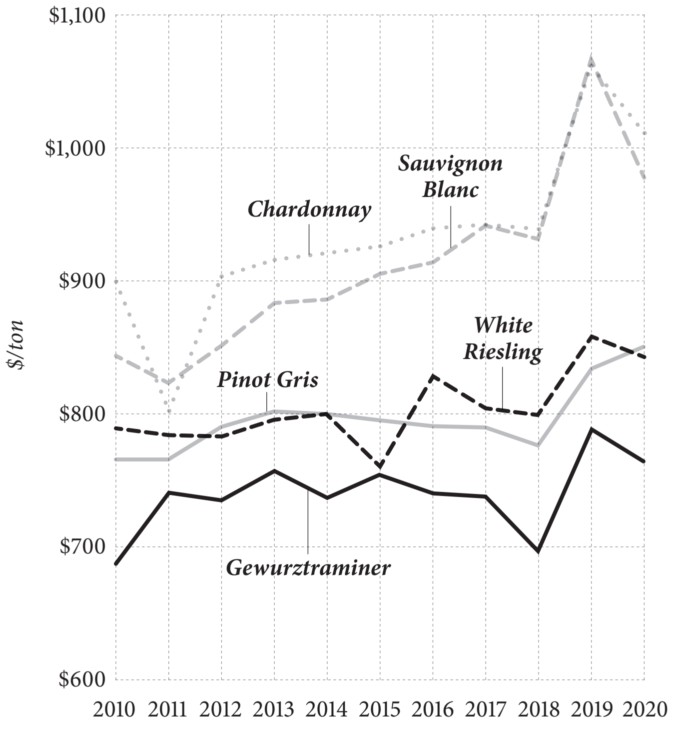
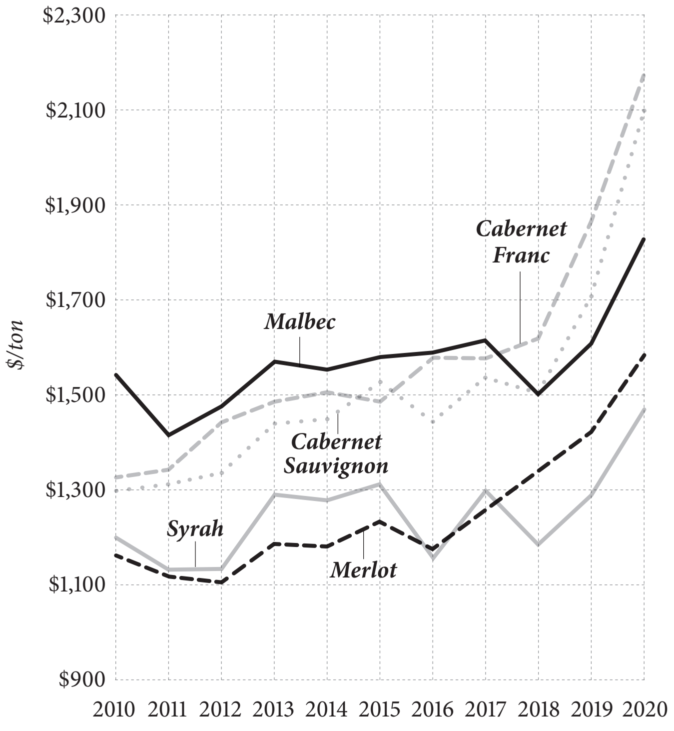


Figure 5: *Red Wine Grape Price Trends*



Vegetables

Table 1 reports production and Table 2, prices for major vegetables in Washington. Production of potatoes, asparagus, and onions were all close to longer run averages. Green pea production was up significantly at a five-year high, whereas sweet corn production was down. Green peas and sweet corn are often grown together. On the price side of the ledger, strong price growth for asparagus—a decade high by a wide margin—stands out. Potato prices were somewhat on the lower side of normal. Green pea prices were low, possibly because of the large size of the crop. Sweet corn prices in the fresh market were strong, whereas processing prices were at a ten-year low. Overall, these trends reflect relative strength and stability in vegetable markets.

Table 1: *Vegetable production*

Year	Asparagus (cwt)	Onions (cwt)	Green peas (cwt)	Potatoes (cwt)	Sweet corn, fresh (cwt)	Sweet corn, processing (tons)
2010	228,000			88,440,000		
2011	220,000			97,600,000		
2012	202,000			95,940,000		
2013	188,000			96,000,000		
2014	182,000			101,475,000	1,817,000	693,000
2015	167,000			100,300,000	3,441,000	722,000
2016	211,000	18,053,000	1,855,000	105,625,000	524,000	909,000
2017	232,200	15,894,000	1,528,100	99,220,000	808,000	734,000
2018	267,000	17,301,000	1,782,000	100,800,000	447,000	806,000
2019	226,000	14,328,000	1,906,000	104,960,000	630,000	756,000
2020	209,000	16,119,000	2,318,400	99,653,000	308,000	755,000

Table 2: *Vegetable prices*

Year	Asparagus (cwt)	Onions (cwt)	Green peas (cwt)	Potatoes (cwt)	Sweet corn, fresh (cwt)	Sweet corn, processing (tons)
2010	77.14			7.40	38.80	79.80
2011	78.90			7.90	41.00	109.04
2012	90.00			7.30	33.00	113.27
2013	95.06			8.25	37.00	121.49
2014	75.39			7.60	27.00	107.84
2015	93.32			7.70	6.30	105.65
2016	88.30	10.29	17.09	7.70	24.40	100.00
2017	101.40	8.15	15.63	6.92	35.50	90.00
2018	98.11	10.27	12.78	7.82	64.18	79.97
2019	93.99	12.60	15.82	8.90	34.20	85.00
2020	111.00	8.43	11.93	7.56	51.30	76.96

Berries

After years of explosive growth, the blueberry crop increased only 5 million pounds to 168 million pounds in 2020 from 2019. While production was only up modestly, prices jumped from $0.94/pound in 2019 to $1.29/pound in 2020, resulting in a forty-percent jump in the value of the Washington blueberry crop to $217 million. Blueberries remain one of the most dynamic and interesting segments of Washington agriculture.

Red raspberry production was flat, coming in just below 70 million pounds. The value of the raspberry crop continued its rebound that started in 2019 with a crop valued at over $62 million. For comparison, the 2018 crop was valued at $35 million. Price per pound jumped dramatically in 2020 to $0.91, which was close to double the 2019 price ($0.56/pound). This is still below the 2015 price of $1.22/pound in 2015. USDA did not report updated statistics for strawberries in 2020.

Hops

Hop production tends to go up and down in dramatic fashion, so it is somewhat surprising to see both production and value holding steady in 2020 compared to 2019. Production came in at 74 million pounds valued at $444 million. Comparable numbers for 2019 were 82 million pounds and $475 million. This marks a number of years in a row where the Washington hop crop has been valued in the $400-$500 million range.

Mint

Continuing a trend, mint production and prices were largely unchanged in 2020 from levels seen in 2019 and 2018. Production totaled 1 and 1.4 million pounds for peppermint and spearmint, respectively. The spearmint crop was valued at $24 million. The value of the peppermint crop was not reported by the USDA for disclosure reasons.

Beef Cattle Sector Review and Outlook

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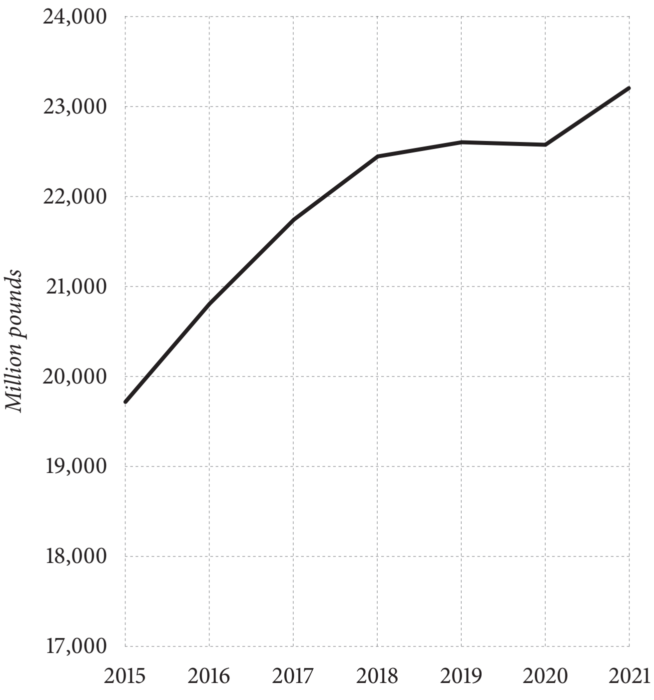
CATTLE slaughter production chain disruptions, starting in 2020 due to COVID-19, had effects that carried over throughout much of 2021. The fed cattle supply averaged 15 percent above operational slaughter capacity in 2020 and 2021. Despite the operating constraints, the commercial production of beef from feedlots and cull cattle through October set a record high (Figure 1). This record production coincided with high consumer demand from both domestic and export markets, resulting in record high domestic retail prices. Additionally, exports set a record high in total export value through October with two months left in the year. High meat retail prices have reportedly contributed to the high inflation we're experiencing, as even the White House has made statements on the high market concentration of meat packers (https://www.whitehouse.gov/briefing-room/blog/2021/09/08/addressing-concentration-in-the-meat-processing-industry-to-lower-food-prices-for-american-families/).

Figure 1: *Washington Beef Cattle Inventory (U.S. Commercial Beef Production, January to October)*



Source: Author created with USDA Quick Stats

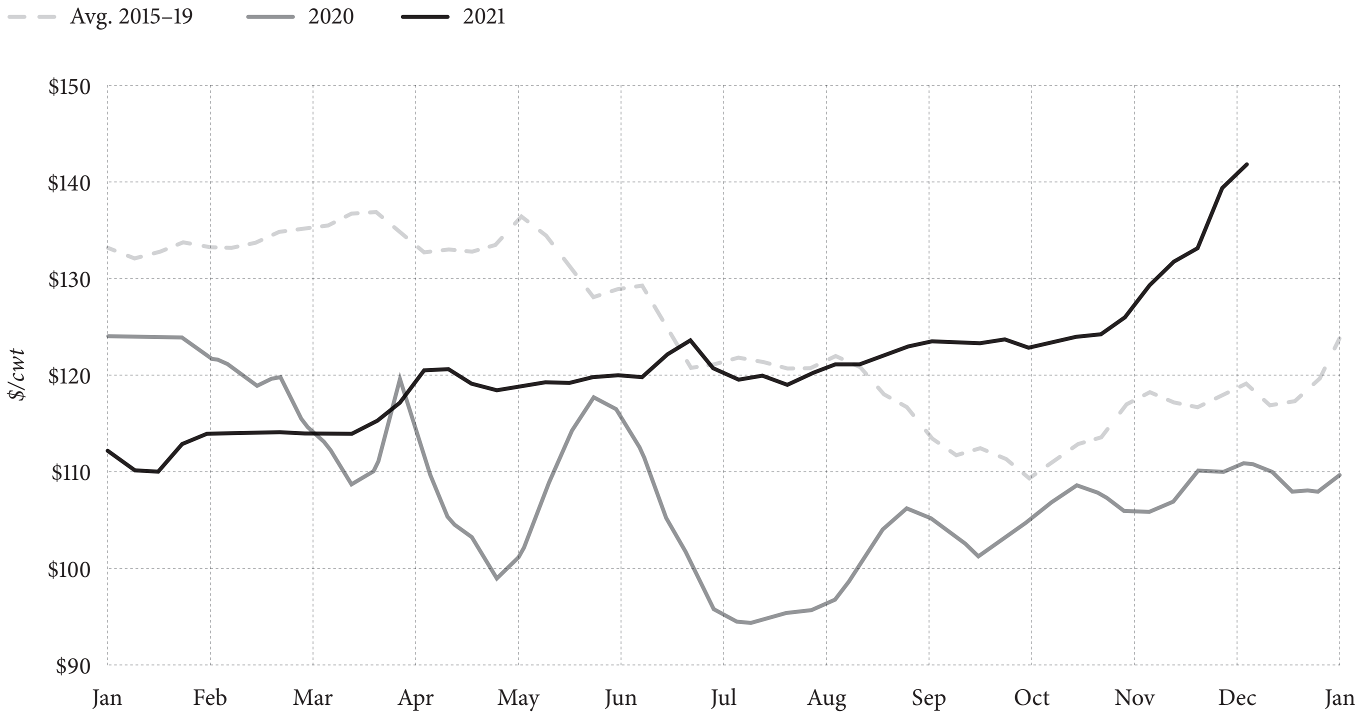
At tthe start of 2021, the beef market looked optimistic, with higher prices as consumers returned to work and recreation, bolstering beef demand in restaurants. The data on beef sales to restaurants is not available, however consumer demand for beef is reflected in another record set in 2021—the price spread between choice and select beef. The choice-select spread is a meat quality price premium, primarily recognized when consumers purchase steaks. The spread has an interesting seasonal pattern that increases in spring and summer, commonly referred to in beef market analysis as the summer grilling season. The choice-select spread hit record high in June, but has remained high throughout 2021.

Given tthe high prices in the consumer market, beef producers were hoping to see higher prices further up the production chain. This did not happen throughout most of the year. Figure 2 shows the prices for finished feedlot steers in the Sothern Plains, reflecting major cattle feeding in Texas and Kansas. Feedlot steer and heifer prices are not reported in Washington under mandatory livestock reporting rules.

Figure 2 iillustrates that 2021 prices started below 2020 prices, but started improving in the spring and rose above last year prices. The 2021 prices were below the 2015-2019 average until the fall, when a $17 per cwt price rally occurred. Comparing the finished feedlot steer price graph to the boxed beef cutout value—representing the carcass value price sold by the packers shown in Figure 3—we can evaluate market price transmission back through the production chain.

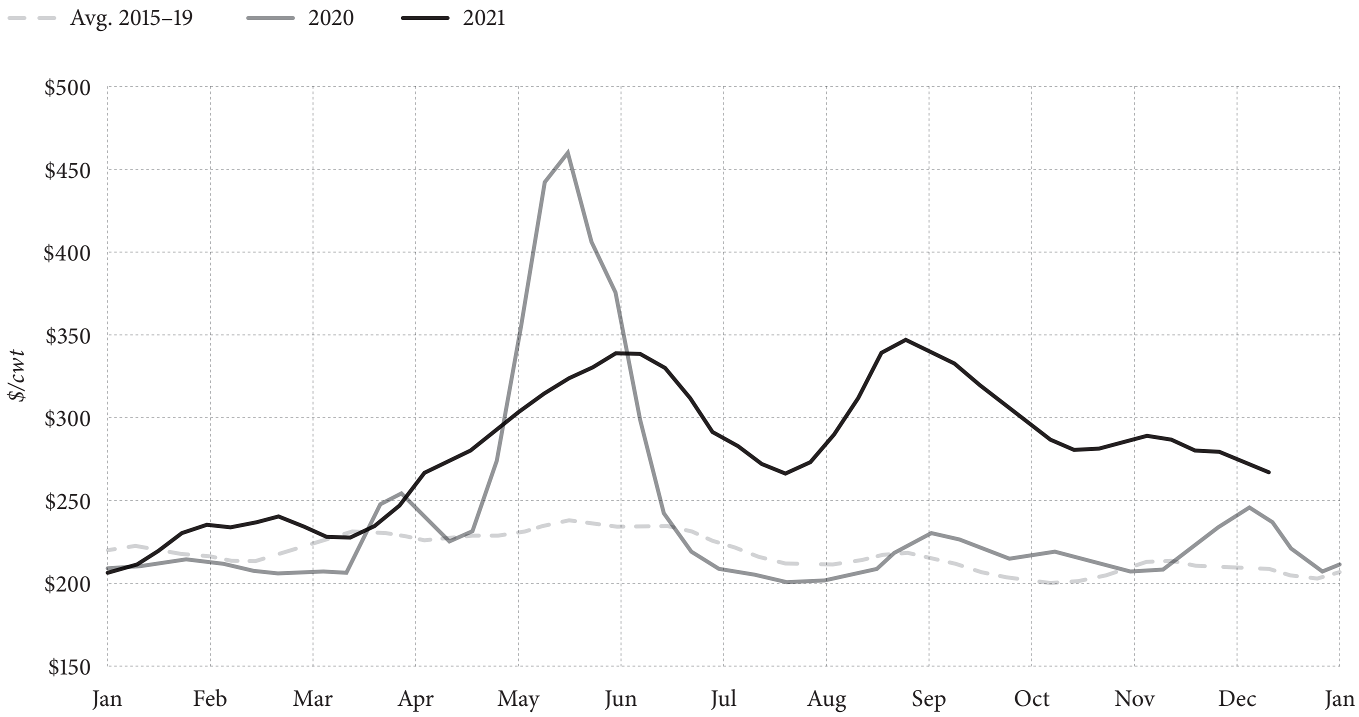
The spring 2020 price spike, due to COVID-19, in Figure 3 set a short-lived boxed beef record value at $459 per cwt. In comparison to feedlot steer price, there was some price improvement because of discounts given, due to the market uncertainty at the time, but feedlot prices remained below trend. In 2021, boxed beef value was above recent average price trends, and showed a grilling season price increase and a second summer price rally. Feedlot steer prices did not see an associated price increase, indicating that high boxed beef prices were not passed back through the production chain. In the fall, the feedlot steer price rally corresponds with boxed beef value decreases over the same time. Many factors affected the slaughter steer price

Figure 2: *Southern Plains Finished Feedlot Steer Price*



Source: LMIC.info

Figure 3: *U.S. Boxed Beef Cutout Value per cwt*



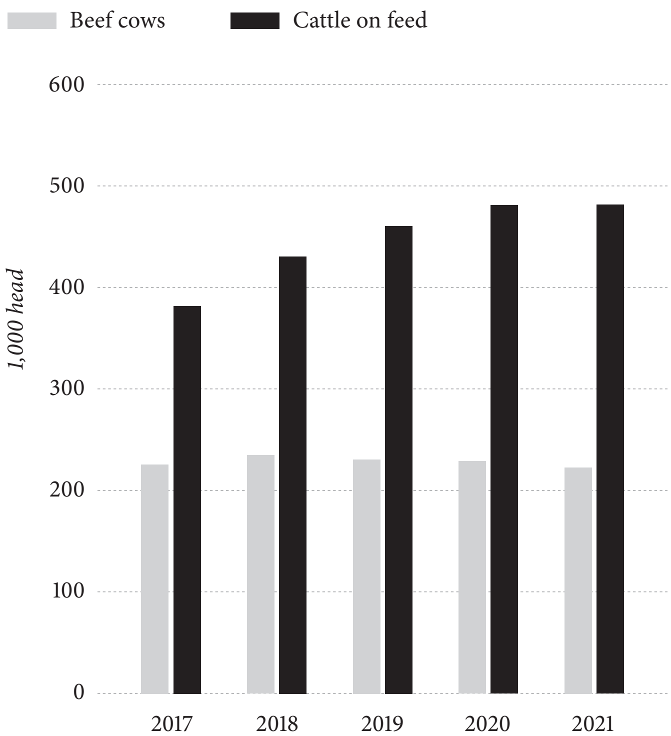
Source: LMIC.info

rally: the packing plants worked through the backlog of feedlot cattle inventory to move toward a normal balance of finished feedlot inventory to packing capacity, as well as increasing negotiated purchases—often referred to as the "spot" or "cash" market, where the price is determined through buyer and seller interaction on the day of sale.

U.S. and PNW Beef Production Review

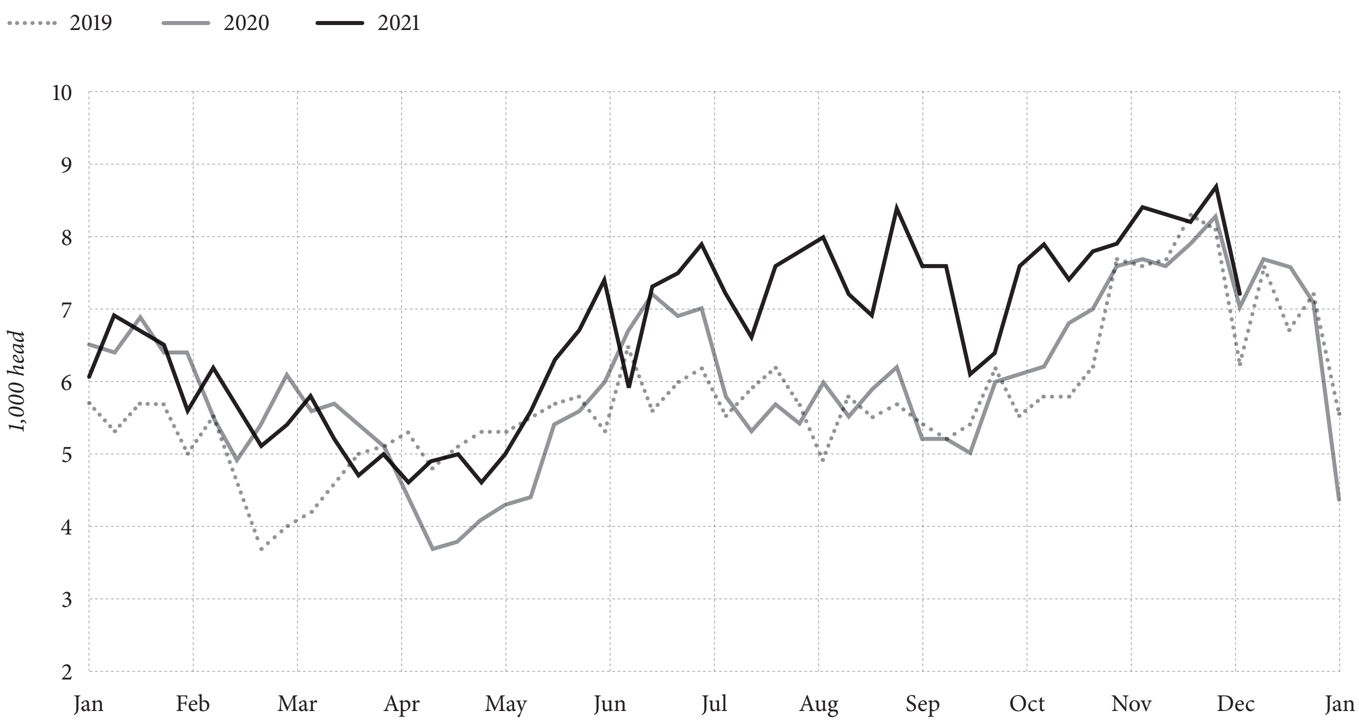
Cattle producers were negatively impacted by the 2021 drought that was widespread across the west. Cattle producers most affected by drought are cow-calf producers that rely heavily on rainfall dependent grazing resources and low-cost hay as a primary winter feed. When grazing resources must be supplemented with hay, that has strong negative profitability implications. Drought has increased hay prices by 40-50% in 2021 compared to 2020. A common drought management plan is to wean and cull early, culling more than normal to reduce the herd size. As drought, market volatility and low profitability challenged producers over the past 24 months, the industry is liquidating the beef cowherd, expected to decline 400,000 head in 2021. Figure 4 shows beef cow slaughter rates in the PNW. Data are reported by region, so it is not possible to isolate Washington (although Alaska's cow herd is small, and it

Figure 5: *Washington Beef Cattle Inventory*



Source: Author created with USDA Quick Stats

Figure 4: *Washington Beef Cattle Inventory (Weekly Slaughter in WA, OR, ID and AK)*



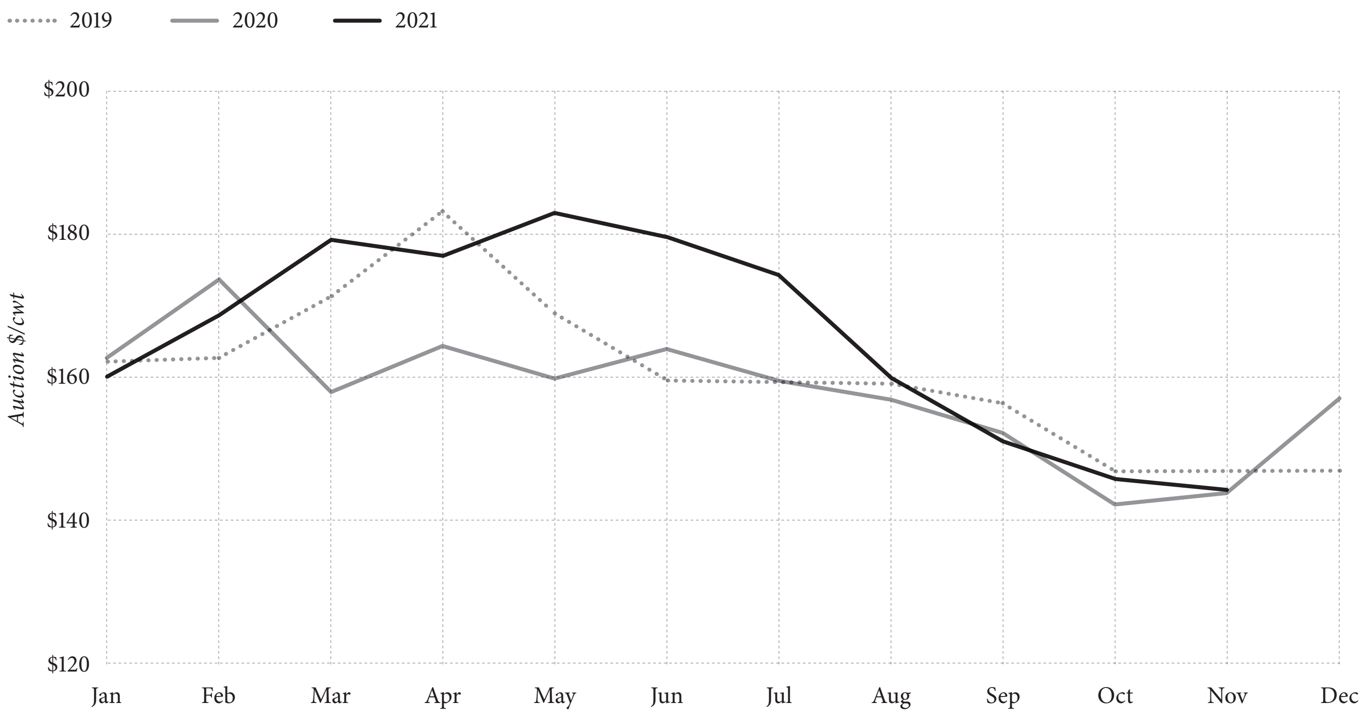
Source: Author created with USDA NASS Livestock Slaughter Report will not strongly impact the regional data). Figure 4 shows that the drought increased the culling rate, lowering future calf production. The total number of beef cows slaughtered in the PNW region was 299,000 in 2019, 312,000 in 2020 and, through November, was 320,000 in 2021.

Beef cow inventory statistics are reported annually based on a January 1 date. Washington's beef cattle inventory is presented in Figure 5. Data indicate that the expansion in U.S. beef cow inventory has ceased, and that cow herd liquidation has started. Washington mirrors this trend with its cow herd, at 235,000 head in 2018, decreasing to 221,000 head at the start of 2021. The projected feedlot inventory shows no change from 2020, at an estimated 480,000 head fed in 2021. The cattle on feed number estimates the annual number of feedlot cattle marketed, by taking the January 1 USDA cattle on feed inventory by state and multiplying by 2, reflecting a typical 180 day feeding period with an inventory turnover of two.

Price Trend

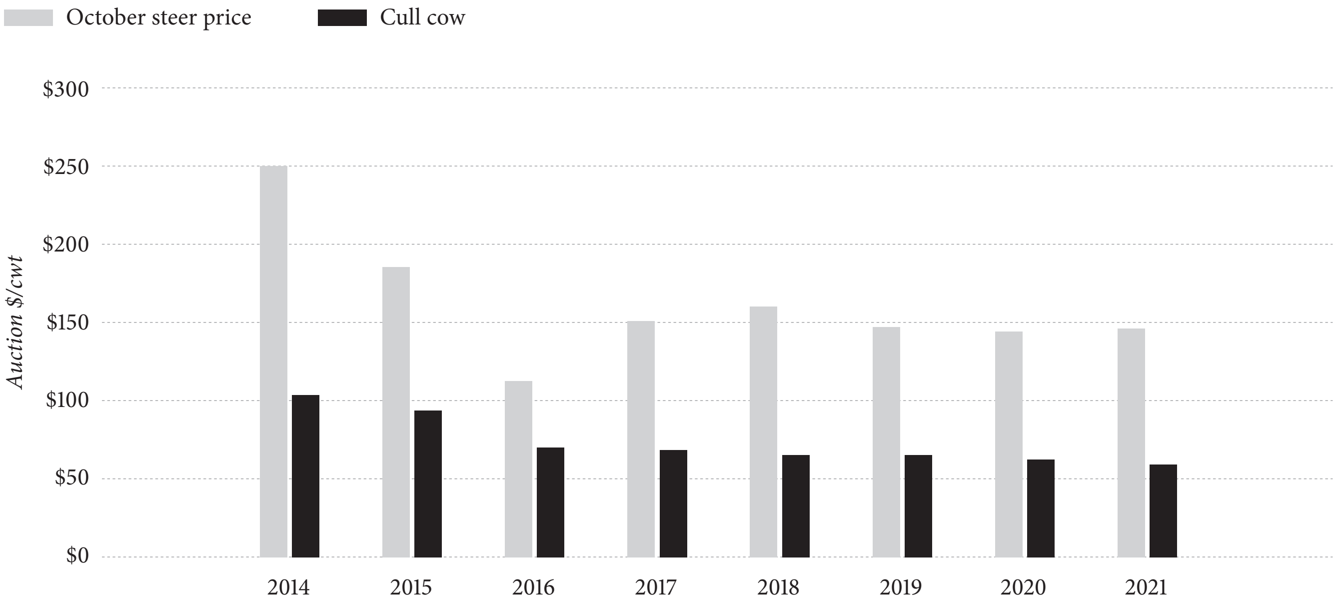
Washington auction prices, for calves sold during 2021, saw a spring and summer price rally, before prices fell in August through fall. Figure 6 shows monthly auction prices for steers weighing 500 to 600 pounds (the typical sale weight for cow-calf producers). Over 80% of Washington calves are born in the spring and weaned and sold in the fall, so the majority of producers were not able to sell at the higher spring and summer prices, and forward contracts priced for fall delivery. For weaned calves, October is the primary marketing month for the majority of Washington cow-calf producers. The October steer price is isolated and shown in Figure 7. The October 2021 price at $146 per cwt is remarkedly close to prices in 2020 and 2019, at $144 and $147 respectively. At the start of 2021, futures market contract prices for October feeder cattle were about $15 higher than actual October prices, indicating there was a potential for risk management using futures contracts or the USDA Livestock Risk Protection (LRP) program. In January 2020, the premium cost to enroll in the price protection ranged from $4.00 to $$8.00 per cwt. Premiums are higher in January, reflecting the longer time risk associated with LRP price protection program early in the year. Of interest is looking forward to marketing calves in 2022. The LRP program expected end value, for feeder cattle weighing less than 600 pounds, for October 2022 price protection, is $197 per cwt at premium costs ranging from $4.00 to $11.00 per cwt, depending on coverage level. The 2022 expected end value of $197 compares to the 2021

Figure 6: *Washington Monthly Steer Price (500–600 lb)*



Source: Author using USDA/AMS – Weekly Combined Cattle Report – ML_LS795

Figure 7: *Washington October Steer and Cull Cow Prices*



Source: Author USDA/AMS – Weekly Combined Cattle Report – ML_LS795

expected October end value of $172 per cwt, illustrating expected market improvement of about $25 per cwt, or about a 15% gain, in price for 2022.

Cull cows are a significant source of revenue for cattle producers and typically represent 15-20% of total revenue. Cull cow price (Figure 7) has been relatively stable compared to recent years, but has shown a declining trend. Cull cow prices declined to $58 per cwt in 2021, reflecting the higher supply of cull cows due to the 2021 drought.

Summary Review and 2022 Outlook

Cattle producers market optimism for improved feedlot and weaned calf prices in 2021 was not realized, due to market conditions that allowed the packers to retain much of the COVID-19 recovery market gains. The outlook for 2022 is again optimistic for cattle producers, as packer market leverage created by production chain disruptions have dissipated. The end of year rally in finished feedlot steer prices illustrates the shift in market leverage from the packers to the feeders. High corn prices also reduced the price feedlots could pay to calf producers in 2021 in order to maintain feedlot profit margins. Presently, reports on growing conditions in South America are good, and if 2022 U.S. growing conditions are near normal, the corn price should decline, supporting optimism for higher cattle prices. The higher cull cow slaughter rates will reduce cow inventory and lower the supply of calves, further supporting improved prices in 2022. New packing plants and expansion of existing facilities is expected to increase cattle slaughter capacity in the U.S. by 25,000 head per week, adding further support for improved economics for the cattle production industry.

In 2021 the cattle industry was shocked to learn of the Easterday Ranches bankruptcy. The ranch/feedlot filed bankruptcy in February, after the Tyson Fresh Meats company filed suit for fraud with damages of $225 million dollars. Easterday Ranches billed the company for 200,000 head of non-existent cattle, to cover over $200 million in commodity trading losses between 2011 and 2019. It is a common practice in the industry to have cattle partnership/ownership agreements between feedlots and packers, referred to in the industry as captive supply. One aspect of the fall price rally in finished steers was lower captive supply and more negotiated trade (cash spot market) purchases. The Easterday Ranches fraud, although large, did not significantly impact Tyson's stock market price, or Washington cattle prices. The Easterday Ranches feedlot has been purchased by Agri Beef, which allows the feedlot to remain in operation to maintain Washington's cattle feeding inventory and economic contribution.

Dairy Sector Review and Outlook

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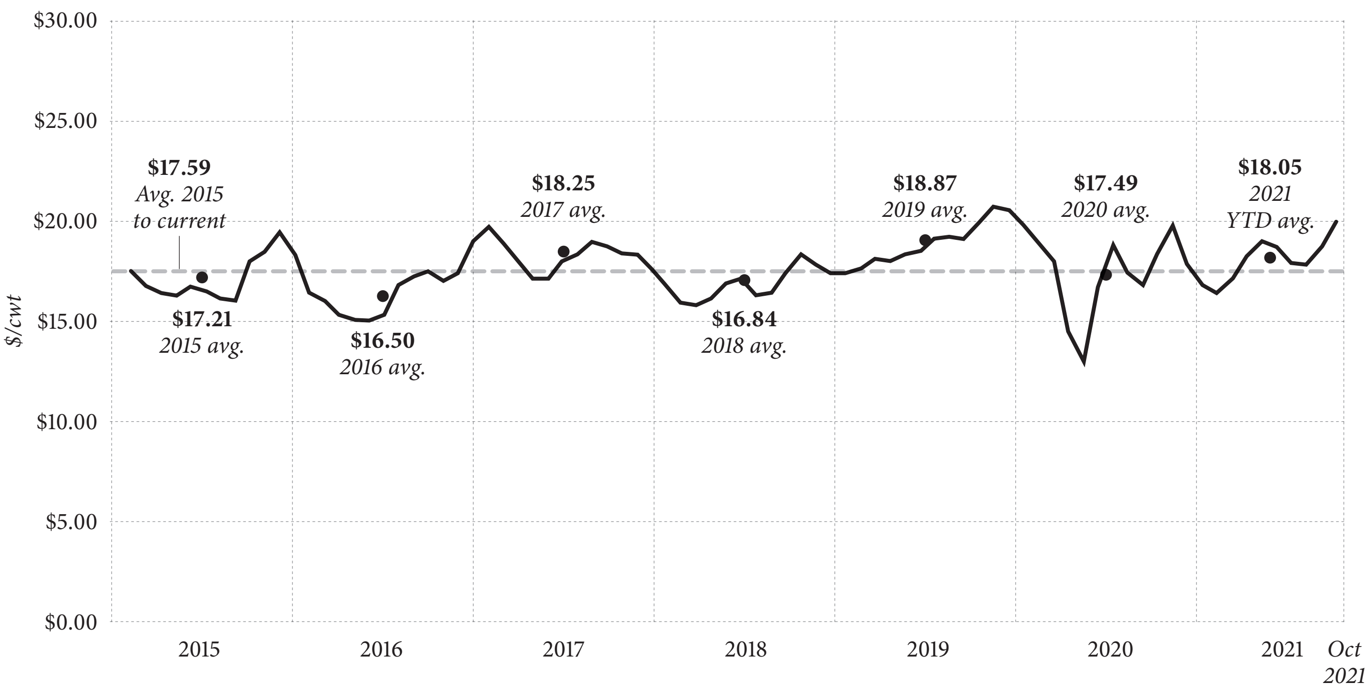
IN 2020, the COVID-19 pandemic significantly impacted the dairy market mostly negatively, with low prices and disruptions in the dairy supply chain of commercial food production. Many hoped for a recovery of the market in 2021, but Washington's dairy industry faced increasing profitability challenges: volatile milk prices, higher labor and feed costs, and drought conditions affecting milk production.

Washington Milk Price, Production and Cow Inventory

Many of the logistical challenges in the 2020 dairy market negatively affected the supply chain in 2021, due to the slow recovery from the pandemic of the HRI (hotel, restaurant, institutional) sectors. Analysis of the pandemic's effects on employment show that significant labor shortages have developed in the leisure and hospitality sectors of the economy. As the ripple effects of the pandemic continue, what economic "normal" looks like will likely be different than what we've seen in the past. The monthly, Washington milk prices—received from 2015 to October 2021—are presented in Figure 1. The initial disruption from the pandemic is evident in the significant drop in spring 2020 milk prices that fell to a low of $13 per cwt in May. Milk prices improved through 2021, reaching $19.9 per cwt in October. Milk prices in 2021 through October averaged $18.05 per cwt— the third highest since 2015. The improvement in milk prices coincides with record high dairy exports through 2021, with gains in most major markets and increasing exports of milk powders and cheese.

Negative producer price differentials in the pricing formula of the Federal Milk Marketing Order (FMMO) significantly impacted milk price..The FMMO system provides a regulated structure for determining milk price, as well as

Figure 1: *Washington Monthly Milk Price*



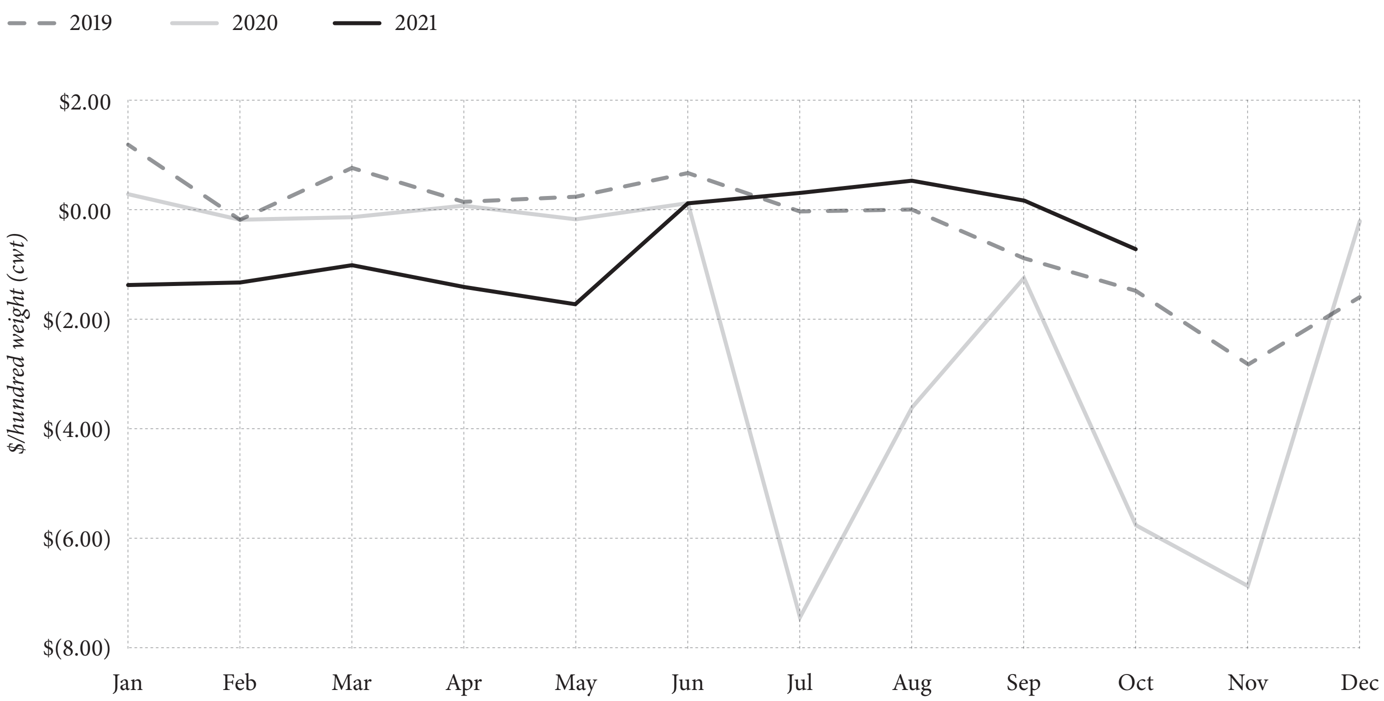
Source: Author using USDA Quick Stats

equitable distribution of proceeds to dairy farmers, doing so by paying all dairy farmers within the geographically defined FMMO the same blend price for milk. The FMMO calculates the blended milk price through formulas based on the assumption that Class 1 milk for fluid use has the highest price. When other milk classes, such as Class III milk used for cheese, have higher prices than Class 1, the producer price differential (called PPDs) becomes negative. The PPDs for 2019 through October 2021 are present in Figure 2.

Each of the three years presented have months when the PPD was negative. Due to COVID-19, marketing impacts in 2020 that resulted in high Class III (cheese) prices generated negative PPDs as low as -$7.43 and -$6.88 in July and November respectively. The start of 2021, from January through May, had negative PPDs of about -$2.00 per hundred weight. Negative PPDs are not an issue in themselves, as the blended milk price formula that determines what farmers are paid will include the higher Class III prices in the calculation. However, therecould be a potential negative impact on producers if high priced Class III milk is de-pooled from the FMMO. Based on the assumption that Class I is the highest priced milk class, FMMO regulations only require Class I milk be pooled. When cheese or Class III prices are greater than Class 1, cheese plant manufacturers can make a management decision to de-pool their milk purchases from the FMMO; this could benefit dairy farmers delivering to that plant if the farmers are paid the higher Class III price, rather than the FMMO blended price. However, the other dairy farmers in the FMMO are disadvantaged with lower blend prices due to the decision to de-pool Class III milk. There is no evidence or data to suggest that de-pooling is an issue in the Pacific Northwest FMMO, but public information is not available on the volume of de-pooled milk. Negative PPDs and de-pooling is a contentious issue across the country, and 2022 could see the policy debated of whether to revise FMMO regulations concerning optional de-pooling.

The gains in 2021 milk price were offset by lower production, due to summer heat stress and a drop in cow numbers. Figure 3 presents Washington monthly milk production. The decrease in milk supply helped support milk prices, however the decline in Washington's milk production indicates stronger industry contraction when compared to other states. For the data available through October 2021, Washington's milk production decreased about 4.2%, while

Figure 2: *Washington Monthly Milk Price*



Source: Author using Pacific Northwest FMMO Data https://fmmaseattle.com/

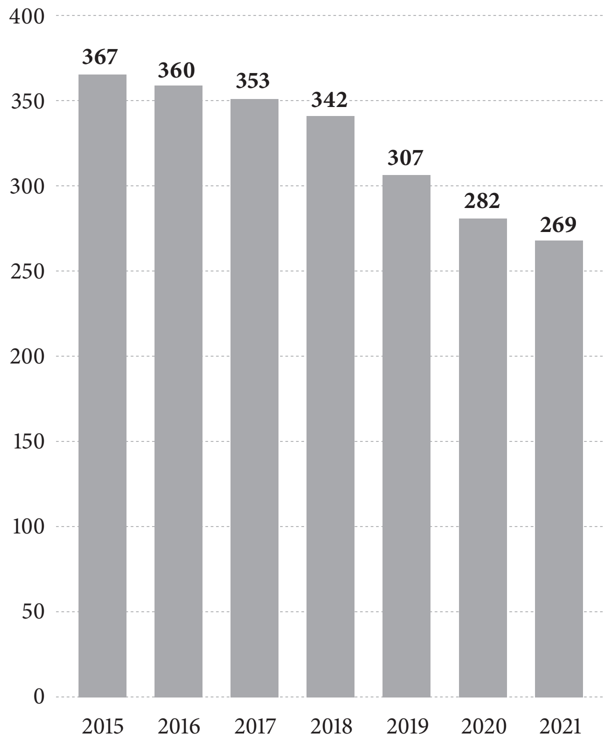
California and Idaho's milk production increased about 1% compared to 2020 over the same months.

Washington's decrease in production is the result of a drop in cow productivity from heat stress and declining numbers of both dairy cows and dairy farms. From June through September, milk produced per cow decreased about 3% in 2021 compared to 2020 in Washington. Dairy cow inventory is also a primary driver of production and economic contribution. Washington's dairy cow inventory has decreased from a high of 282,000 dairy cows in 2019 to 264,000 as of October 2021 (a contraction of about 6%), practically erasing years of slow dairy herd inventory growth since 2013. The decline was the result of culling decisions: farmers evaluated drought conditions that were lowering feed yields, as well as increasing the cost of feed and labor due to low availability. The declines in inventory coincide to a decline in the number of dairy farms in Washington. The number of Washington dairy farms dropped from 367 in 2015 to 269 as of September in 2021, a 27% decrease from 2015 (see Figure 4).

Profitability and Risk Management

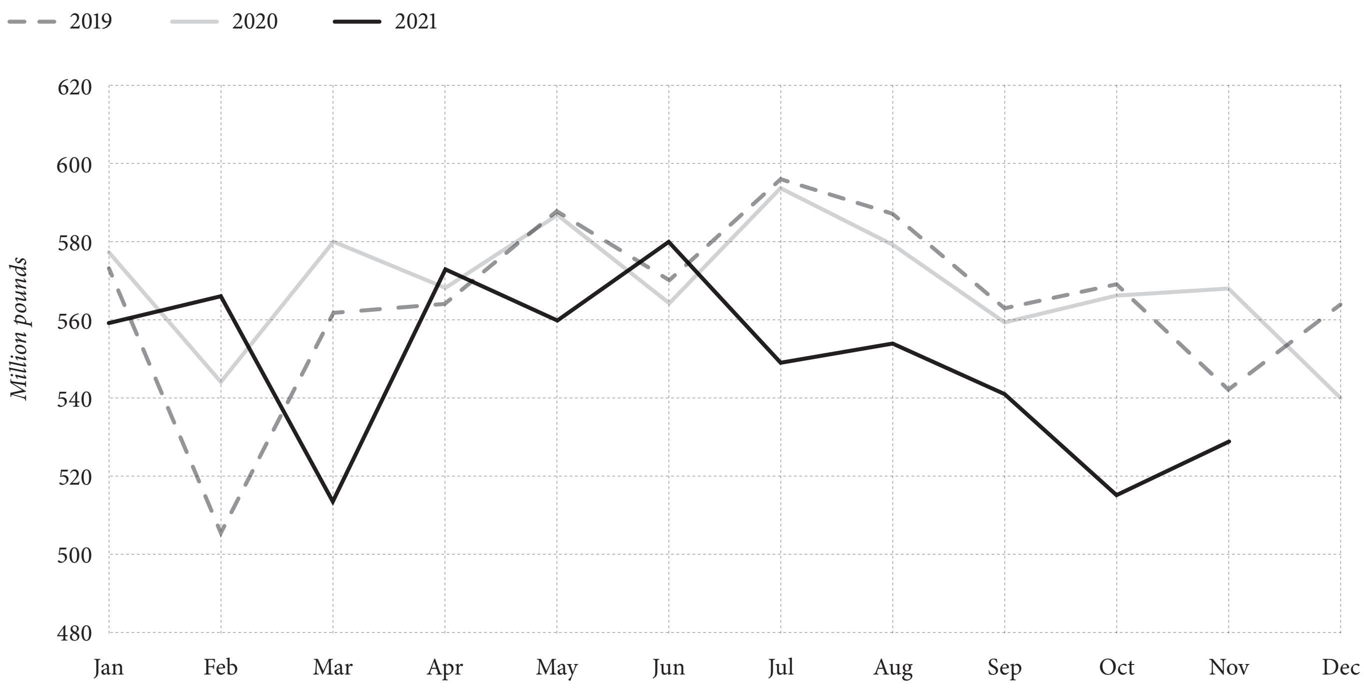
Although milk prices improved slightly in 2021, dairy profitability margins slimmed as feed and production costs rose. The Dairy Margin Coverage (DMC) program is a risk

Figure 4: *The Number of Washington Dairy Producers*



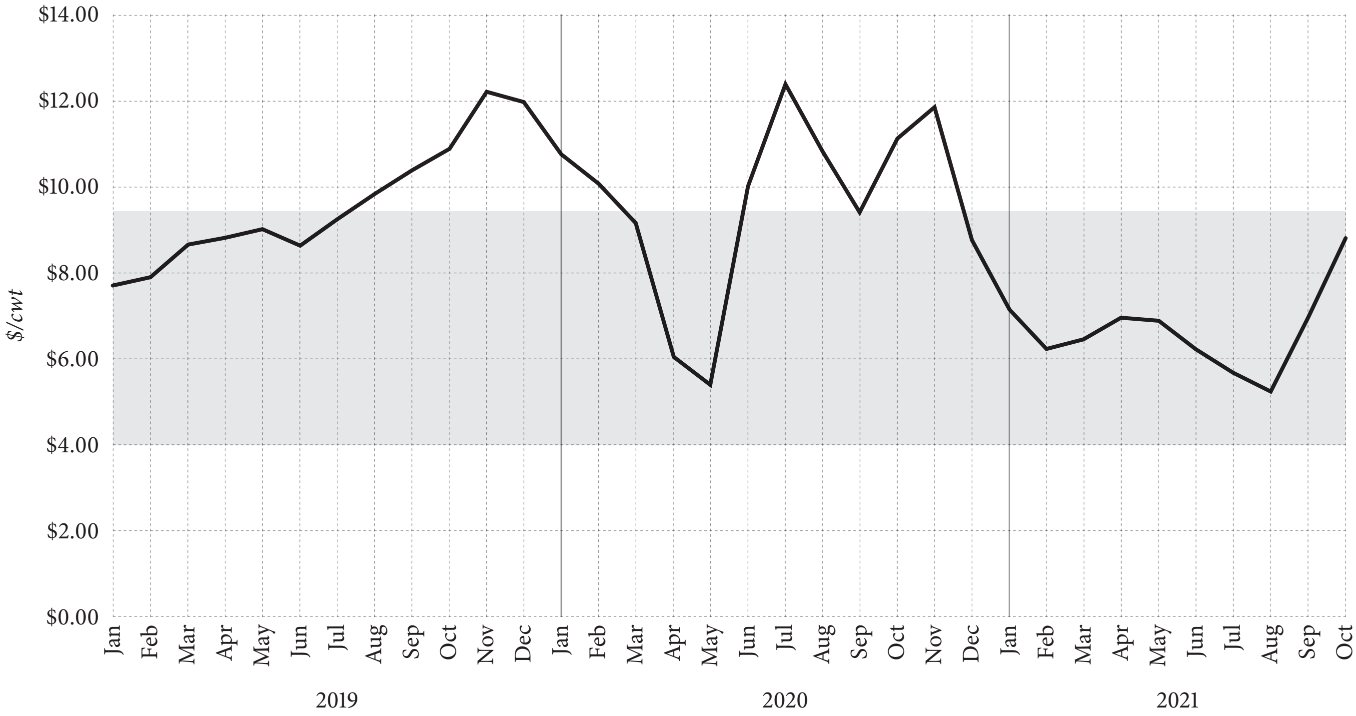
Source: Authors graph using Pacific Northwest Federal Milk Marketing Order, 2021. https://fmmaseattle.com/statistics/stats/StatsPNW2020.pdf

Figure 3: *Washington Monthly Milk Production*



Source: Author using USDA Quick Stats data

Figure 5: *Dairy Margin Coverage Program Margins, 2019 to October 2021*



Source: Author complied using data from https://www.fsa.usda.gov/programs-and-services/dairy-margin-coverage-program/index#accordion-col-8

management tool that dairies use to offset low margins; it indicates the extent of low margins being experienced in the dairy industry. Figure 4 presents the DMC program calculated margins. The DMC program allows dairy farmers to elect coverage between margins of $4.00 to $9.50 under the Tier I level of production. Figure 4 shows that DMC margins have been below $9.50 for each month since December 2020 through 2021, reflecting the ongoing profit challenge dairies are facing. DMC enrollment is high in Washington: program payments in 2021, through August, amounted to around $16 million to Washington dairy producers. Unfortunately, the DMC program only effectively covers the first 5,000,000 pounds, or about 230 cows' worth, of production on a farm. Production above this must pay higher premium costs on the higher production levels. Given Washington's average herd size is about 980 cows, the majority of a dairy's financial risk is not covered under the DMC.

To help larger producers, the 2018 Farm Bill also developed the Dairy Revenue Protection (DRP): a risk management tool as part of the crop insurance program. DRP is designed using milk futures contract prices. This program has not been widely used across the country—in Washington, only seventy-three polcies were sold in 2020, and only seventy-eight in 2021. So far in 2021, because the program design is based on futures market price volatility, only about $4 million has been paid for DRP indemnity payments, compared with close to the $11 million producers paid in 2021 DRP premiums. Ultimately, most Washington dairy producers have to self-manage financial risk with farm debt and equity. In 2019 and 2020, dairy producer financial risk was offset by direct government payments from the Market Facilitation Program and Coronavirus Food Assistance Program payments. iThere were no direct government payments in 2021.

World Supply and Exports

The dairy market has become increasingly dependent on exports. U.S. dairy exports have grown from about 5% of total U.S. production to about 16% of production in 2021. 2021 saw thethe highest volume of dairy exports ever recorded. By volume, Southeast Asia and Mexico are our largest trading partners, followed by China. Year to date dairy exports to Southeast Asia are essentially the same as in 2020. Dairy exports to Mexico in 2020 fell about 16% due to COVID-19, but have regained sharply in 2021 to levels similar to 2019. China has been the destination for increases in dairy exports, with a 51% increase in the volume of exports to China in 2021 compared to 2020. China is the world's second leading importer of dairy products, representing substantial opportunity to gain market share.

Dairy Outlook for 2022

The volatility that dairy markets have experienced over the last several years will continue in 2022, as the economy recovers from the COVID-19 pandemic. The interaction between milk production and domestic and international demand for dairy products is highly competitive, creating greater price volatility. Higher prices do not necessarily result in higher profits. Low dairy profit margins are likely to continue through most of 2022. Price inflation on feed, labor, and machinery are likely to outpace milk price gains, keeping profit margins low. High feed costs are largely locked in until the 2022 crop harvests. The increase in labor cost is compounded by shortages in labor availability that are challenging many economic sectors such as health care, restaurant trade, trucking and construction. While COVID-19 shocked the economy, exposing labor problems, labor availability is likely to remain a challenge for years to come, coupled with increasing wage rates as Washington implements new labor overtime rules and maintains its high minimum wage.

The record volume of dairy exports has been an important factor in milk price improvement seen in 2021. The U.S. keeps setting year over year record growth in exports like we saw in 2021. To improve 2022 milk prices, the rate of export growth needs to continue. China's demand remains critical to the outlook for U.S. milk powder exports. Challenges to export value include the ongoing gains in the strength of the dollar at the end of 2021, which will likely hold through 2022 due to pressure on interest rates. As exchange rates increase, milk price will likely be depressed to maintain export volume.

Potato Situation and Outlook

Bruce M. Huffaker (208) 617-5172

The USDA's November crop production report shows that Washington growers produced 93.308 million cwt of potatoes in 2021—the state's smallest potato crop since 2010. It is down 6.4% from 2020 production despite a 5,000 acre increase for a total of 160,000 in the 2021 planted area. Extreme heat during June and July suppressed yields and created quality problems for the potato crop. The losses have created challenges for growers, processors, and other potato handlers.

Potatoes rank first or second among Washington field crops in terms of value. The USDA estimated the farmgate value of Washington's 2019 potato crop at $934.1 million before falling to $753.4 million for the 2020 crop, in contrast to the wheat crop which jumped from $792.5 million to $948.6 million The 2020 decline in potato crop was the result of both reduced production and lower prices. The state's processors reduced contract volumes due to the uncertainty in markets for finished products created by the COVID-19 pandemic. Although both contract volumes and potato acreage increased in 2021, the summer heat reduced the yield on this year's potato crop by 60 cwt per acre, amounting to 585 cwt per acre—the state's lowest yield per acre since 2006. Since the bulk of Washington potatoes are produced under contract, higher prices for open-market potatoes are not likely to offset reduced yields for the 2021 potato crop.

The state's processing industry magnifies the economic impact of Washington potato production. Washington Potato Commission data indicate that over 80% of the potatoes grown in the state are sold to processors. They are transformed into french fries and other frozen products, dehydrated products, and potato chips. Roughly 10% of the crop is marketed as table potatoes. The remaining percentage includes seed potatoes, shrinkage, and other sales not reported.

French Fries aand other frozen products constitute the largest portion of Washington's value-added industry. Though data on the total value of those sales are not available, we know that the Seattle port district exported $954 million worth of frozen potato products during 2019 and $739 million during 2020 (that downturn relating to COVID-19).

Table 1: *Washington Potato Production and Disposition*

Crop	Harvested (1,000 acres)	Yield (cwt/acre)	Production (1,000 cwt)	Fresh (1,000 cwt)	Process (1,000 cwt)	Other (1,000 cwt)
2010	134.0	660	88,440	10,647	74,003	3,790
2011	160.0	610	97,600	10,848	75,994	10,758
2012	164.0	585	95,940	10,157	79,924	5,859
2013	160.0	600	96,000	10,282	72,342	13,376
2014	165.0	615	101,475	10,093	78,823	12,559
2015	170.0	590	100,300	9,113	76,550	14,637
2016	169.0	625	105,625	10,833	80,492	14,299
2017	164.0	605	99,220	10,579	78,468	10,172
2018	160.0	630	100,800	9,687	85,553	5,559
2019	164.0	640	104,960	11,615	84,303	9,042
2020	154.5	645	99,653	9,420	81,822	8,411
2021	159.5	585	93,308	-	-	-

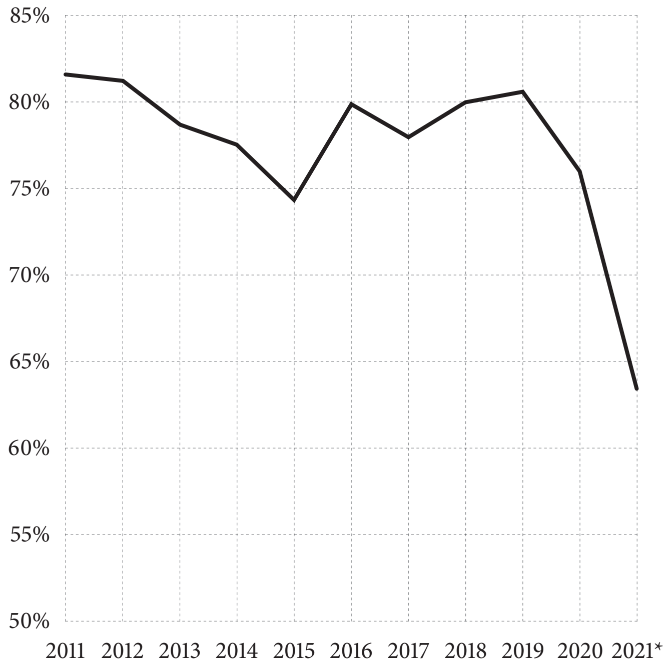
Sources: Production – USDA; Disposition – Washington Potato Commission

During the first nine months of 2021, frozen potato exports through the Seattle Port District totaled $534 million, up 7.7% from the same period in 2020. The port data do not cover sales of product consumed domestically, or product exported to either Mexico or Canada by truck or rail.

Historically, the Seattle Port District1 has shipped between 75%-80% of all US, frozen, potato product exports. However, that percentage dropped to 64% during the first nine months of 2021. The downturn is due to the combination of a major surge in exports to Mexico as well as the current West Coast port congestion issues. Because of the port congestion, processors have been moving product to other ports, including Los Angeles, Detroit, and San Diego (which may include increased shipments to Mexico as well as offshore shipments).

Globally, the outlook for potato markets is complex. Washington's heavy participation in the global French fry market leaves it exposed to foreign competition. Global French fry trade outside of major trading zones (North America and the EU) has grown at a 5.5% annual rate since 2006. The growth rate had been at 6.0% per year through 2019, but the pandemic took a toll on sales during 2020 and 2021. During the year ending on August 31, 2021, global trade increased by 4.5% to 8.51 billion pounds. However,

Figure 2: *U.S. Frozen Potato Exports, Seattle Port District Share*



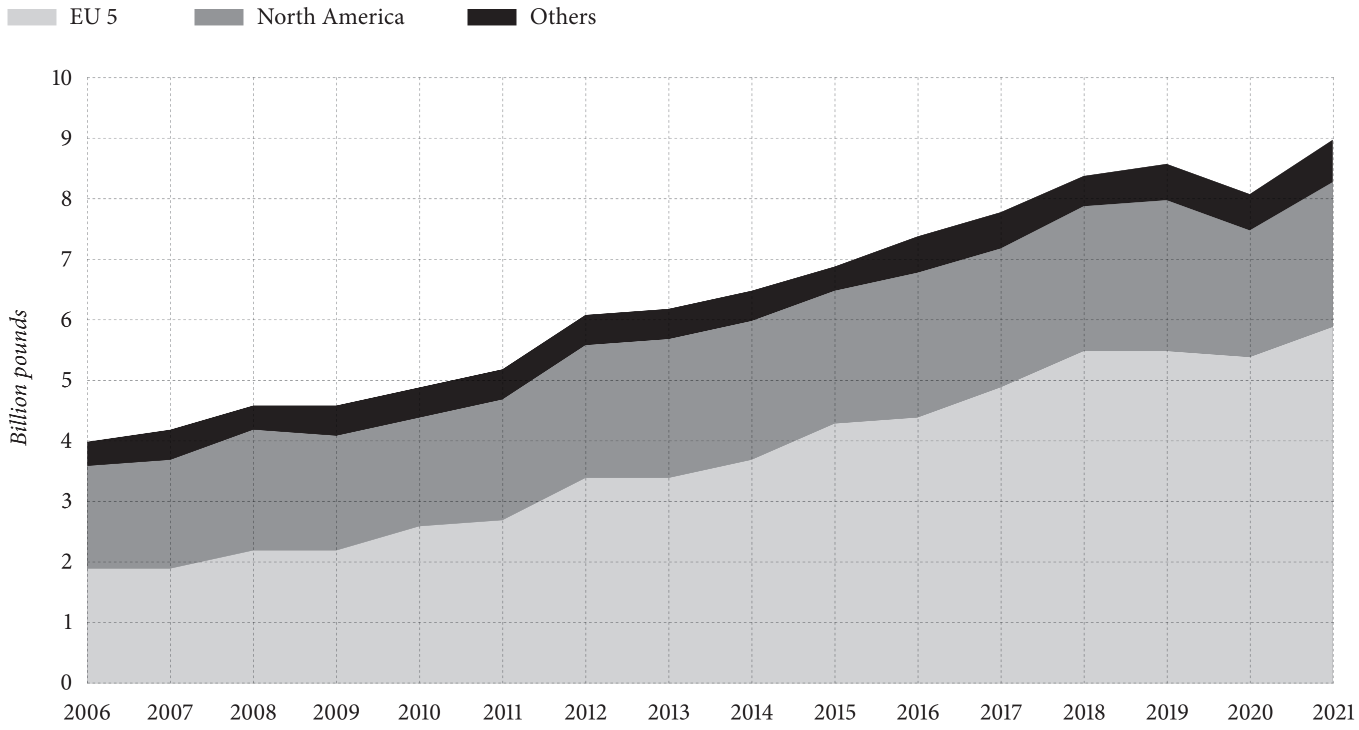
* Through September 30, 2021

Figure 1: *U.S. Census Department's Seattle Port District*

District code	Port district name				
30	Seattle, WA				
Port code	**Port name**	**Port code**	**Port name**	**Port code**	**Port name**
3001	Seattle, WA	3012	Danville, WA	3025	Metaline Falls
3002	Tacoma, WA	3013	Ferry, WA	3026	Olympia, WA
3003	Aberdeen, WA	3014	Friday Harbor, WA	3029	Seattle-Tacoma Intl Arpt
3004	Blaine, WA	3015	Boundary, WA	3071	UPS, Seattle, WA
3005	Bellingham, WA	3016	Laurier, WA	3072	Avion Brokers @ SEATAC
3006	Everett, WA	3017	Point Roberts, WA	3073	DHL Worldwide Express
3007	Port Angeles, WA	3018	Kenmore Air Harbor, WA	3074	Airborne Express @ SEATAC
3008	Port Townsend, WA	3019	Oroville, WA	3082	Grant County Airport
3009	Sumas, WA	3020	Frontier, WA	3095	UPS Courier Hub, Seattle, WA
3010	Anacortes, WA	3022	Spokane, WA		
3011	Nighthawk, WA	3023	Lynden, WA		

Sources: Production – USDA; Disposition – Washington Potato Commission

Figure 3: *Global Frozen Potato Product Sales by Origin**



* Excludes intra-EU trade and trade between the U.S. and Canada. (Year ending August 31)
Source: IHS Markit

it remained 655 million pounds below the pre-pandemic trajectory.

The global French fry market is dominated by large processing companies in two geographic areas: North America and the European Union. Together, they supplied over 90% of the product sold to customers outside of their local trading areas this most recent reporting period. However, since 2006, the North American share of the market has dropped from 40.7% to 27.1%, while the EU market share has increased from 48.3% to 65.3%.

As the COVID-19 pandemic abates, we might expect global French fry trade to rebound to its previous trajectory, resulting in 10.24 billion pounds for the year ending in August, 2022 and 10.86 billion pounds in 2023. Unfortunately, several factors make it unlikely that sales will reach that previous track anytime before 2023, at the earliest. North American fryers simply do not have enough raw potatoes available to produce the needed product. The situation in Europe is not much better. Even if the potatoes were available, moving the product to where it is needed might be impossible due to continuing port congestion and other logistical issues.

North American growers produced 536.22 million cwt of potatoes during 2021, including 413.16 million cwt in the US, and a record 123.06 million cwt in Canada. The US crop was the smallest since 2013, while Canada's crop was record large. Despite near-record North American production, the supply still falls short of processing industry needs. Processors have been expanding capacity to meet the increased demand of French fries and other frozen products. During the last five years, they have built large new facilities in Washington, Oregon, Idaho, Alberta, and Manitoba, while bringing on additional specialty lines in New Brunswick, Maine, and several other locations. The industry pulled back on contract volumes during 2020 due to the uncertain environment surrounding COVID-19. Demand did not fall as much as had been anticipated, and the supply situation was exacerbated by drought in Maine and Atlantic Canada. Fryers ramped up contract volumes in 2021, but adverse growing conditions across the western US and the Canadian Prairie Provinces depressed yields and held production below preseason plans. Although Canada had a record crop, 92.5% of its extra production is located in eastern Canada, which has limited processing capacity. In the Pacific Northwest, where the bulk of US

Table 2: *North American Potato Production (1,000 cwt)*

Crop	U.S. (1,000 cwt)	Canada (1,000 cwt)	Total (1,000 cwt)
2010	373,984	97,153	471,137
2011	401,429	92,372	493,800
2012	431,873	100,742	532,614
2013	408,105	102,384	510,489
2014	420,639	100,772	521,411
2015	421,855	104,907	526,762
2016	430,984	105,224	536,207
2017	429,634	106,673	536,307
2018	431,783	102,447	534,229
2019	424,419	105,589	530,008
2020	420,020	104,066	524,086
2021	413,162	123,055	536,217

Sources: USDA and Statistics Canada

processing capacity is located, production dropped 4.0% to 250.93 million cwt.

Processors will be moving potatoes from Maine and eastern Canada to processing plants in the Columbia Basin and the Prairie Provinces of Canada. However, that solution is costly and the capacity to move the potatoes is limited. The situation is exacerbated by an embargo on shipping bulk potatoes from PEI due to a discovery of Potato Wart in two PEI potato fields; it took five months to resolve the last Potato Wart. A similar delay this year could make it difficult to start moving PEI's surplus potatoes before next spring.

EU processors have faced major challenges during the pandemic. Five countries (Belgium, the Netherlands, Poland, Germany, and France) are the EU's major French fry producers and exporters. While North American exports to offshore markets increased by 14.0% during the year ending August 31, 2021, EU external exports only increased by 0.2%. A recent forecast of potato production in the five fry-exporting countries suggests that their combined 2021 potato crop fell 7.0% short of 2020 production to 803.0 million cwt, almost matching the size of the countries' 2019 crop. However, combined with quality issues in Belgium (the largest exporter), the crop size is a limiting factor for growth in EU French fry exports during the 2021-2022 marketing year.

Supply and logistical challenges in the global French fry sector is impacting Washington's potato industry in several ways: (1) finished-product prices have been rising at a record pace; (2) processors will be looking to start the 2022 harvest as early as possible to alleviate the raw product supply shortage; (3) Washington growers and processors have agreed to an average 20% increase in the base contract price for the 2022 potato crop; and (4) the combination of high production costs, reduced yields, and contract quality penalties are placing a financial strain on some Washington growers.

The importance of potatoes in Washington's agricultural economy will continue to grow; a large new processing line in Othello is just ramping up production now. Other projects are in the planning stages, though the timing will be dependent upon when the industry successfully absorbs the capacity created in recent years, along with a few new facilities currently under construction in other parts of North America. Competition from European product is likely to remain fierce. Overcoming the current congestion issues at the port of Seattle and making sure that they will not be a recurring issue is critical for maintaining the port's position as the largest outlet for US frozen potato product exports, as well as creating a competitive edge for the state's French fry exports.

Pulse Industry Situation and Outlook

Drex Rhoades (208) 882-3023

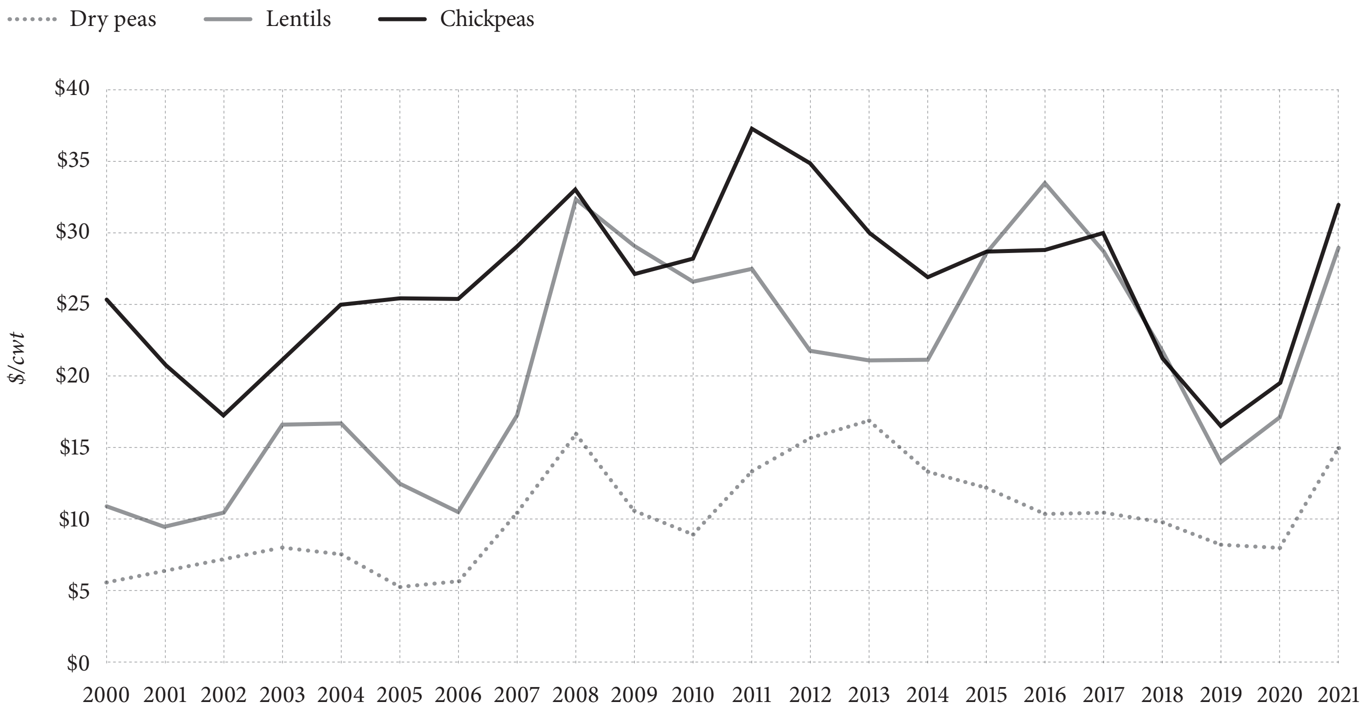
Flowering dry pea field in Colton, Washington

TO understand the U.S. pulse industry as it stands today (pulses = dry peas, dry beans, chickpeas, and lentils), one needs to reflect on its not-so-distant past. I do not intend to take you back to 1912 when a Spokane, Washington farmer first planted ten bags of field peas near Fairfield, making Washington State the "birthplace" of the U.S. pulse industry, but perhaps a brief 10-year reflection is in order. The top two growing states for dry peas and lentils are Montana and North Dakota, while Washington and Idaho remain the leading growers of chickpeas. Today, there are over 70 first purchasers and exporters of pulse crops in the United States, employing over 3,000 people in small-town rural America. Right now, the industry is struggling to overcome seemingly insurmountable obstacles, despite only five years ago pulse crops being the talk of the town.

Pulse Industry on the Rise

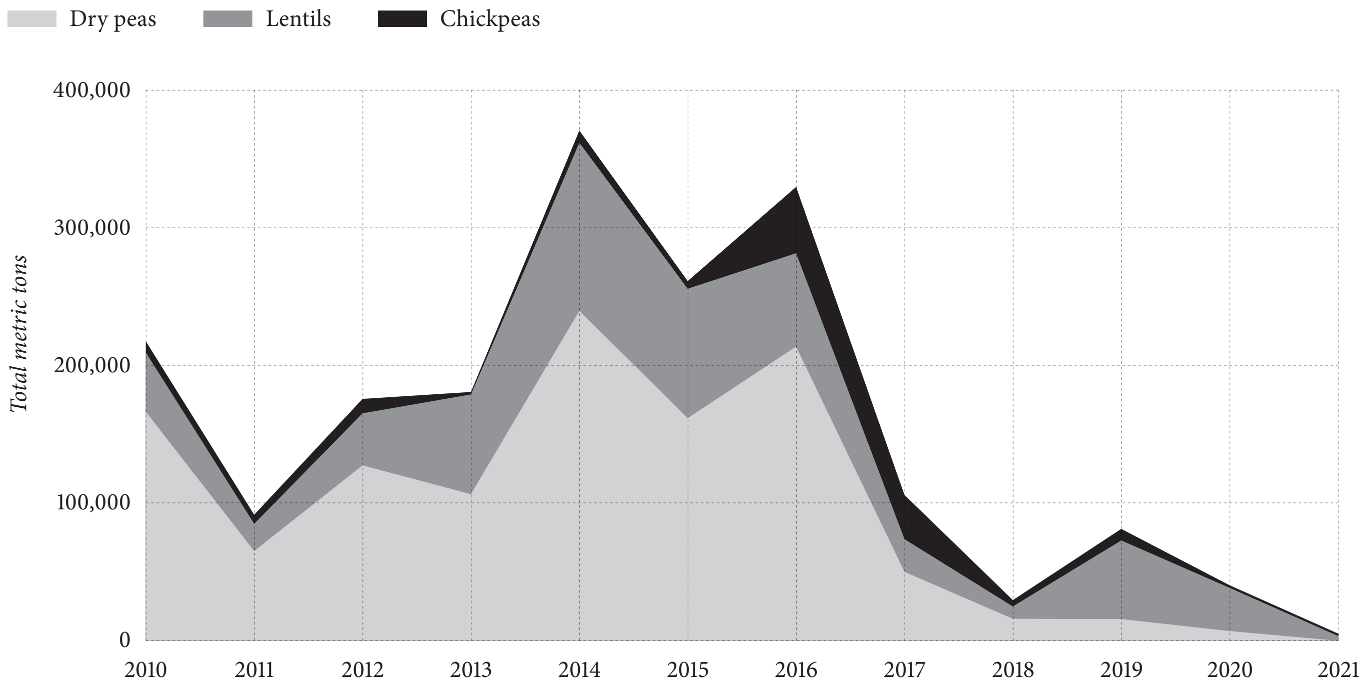
The industry experienced a surge in chickpea sales in 2011, as the American consumer discovered the delights of sweet and savory hummus snacks. For a couple of years, chickpea prices were high, and acreage in the U.S. soared to new heights. Prior to this time, the pulse industry exported around 80% of these crops and only dreamed of a robust domestic market for their crops. Between 2011 and 2016, U.S. pulse farmers and trade members experienced a boon, with strong prices, and favorable growing conditions followed by exceptional yields (Figure 1). After years of convincing by the international pulse industry, the United Nations (UN) declared 2016 as the UN International Year of Pulses (IYP), honoring these humble members of the legume family for their nutritional, sustainable, and eco-

Figure 1: *U.S. Yearly Average Grower Prices, 2000–2021*



Source: USA Dry Pea and Lentil Council; USDA, Bean Market News, USADPLC industry data

Figure 2: *U.S. CSP Exports to India, 2010–2021**



* 2021 YTD through October 17, 2021

Source: 2021 USA Dry Pea and Lentil Council, all rights reserved nomic properties. Global and domestic demand showed great promise. Growers discovered the benefits of including pulses in their rotation, for both fiscal reasons and their soil regenerative properties. Awareness of pulse crops as a food category reached atmospheric status with a social media campaign designed around the catchy slogan, "the Half-Cup Habit," garnering over a billion impressions, and prompting over 150,000 consumers to proclaim their goal to increase pulse consumption by a half-cup per day.

India Pulls the Pulse Rug

2016 could be declared the year that moved pulse crops from a "poor man's beef" on the bottom shelf in grocery stores to a new food category, destined to become "the next great thing" in food manufacturing. Arguably, 2017 may be the year that up-ended the U.S. pulse industry global market. From 2010 to 2017, pulse exports were increasing dramatically. The euphoria felt by the industry after hosting their own special year did not wane until the biggest customer of the world pulse exports, and thus U.S. exports—India—enacted a global tariff on pulse imports to protect domestic markets and boost the government's re-election status among farmers. In 2019, in retaliation for losing their preferential trade status with the U.S., the Government of India (GoI) tacked on an additional 10% tariff to U.S. exporters only. As a result, U.S. pulse exports dropped dramatically for the 2018/19 marketing year. Exports to India fell to record low levels, and U.S. Stocks-on-Hand rose to near-record highs (Figure 2). Canada faced the same tariffs which excluded them from the India market. It was not until the past two marketing years that India suffered production losses and relaxed import restrictions. Canada has been able to capitalize because of the 10% tariff on U.S. goods. Business was so good for Canada, that they bought U.S. product to make up for their own low stocks, in particular when high quality product was sought by Indian traders.

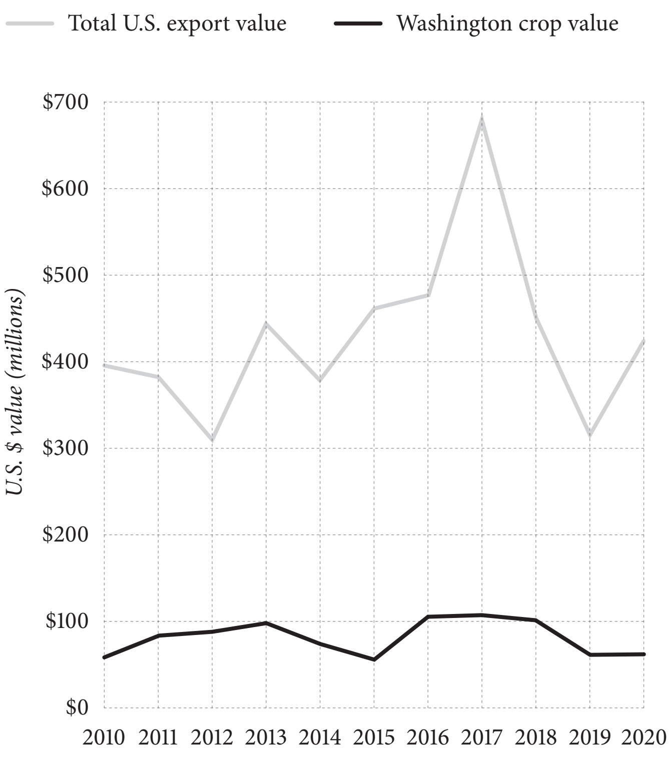
China Snack Market Wanes

China was also a key market for the U.S., especially for dry peas for their use in snack and noodle manufacturing. The U.S. entered a trade war with China in 2018, who retaliated by imposing an additional 25% tariff on U.S. Ag Commodities. U.S. pea exports into China reached record lows in 2018/19, and while the U.S. exported less than 15,000 Metric Ton (MT) into China, Canadian pulse shippers exported 2 million MT of pulses to China. U.S. pulse trade members say many of these customers may be lost for good.

The Standard for Quality

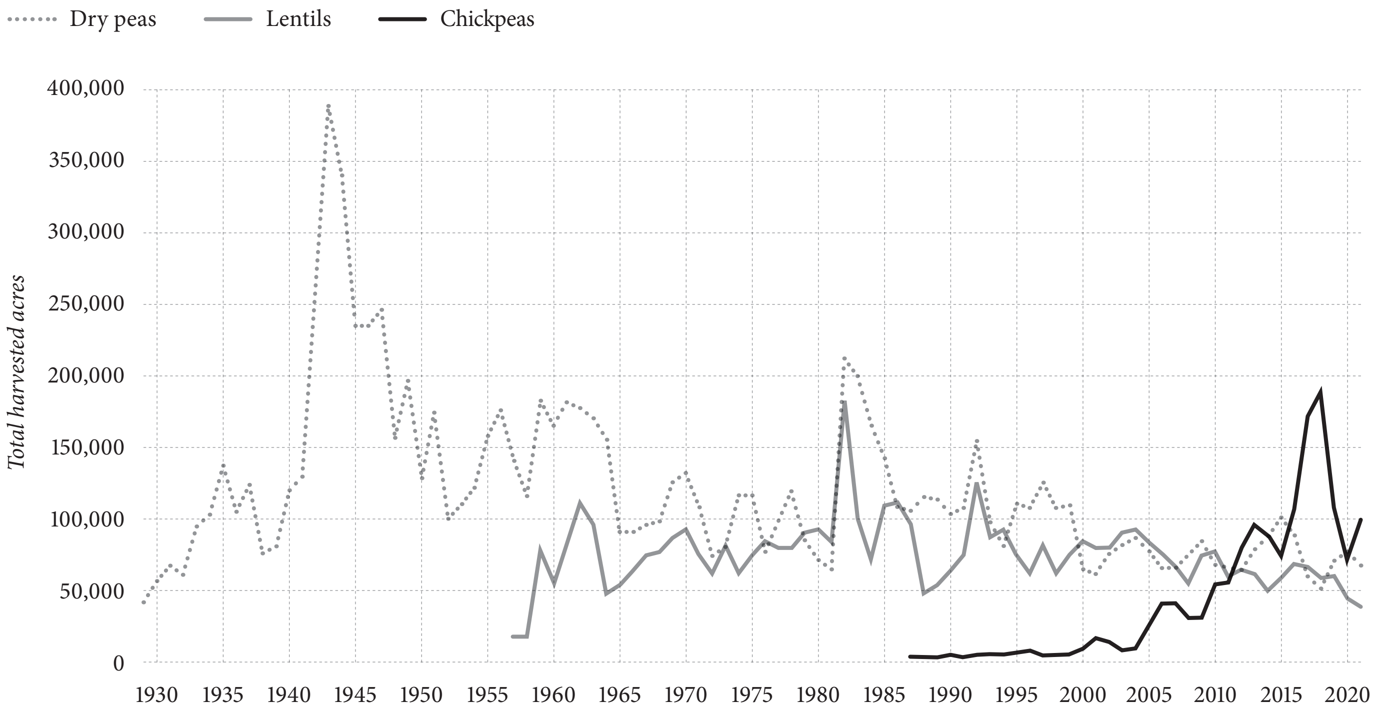
The U.S. pulse industry differentiates themselves from other exporters by marketing quality product. Producing quality pulse crops, from seeding to processing, is an expensive endeavor. U.S. grading standards are also the best in the world, and difficult to circumvent —when you buy a #1 U.S. pulse crop, this is exactly what you are getting. There are many discerning customers who count on the consistency of U.S. product. Due to stringent quality control held through the supply chain, U.S. global pulse exports typically cannot compete on the same price level with our leading competitors, such as Canada and Russia. These tariffs put U.S. trade members at an extreme disadvantage. People in the know estimate the U.S. cool season pulse industry (dry peas, lentils, and chickpeas) lost $107 million in exports during this time. Washington State exports declined by approximately $40 million alone from 2018 to 2019 (Figure 3). Thankfully, domestic use of pulse

Figure 3: *Value of Washington CSP Crops and Total U.S. Exports*



Source: USDA NASS & GATS

Figure 4: *Washington's Dry Pea, Lentil, and Chickpea Acreage History (1929 – September 10, 2021)*



Source: 2021 USA Dry Pea and Lentil Council, all rights reserved; USDA NASS & USADPLC industry data

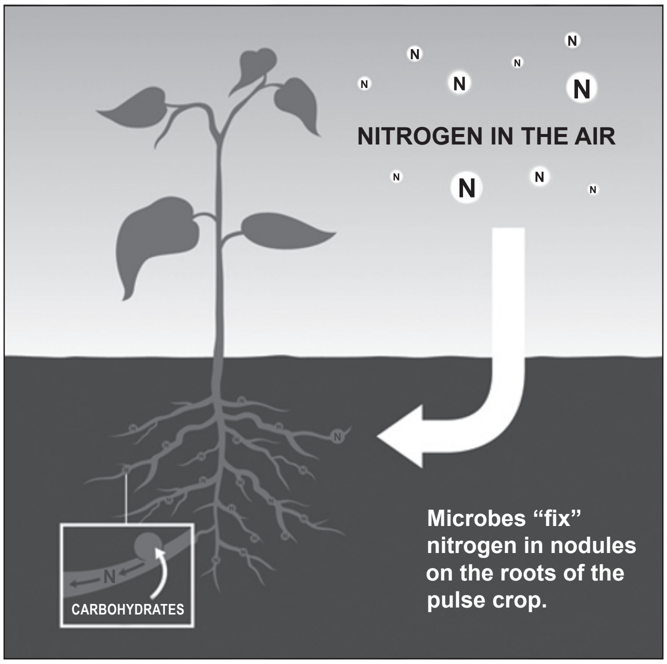
crop inventory as ingredients for food manufacturing and pet food has steadily increased since the IYP designation (and the U.S. pulse industry marketing campaign), and the U.S. relied less and less on global exports. However, U.S. pulse stocks were at an all-time high, and for the first time in the history of the pulse industry, trade members relied on government purchases to lower stocks and distribute dry and canned whole pulses to food kitchens across the nation. Prices for pulse crops dropped, and farmers reacted by planting fewer acres of pulses.

The USA Dry Pea & Lentil Council has been tracking Washington State cool season pulse acreage for over 90 years. Figure 4 graphs this history, and one can see how chickpeas have dominated Washington acreage since 2012. One can also visualize how dry pea and lentil acreage in Washington State has declined since the Indian tariff, while chickpea acreage has increased due to the strong domestic hummus market. The historic high of 189,300 acres of chickpeas in 2018 compared to the drop of dry pea acreage (51,000) and lentil acreage (59,000) is quite remarkable.

The Perfect Rotational Crop

However, there are many growers who include pulse crops in their rotation for agronomic reasons. Pulses require little water to grow and lower the need for synthetic fertilizers. The air around us is filled with nitrogen gas (NO_3), and pulse crops can convert nitrogen from the air into a usable form and deposit in the soil. This process of nitrogen fixation moves nitrogen from the air and through a symbiotic relationship with bacteria that form nodules on the roots of pulse crops, Rhizobium leguminosarum, ultimately providing a useful form of nitrogen (NH_3/ammonia) to the growing plant. The process allows the producer to grow a pulse crop without adding fertilizer and even leaving residual nitrogen in the soil to be utilized by the following crop. Pulses also control grassy weeds that impact small grains like wheat, and change the disease cycles in the soil. Ultimately, despite the negative market pressures experienced since 2018, growers continue to keep pulse crops in their rotation for these agronomic reasons. There are more altruistic reasons to grow pulses as well. Climate scientists estimate that our current food production system is responsible for 26% of greenhouse gas (GhG) emissions. Seventy (70%) percent of those GhG emissions are generated from the production of our food at the farm level. The current administration is promising to implement policy to reduce agriculture's contribution to increased GhG emissions and are well aware that pulse crops have a lower carbon footprint than most other crops. As policy makers discuss ways for growers to store carbon and receive carbon credits, and consumers demand sustainable alternatives to animal sources of protein, growing pulse crops could very well become more than just an agronomic decision for farmers.

Figure 5: *Pulse Crops Can Convert Nitrogen from the Air into a Usable Form and Deposit in the Soil*



Source: www.pulses.org

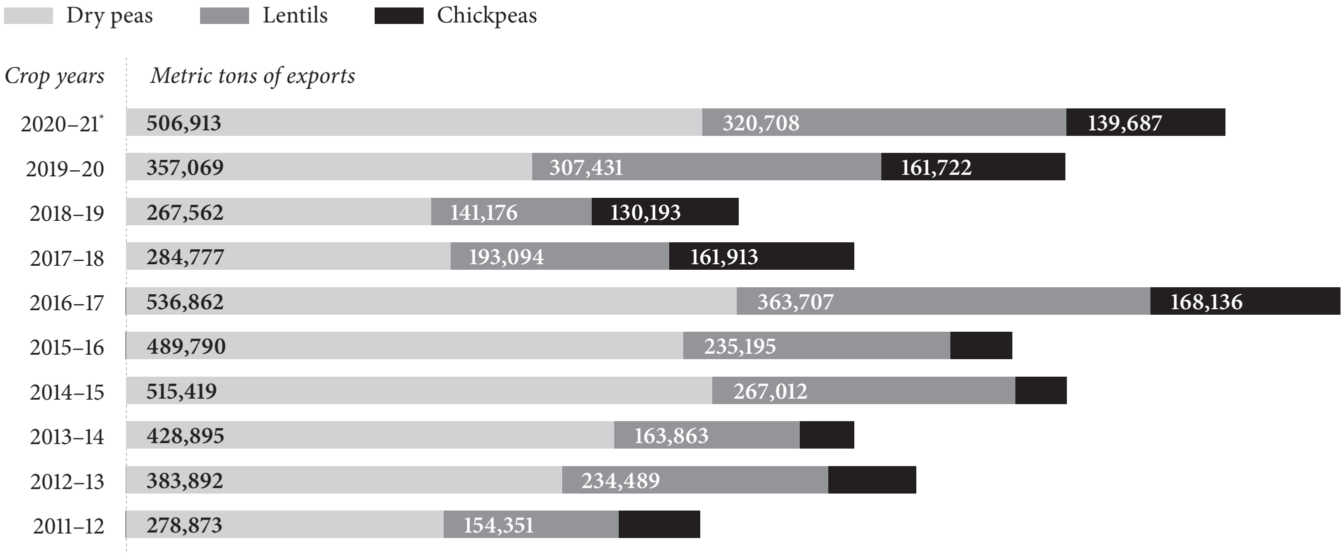
The Industry Reels from a 'One-Two' Punch

Fast forward to 2018, the U.S. pulse industry was recovering from taking one on the chin, as retaliatory trade tariffs and other trade restrictions had all but decimated the U.S. global export business. The next punch was unexpected, however, as our own government snuck in a "haymaker" causing domestic pet food use to plummet. In June of 2018, the Federal Drug Administration (FDA) Center for Veterinary Medicine (CVM) press statement announced an investigation into a perceived relationship between "grain-free" dog food (of which pulses are a key ingredient) and a very rare heart disease called canine dilated cardiomyopathy (DCM) in some breeds consuming this food. There is much debate about the lack of research supporting these claims, and current scientific evidence does not support the FDA CVM's claim, but the resulting damage to the pulse industry is significant. Due to the negative response in news outlets and social media, grain-free pet food sales suffered and pet food contracts for pulses nearly ceased. In Washington State, these pet food sales helped to move the stocks of smaller sized chickpeas and off quality crop. Less demand led to a decrease in supply. Growers planted less acres and stocks continued to climb. Today, a coalition including the pulse industry, members of the pet food industry, and scientists studying the relationship between nutrition and DCM in dogs are working to better understand the relationship between pulses and DCM.

An Unlikely Ally—COVID

Although the entire U.S. supply chain is currently in disarray due to COVID-19 related issues, dry and canned pulse crops had already disappeared from U.S. grocery stores in 2019/20, due to panic buying. As the world locked-down, consumers around the globe followed suit and filled their pantry with an affordable plant-based protein, offering a long-shelf life and a high nutritional profile—pulses. The nation of India distributed vast stores of pulses to their low-income populace and found itself in a quandary—how to feed the people without significant pulse stores or imports. India is one of the world's leaders in pulse production, but it consumes far more than what the Indian farmer can produce. The government of India has since lowered import restrictions and the global tariffs, though it has yet to drop the additional 10% tariff on the U.S. As you can see in the U.S. pulse exports by year chart (Figure 6), in 2019/20, the U.S. pulse exports had benefited from greater pulse consumption during the COVID-19 pandemic. Despite continued tariffs in key international markets, increased pulse consumption worldwide opened other markets for U.S. product and exports increased to India and China. 2020 was a great crop year, for the U.S. yields were high and overall crop quality was excellent. Lower prices led to a depletion of supply as demand increased and the market rebounded. The U.S. pulse trade was finally looking forward to a new crop.

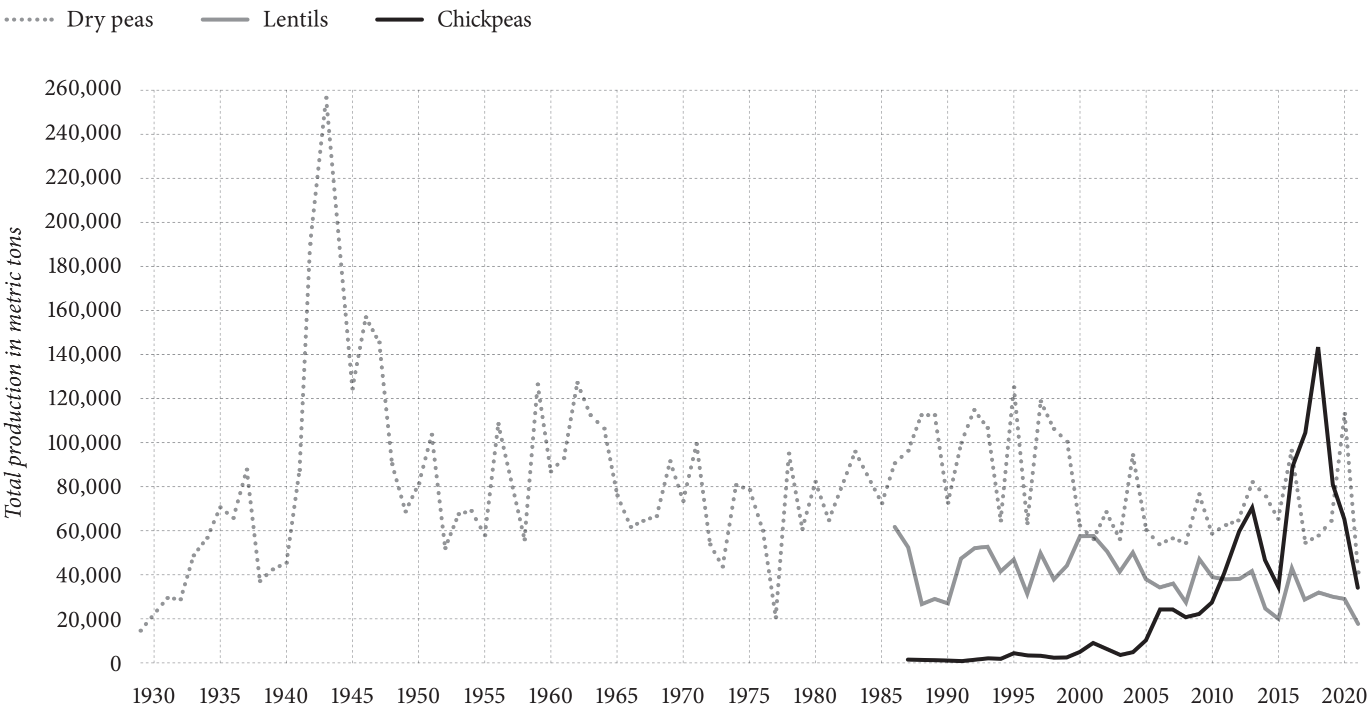
Figure 6: *U.S. Dry Pea, Lentil, and Chickpea Exports*



* 2020–21 YTD through September 15, 2021

Source: USA Dry Pea and Lentil Council; USDA GATS

Figure 7: *Washington's Dry Pea, Lentil, and Chickpea Production History (1929 – September 10, 2021)*



Source: 2021 USA Dry Pea and Lentil Council, all rights reserved; USDA NASS & USADPLC industry data

The Uppercut—National Drought and Shipping Disruption

In 2021, many of the growing regions for pulse crops faced record high temperatures and low soil moisture, resulting in a 40-50% decline in pulse production (Figure 7). The hot, dry weather caused a higher-than-normal amount of damage, defects, and dockage in their grade certificates. At the same time, the U.S. pulse industry was harmed by the same shipping disruptions felt by the rest of the agricultural industry, culminating in cancelled shipping contracts, container shortages, congested ports, and shortage of trucks and drivers. Many pulse exporters were forced to reduce their labor force by 10-30%, despite the backlog of shipments to customers who had to wait up to six months to receive shipments. At the time of the writing of this pulse industry focus, the House and Senate are working on a bipartisan bill to force international shipping carriers to load agricultural products for export, and to restrict the demurrage and late fees these carriers are allowed to charge exporters—a practice that is costing the U.S. agricultural industry billions.

Triumphant Comeback

One could summarize the last few years for the U.S. pulse industry as "trying," for sure. Thankfully, the safety nets—Farm Bill programs, crop insurance, and trade relief and economic stimulus programs—functioned the way they were designed. The U.S. pulse industry persevered through trade wars, a national drought, a global pandemic, and unfair shipping practices. Total production is down, and at a time when domestic and international pulse use is up, the U.S. inventory of quality pulse crops is lower than average. The good news is, pulse prices are finally at a level that satisfies the grower, and trade members are re-establishing business relationships with estranged global customers. The next step is to regain access to our export markets.

About the USADPLC/APA

The American Pulse Association, Pulse Foundation, USA Dry Pea and Lentil Council and the U.S. Pea and Lentil Trade Association represent the pulse crop industry in the United States. Our members include the farmers, processors, exporters, flour makers, fractionators, and food manufacturers of U.S. pulse crops (dry peas, lentils, chickpeas, and dry beans). The over-arching mission of each of these organizations is to grow the pulse crop industry in the United States by providing affordable solutions to the health, nutrition, food security, sustainability, and climate mitigation goals of the consumers we serve.

Macroeconomic Conditions and Washington Agriculture

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THE global, national, and Washington State economies all began recovering during 2021. But the recovery has been muted by supply-chain disruptions, persistent and evolving COVID-19 variants, and high inflation. Several sectors are experiencing labor shortages, driving further inflation increases. There is good news. According to data from the Bureau of Economic Analysis (BEA), real GDP has returned to trend growth for the United States and the International Monetary Fund (IMF) is forecasting a 4.9% growth rate for the global economy in 2022. With respect to Washington agriculture, the sector largely recovered from the economic shocks of the COVID-19 pandemic despite significant output lost to droughts and floods.

Table 1: *2021 IMF World Economic Outlook Annual Percent Changes*

	2020	2021*	2022**
World output	**-3.1**	**5.9**	**4.9**
Advanced economies	-4.5	5.2	4.5
Emerging markets and developing economies	-2.1	6.4	5.1
World trade volumes	**-8.2**	**9.7**	**6.7**
Imports			
Advanced economies	-9.0	9.0	7.3
Emerging markets and developing economies	-8.0	12.1	7.1
Exports			
Advanced economies	-9.4	8.0	6.6
Emerging markets and developing economies	-5.2	11.6	5.8
Consumer prices			
Advanced economies	0.7	2.8	2.3
Emerging markets and developing economies***	5.1	5.5	4.9

Source: IMF World Economic Outlook 2021.4

* Based on projections for Q4

** Projections

*** Excludes Venezuela but includes Argentina from 2017 forward

World Status and Outlook

World real output rebounded in 2021, growing faster than forecasted last year. Table 1 shows output, trade, and inflation statistics for 2020 and 2021, as well as IMF projections for 2022. World output grew 5.9% in 2021, with faster growth among emerging markets and developing economies (EMDEs) than among the advanced economies. Economic growth in 2022 is expected to be more modest than in 2021.

International trade rebounded after the large declines of 2020. After falling by 8.2% in 2020, total world trade grew 9.7% in 2021. EMDEs experienced more pronounced increases in both exports and imports compared to advanced economies. Growth of world imports rose from -9.0% in 2020 to 9.0% in 2021 for advanced economies, and from -8.0% in 2020 to 12.1% in 2021 for EMDEs. The gains in trade were, however, coupled with higher-than-expected inflation rates. Last year the IMF was forecasting inflation rates of 1.6% and 4.7% for advanced economies and EMDEs, respectively; the actual inflation rates were 2.8% and 5.5%. These occurred as economies faced supply-chain disruptions, demand increases, worker shortages, and the effects of monetary stimulus. As for its 2022 economic projections, the IMF concludes: "Overall, the balance of risk for growth is tilted to the downside. . . . Inflation risks are skewed to the upside."

United States Status and Outlook

Table 2 reports the economic data and projections of the Congressional Budget Office (CBO) for the United States through 2022 (the 2021 data are still largely based on forecasts). U.S. real GDP rose 6.7%, while the unemployment rate fell from 8.1% to 5.5%. The largest moving component of GDP was net exports, which fell 38% from last year. Personal consumption grew 10%, private domestic investment rose 16%, and government spending grew 6%. For 2022 the CBO projects that U.S. real GDP will grow 5.0%.

U.S. monetary and fiscal policy remain expansionary. In terms of monetary policy, the Federal Reserve kept short-term interest rates at historically low levels. In the face of

Table 2: *2021 Congressional Budget Office Budget and Economic Outlook*

	2020	2021*	2022**
Output			
Real GDP (Billions of 2012 dollars)	$18,426.1	$19,657.5	$20,638.8
Percentage change, annual rate	-3.5%	6.7%	5.0%
Components of Real GDP (billions of 2012 dollars)			
Personal consumption expenditures	$14,145.3	$15,618.1	$16,596.1
Gross private domestic investment	$3,604.7	$4,196.0	$4,658.0
Government consumption expenditures and gross investment	$3,831.3	$4,052.3	$4,232.6
Federal	*$1,484.5*	*$1,557.2*	*$1,582.0*
State and local	*$2,346.9*	*$2,495.1*	*$2,650.6*
Net exports of goods and services	-$644.8	-$892.9	-$849.2
Exports	*$2,127.2*	*$2,465.8*	*$2,729.1*
Imports	*$2,772.0*	*$3,358.7*	*$3,578.3*
Prices			
Consumer Price Index, all urban consumers (CPI-U)3	258.8	267.3	273.9
Annual % change in CPI	1.2%	3.3%	2.5%
Labor			
Unemployment rate, civilian, 16 years or older	8.1%	5.5%	3.8%
Labor force, civilian, 16 years or older (millions)	160.9	161.9	164.9
Labor force participation rate, 16 years or older	61.81%	61.87%	62.65%
Interest rates			
10-year Treasury note	0.9%	1.6%	1.9%
3-month Treasury bill	0.4%	0.0%	0.1%
Federal funds rate	0.4%	0.1%	0.1%
Income, personal (billions of 2012 dollars)	**$19,208.3**	**$20,897.1**	**$21,119.5**

Source: Congressional Budget Office

* Based on forecasts of Q2–Q4

** Forecasted

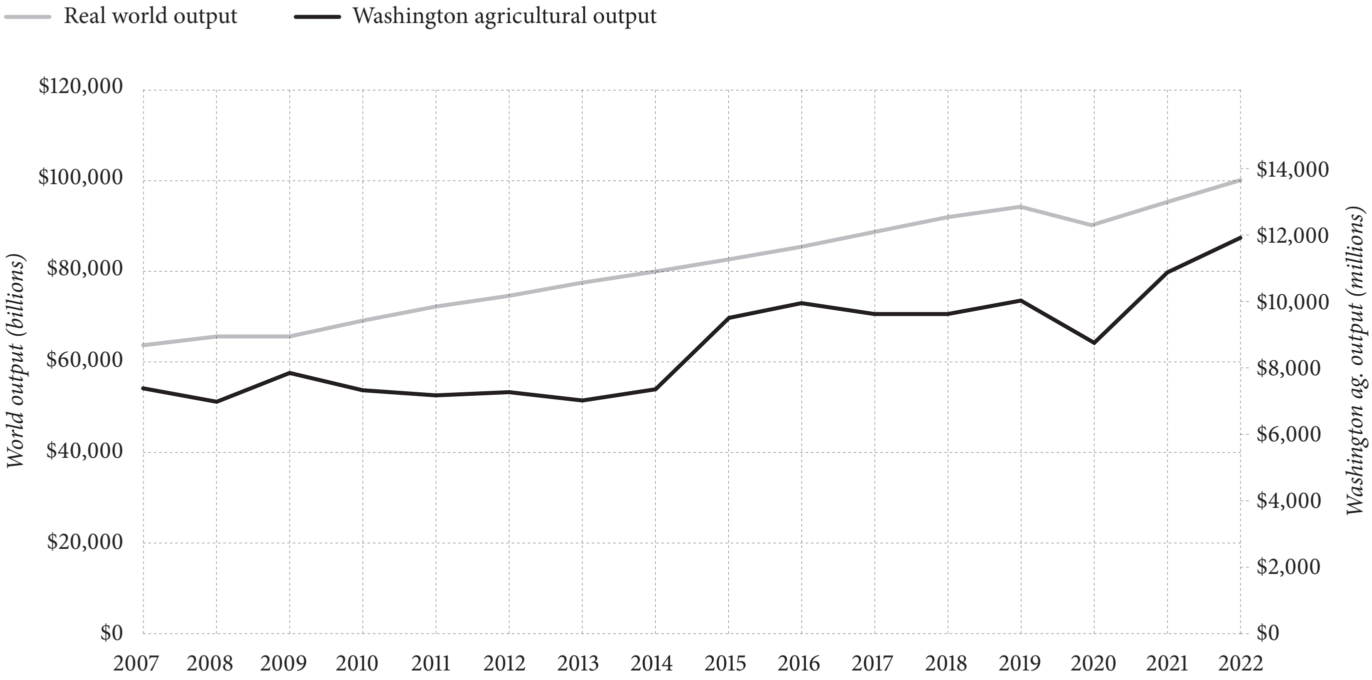
*** The base year for the CPI is 1982 – 84 = 100

rising inflation and falling unemployment, however, multiple rate hikes are expected in 2022. These will put upward pressure on long-term interest rates as well. For example, the CBO expects the yield on the 10-year Treasury Note to rise from 1.6% to 1.9% in 2022. In terms of fiscal policy, Congress notably passed major spending bills related to the pandemic and infrastructure. This is expected to result in a roughly $2.3 trillion government budget deficit for 2021. The budget deficit is expected to decline as the pandemic wanes, but there is still a great deal of uncertainty regarding the pandemic's evolution

Washington Agriculture's Relationship to the Macroeconomy

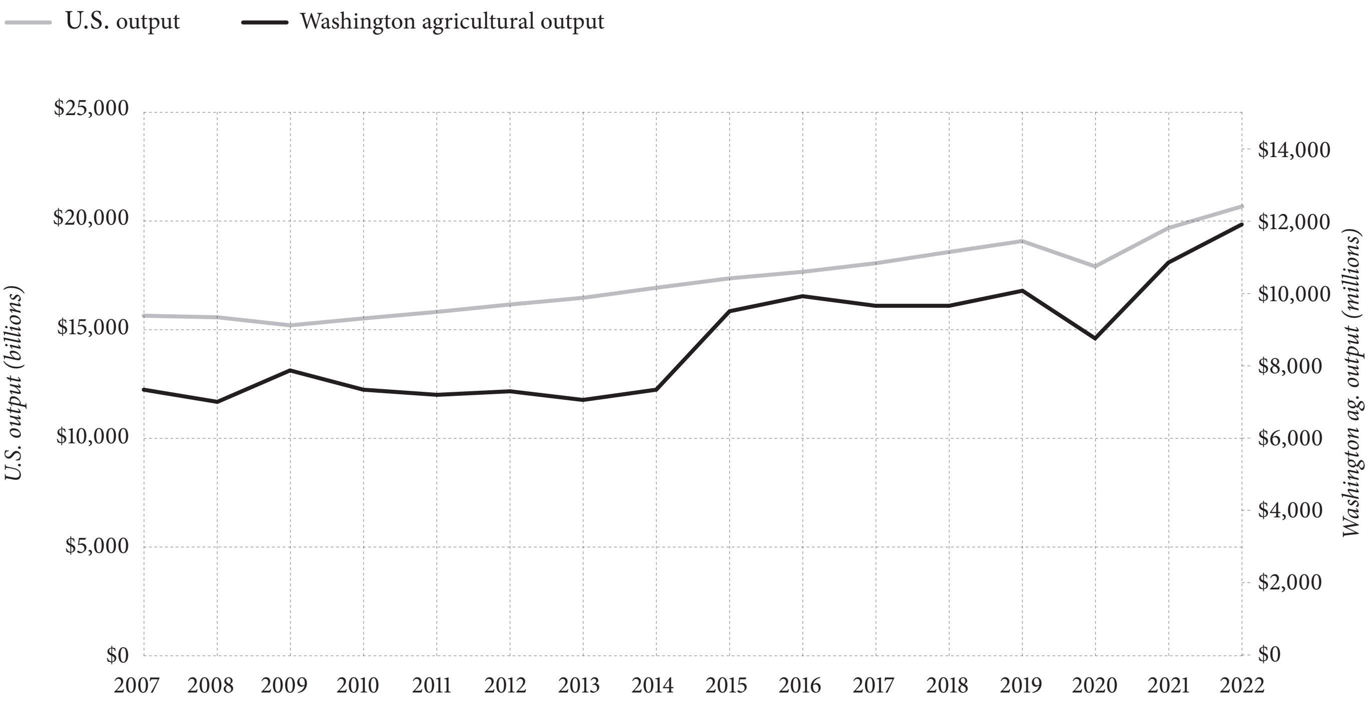
In 2021 Washington agriculture expanded faster than both the world and U.S. agricultural sectors. Figures 2 and 3 show world and U.S. output on the left axis and Washington agricultural output on the right axis. Washington agricultural output grew 25% from 2020 to 2021 (much more rapidly than was forecast last year) and is projected to grow another 10% in 2022. This growth rate is roughly 5 times larger than that of world output in 2021, and 2.5 times larger than that of Washington State output.

Figure 1: *Real World and Washington Agricultural Output (2007–2022)*



Source: IMF World Economic Outlook and BEA

Figure 2: *U.S. and Washington Agricultural Output (2007–2022)*



Source: CBO and BEA

Washington Agriculture and International Trade

A relatively large amount of Washington agriculture is exported. Though much of the state's exporting has resumed, shipping delays still plague western seaports. The Northwest Seaport Alliance is still reporting volume growth month over month but said in its November release that from October to November "full exports decreased 9.8%." Table 3 shows total Washington State agricultural exports by country of destination. Exports to China, Washington agriculture's leading export destination, grew especially rapidly during 2021. Most other major Washington agricultural export markets neared or surpassed their 2019 levels in 2021. Key exceptions were Hong Kong, the UAE, and Mexico. Trade relationships with Asia remain critical, and it may be that Washington has gained market share over its agricultural export competitors.

Over the course of 2021, the value of the dollar rose mildly relative to other currencies. This worked against U.S. exporters, but the effect was clearly outweighed by momentum in the resumption of trade from the lows of the pandemic.

Summary

Washington's agricultural sector experienced greater-than-expected growth in 2021 and has largely recovered from the 2019-2020 COVID-19-induced recession. International, national, and regional economists all see that recovery continuing but slowing in 2022. As for the overall economy, there are mounting concerns regarding inflation, labor market conditions, and protracted supply-chain disruptions. Whether the economic recovery can be sustained and expectations for growth can be met will depend in large part on the effects of and responses to the continuing pandemic.

Table 3: *Total Washington State Agricultural Exports by Country of Destination ($1,000s)*

Country	2019	2020	2021*
China	$1,387,696	$1,651,254	$3,104,066
Japan	$790,352	$652,517	$988,347
Korea, South	$345,767	$328,132	$541,769
Taiwan	$286,866	$156,404	$248,145
Philippines	$272,713	$255,208	$246,041
Canada	$237,193	$211,168	$354,956
Vietnam	$66,785	$69,424	$102,291
Thailand	$74,559	$63,115	$91,661
Hong Kong	$32,435	$17,561	$12,205
United Arab Emirates	$30,166	$15,566	$18,044
Guatemala	$56,837	$50,464	$15,492
India	$39,851	$18,558	$54,444
United Kingdom	$15,057	$12,132	$24,810
Netherlands	$27,617	$14,018	$14,827
Dominican Republic	$9,401	$7,312	$14,906
Mexico	$76,264	$56,646	$9,022
Colombia	$7,661	$6,894	$8,219
Pakistan	$7,095	$11,102	$12,916
Brazil	$6,275	$2,946	$9,656
Singapore	$12,799	$8,155	$3,461
Saudi Arabia	$7,635	$6,720	$8,502
All other Countries	$375,940	$295,566	$229,920

Source: USDA ERS https://www.ers.usda.gov and U.S. Census Bureau Foreign Trade Statistics http://usatrade.census.gov

* The fourth quarter is forecasted.

SECTION II. SPECIAL FOCUS

Livestock Health Impacts on Human Consumption and Nutrition

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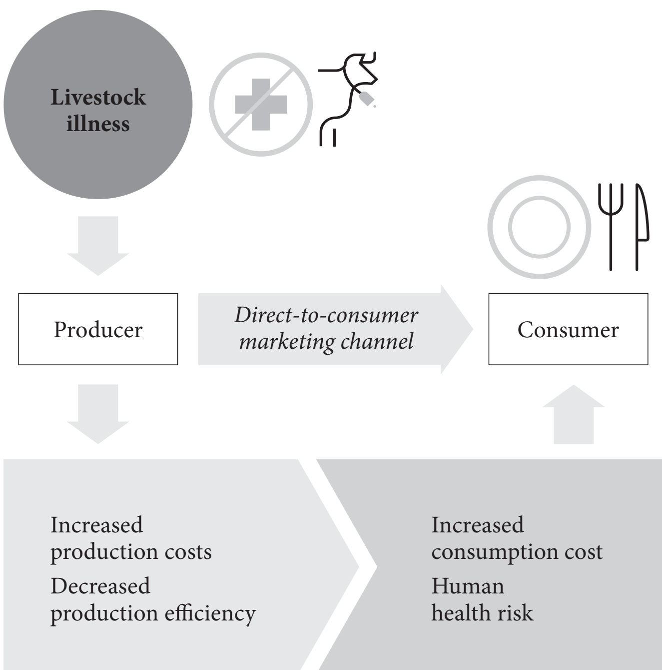
LIVESTOCK health plays an important role in direct meat and dairy production systems because of its impact on production efficiency and costs. Livestock disease places a burden on producers, firms along supply chains, and consumers worldwide (Knight-Jones and Rushton 2013). Rural, smallholder producers are particularly vulnerable, as livestock are a critical component of production (McDermott et al., 1999).

Demand for smallholder, locally sourced food products has grown substantially since 2006. The number of farmers markets across the United States has grown by 180% from 2006-2014, with an even larger growth of 280% in regional food hubs over the same time period (Low et al., 2015). Smallholder farmers participating in direct-to-consumer marketing channels have also seen notable growth in the number of farms participating and the value of sales by 17% and 32%, respectively, from 2002-2007, with growth leveling off towards 2012 (Low et al., 2015). While increased demand for locally sourced food products has supported smallholder farmers, adverse livestock health events have the potential to directly impact consumption costs. The impacts of livestock health on production are well-established, but the impacts of livestock health on consumption costs are lesser known.

Interesting questions to ask would be not only how livestock disease impacts direct production of meat and milk, but also how these impacts translate to human health through changes in nutrition. The marketing channel of focus here is the farmer direct-to-consumer. Figure 1 shows a direct-to-consumer marketing channel with potential impacts from livestock health. Other marketing channels include intermediate agents such as retailers, wholesalers, and brokers that participate between producers and consumers within the channel.

Evaluating both nutrient consumption flows and the cost of nutrient consumption provides important information on availability, access, and utilization of nutrients. Animal sourced foods have been shown to be important for promoting health and cognitive and physical development (Delia et al., 2018; Headey et al., 2018), but these foods can be expensive compared to grain-sourced foods

Figure 1: *Marketing Channel – Livestock Health*



(Headey et al., 2018). Developing a quantitative measure of nutrient consumption and nutrient prices, which are unobserved, provides a starting point for evaluating the association between livestock health events and costs of nutrient consumption.

Evidence from Past Studies

Unfortunately, across the world, there are large gaps in data and information when it comes to livestock and livestock health (Rushton et al. 2018, 2021). The United States and North America are no exception. Some past examples of food supply on human nutrition include LaFrance (2008) who studies the structure of US food demand. Pinstrup-Andersen et al. (1976) study the consequence of increasing food supply on human nutrition among consumer groups by income strata. Likewise, Perrin and Scobie (1981) examine the outcomes of market intervention on human nutrition and stratify consumers into rich and poor strata. Boland et al. (2013) look specifically at supply of animal-sourced foods and discuss initiatives surrounding closing supply gaps in order to provide high quality protein products.

An exploratory analysis of the association between livestock health events and cost of nutrient consumption was recently conducted across villages in rural Western Kenya (Kappes and Marsh, 2020). Observations on household food consumption were used to estimate consumption of protein, lipid, and carbohydrate macronutrients. The United States Department of Agriculture Food Composition Databases were used to convert food consumption to macronutrient consumption (Schmidhuber et al., 2018). Macronutrient prices were then developed using nutrient consumption estimates and observations on food expenditure. It is typical for these rural households to keep at least one livestock species for production purposes, whether it be for subsistence or local market supply. Livestock health observations on symptoms relating to reproductive, respiratory, digestive, urogenital, muscle, skin and/or nerve disorders were collected for each household by a veterinary professional. To mitigate the impacts of endogeneity between household consumption and production, household livestock health observations were aggregated and then averaged at the village level for each village and respective households.

There exists evidence of a statistically significant association between adverse livestock health events on the cost of nutrient consumption. Illness events across bovine and goat livestock species are associated with increased protein, lipid, and carbohydrate macronutrient prices across the sample. This increases household expenditures on nutrition from bovine and goats. There did not exist evidence of any association between changes in nutrient prices and goat illness events. This analysis concluded that within its sample, there exists a relationship between livestock health and a household's cost of consumption. Furthermore, this insight extends to areas representative of its sample, which can include areas across rural America.

Discussion and Broader Implications

Approximately half the value of agricultural production worldwide is accounted for by livestock products, and the demand for animal-sourced food continues to grow globally (Raney, 2009). It is estimated that global demand for meat products will increase by 68% and 57% for milk products towards 2030 (Steinfeld and Gerber, 2010; Alexandratos and Bruinsma, 2012). This rise in demand has helped spur what is referred to as the "livestock revolution" (Delgado et al., 1999), and rural, developing areas have supported its growth by increasing from a 31% and 22% share of global meat and milk production, respectively, to a 63% and 53% share over the time period 1970-2013.

Livestock animal health events do not only impact consumption and nutrition at the household level. The efficiency of domestic and international trade markets, as well as the benefits derived by producers and consumers in these markets are affected by livestock health events as well (Zhao et al., 2006; Nogueira et al., 2011; Tozer et al., 2015). Livestock diseases constrain trade, and, consequently, nutrition to households across the world. Furthermore, the risk of zoonotic disease and foodborne illness has the potential to increase with trade in livestock and livestock products when disease events occur. Moreover, as COVID-19 has demonstrated, supply chains in the livestock sector can be critically impacted by zoonotic diseases. However, regulatory measures such as inspection, certification, tariffs, and embargos serve to mitigate these risks (Hennessy and Marsh, 2021).

Recent events in the global meat supply chain demonstrate the impact livestock disease has on trade. Underdeveloped areas have a higher availability of permanent pasture area per head of rural population, providing a comparative advantage in livestock production and exporting (Upton, 2001). For example, throughout the Brazilian Amazon, cattle populations have grown 200% over the period 1993-

2013 (Wilkison, 2015), with Brazil being the largest beef exporting country since 2003 (USDA, 2011). Since the beginning of 2021, the U.S. has increased imports of beef and veal products by 139% (USDA, 2021). However, Brazil has recently stopped meat exports to China after two cases of bovine spongiform encephalopathy (BSE)—a notifiable transboundary disease—were found in two different meat plants. The U.S. imported an average of $296 million of fresh and frozen beef products (USDA, 2021), adding value to consumer surplus. However, consumers pose to lose that value if recent BSE cases result in an embargo, making nutrient consumption more difficult for some, despite the decrease in risk. U.S. producers have benefited from Brazil's BSE cases, as the U.S. has increased meat exports to China. U.S. producers will also benefit from a U.S. embargo placed on Brazilian beef.

Livestock health is an important factor in value chains of all sizes, spanning from household, smallholder production and consumption systems, to global production and consumption systems. Empirical evidence suggests an association between adverse livestock health and costly consumption, while historical budget and market evidence shows impacts of livestock health throughout the U.S. economy. As livestock health has been an established topic in production research, the broader perspective of livestock health impacts on domestic and international markets will continue to receive more research and outreach attention.

It is established that livestock and livestock products are important sources of food and nutrition for populations across the world, and in some locations, animal sourced foods are the only option for nutrition. Along with livestock health, climate change is also affecting human nutrient availability through its impact on livestock production in both developed and vulnerable countries. Because livestock are typically more exposed to outside elements in developing countries, depending more on pasture and other natural forage, small climactic changes and associated policies can have direct and indirect impacts on production. Air temperature, humidity, wind speed, among other factors, directly affect meat, milk, and reproductive performance. The availability and quality of feed is an indirect effect of climate change on livestock production (Rust and Rust, 2013). Warming environments have also supported the expansion of vector-borne diseases, having direct implications for livestock and human health (Thornton et al., 2007). There exists a complex relationship between factors affecting human nutrition through livestock health in production and the environment, and these relationships will continue to evolve as changes in livestock health and the climate occur.

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Impacts of Bilateral Trade Agreements between the United States and Latin American Countries on Agri-Food Trade

Jeff Luckstead

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Introduction

With the continued stall of the Doha Development Round of the World Trade Organization, originally launched in 2001, many countries have relied on bilateral and multilateral trade agreements to expand international markets. Between 2004 and 2012, the United States signed bilateral trade agreements (BTA) with four Latin American countries: Colombia (Colombia-BTA), Panama (Panama-BTA), Chile (Chile-BTA), and Peru (Peru-BTA). In 2012, when both Colombia-BTA and Panama-BTA came into force, over half of all agricultural exports became duty-free, with the remaining tariffs and other trade barriers phased out over 15 years (USTR, 2011). The Chile-BTA entered into force at the start of 2004, and as of January 2015, all qualifying products are duty free. An important focus of this agreement was expanding access to agricultural products such as pork, beef, wheat, and processed food items. In early 2009, the Peru-BTA entered into force when over two-thirds of agricultural commodities became duty free, with the remaining tariffs on the majority of agricultural commodities phased out over the next 15 years.

Trade creation and trade diversion are well-known phenomena of bilateral agreements. Trade creation can lead to improved efficiency as production shifts from high- to low-cost producers. However, a primary concern of bilateral trade agreements is the possibility of trade diversion, where high-cost producers within the agreement replace low-cost third-party producers. Though tariff reduction is central to these trade agreements, the extent of liberalization and phase-out periods vary. Additionally, while these agreements target and reduce non-tariff measures (NTM), tariff reduction can cause the unintended consequence of governments shifting to sanitary and phytosanitary measures (SPS) to protect domestic producers (Orefice, 2017). Thus, whether a bilateral agreement leads to trade creation or diversion effects and the extent of these effects is an empirical question. This analysis examines the trade creation and trade diversion impacts of these four bilateral agreements on agri-food trade for two (primary agricultural and processed food) broad agri-food commodities.

Methods and Data

Using the Poisson Pseudo Maximum Likelihood estimator to account for both heteroskedasticity and allow zero trade flows, for each bilateral trade agreement $k\,\varepsilon$ (Colombia-BTA, Panama-BTA, Chile-BTA, Peru-BTA) and for each commodity level, the gravity equation is specified as

$$(1)\quad X_{ijt} = exp(\beta_0^k + \beta_1^k y_{it} + \beta_2^k y_{jt} + \beta_3^k FTA_{ijt} G_{ij} + \beta_4^k B_{ijt}^k G_{ij} + \beta_5^k I_{ijt}^k G_{ij} + \beta_6 E_{ijt}^k G_{ij} + \lambda_{ij} + \lambda_i + \lambda_j + \lambda_t) + \varepsilon_{ijt}\,,$$

where X_{ijt} is the value of agri-food exports from country i to j in time t, βs are coefficients; y_{it} and y_{jt} are total value of agri-food production and consumption, respectively; FTA_{ijt} indicator variable is 1 if both the importer and exporter are members of an FTA other than one of the four Latin American bilateral agreements and 0 otherwise, G_{ij} is an indicator variable that is 1 for international trade and 0 for domestic sales; B_{ijt}^k is an indicator variable that is equal to 1 if both countries i and j belong to the same bilateral trade agreement, k in period t, and 0 otherwise; I_{ijt}^k (E_{ijt}^k) is 1 if the importing (exporting) country j belongs to bilateral agreement k but the exporter (importer) i does not in period t and 0 otherwise; λ_{ij} are country-pair fixed effects; λ_i and λ_j are importer and exporter fixed effects; λ_t is a time fixed effect, and ε_{ijt} is an error term.

Bilateral trade values for 227 countries for the years 2001–2016 are collected from the ITPD-E database published by the U.S. International Trade Commission (Borchert et al., 2020). The data set is balanced as all missing observations are filled in with zeros. ITPD-E includes domestic sales data for each commodity, calculated as the (gross) values of total production minus total exports. Because trade flows do not instantaneous adjust to bilateral trade agreements, the data are in three-year intervals: 2001, 2004, …, 2013, 2016 (Trefler, 2004; Baier and Bergstrand, 2007; Olivero and Yotov, 2012). The country-pair fixed effects, which control for endogeneity in the policy variables, absorb the time-invariant variables (e.g., distance, common language, colonial relationship, and contiguous border). With domestic sales data, domestic production is constructed as domestic sales plus total exports and domestic consumption is constructed as domestic sales plus total imports.

The analysis is run for agricultural commodities aggregated into primary agricultural and processed food categories; Table 1 contains the mapping of individual commodities into the two aggregated commodities. The data for the two-commodity model are stacked to create one panel dataset.

Table 1: *List of Commodities*

Commodity categories from ITPD-E Database

Agricultural commodity		Processed food	
Code	**Description**	**Code**	**Description**
1	Wheat	34	Processing/pres. of meat
2	Rice (raw)	35	Processing/pres. of fish
3	Corn	36	Processing/pres. of fruit & veg
4	Other cereals	37	Vegetable & animal oils and fats
5	Cereal products	38	Dairy products
6	Soybeans	39	Grain mill products
7	Other oilseeds (excluding peanuts)	40	Starches and starch products
8	Animal feed ingredients and foods	41	Prepared animal feeds
9	Raw and refined sugar	42	Bakery products
10	Other sweeteners	43	Sugar
11	Pulses and legumes, dried, pres.	44	Cocoa chocolate and sugar conf.
12	Fresh fruit	45	Macaroni noodles & similar prod.
13	Fresh vegetables	46	Other food products, nec
14	Prepared fruits and fruit juices	47	Dist. rectifying & blended spirits
15	Prepared vegetables	48	Wines
16	Nuts	49	Malt liquors and malt
17	Live cattle	50	Soft drinks; mineral waters
18	Live swine	51	Tobacco products
19	Eggs		
20	Other meats, livestock products, etc.		
21	Cocoa and cocoa products		
22	Beverages, nec		
23	Cotton		
24	Tobacco leaves and cigarettes		
25	Spices		
26	Other agricultural products, nec		

Results

The results for estimated gravity models are presented in Table 2. The coefficient estimates for value production, expenditures, and *FTA* are positive and significant, indicating that countries that produce and consume more also trade more, and free-trade agreement generally boosts trade.

For the agricultural commodity, the Colombia-BTA, Chile-BTA, and Peru-BTA result in an expansion of trade—as seen by the positive and significant coefficient estimate—only for intra-member trade (B_{ijt}) and imports from non-member countries, I_{ijt}, because the positive coefficient estimates for exports to non-member countries, E_{ijt}, is statistically insignificant. For example, intra-member agricultural trade expands by 24.35%, 43.91%, and 127.28% for the Colombia-BTA, Chile-BTA, and Peru-BTA, respectively. Also, imports

Table 2: *Static Trade Effects of Bilateral Trade Agreements*

Two-commodity model				
Variable	**Colombia-BTA**	**Panama-BTA**	**Chile-BTA**	**Peru-BTA**
y_{it}	0.372***	0.372***	0.361***	0.397***
	(0.05)	(0.05)	(0.05)	(0.06)
y_{jt}	0.193***	0.194***	0.196***	0.186***
	(0.06)	(0.06)	(0.06)	(0.07)
FTA	0.13***	0.133***	0.135***	0.119***
	(0.04)	(0.04)	(0.04)	(0.04)
Agricultural commodities				
Between members	0.218***	-0.15	0.364***	0.821***
	(0.08)	(0.15)	(0.08)	(0.18)
Non-member imports	0.358***	0.361***	0.367***	0.518***
	(0.10)	(0.10)	(0.10)	(0.12)
Non-member exports	0.11	0.11	0.2	0.2
	(0.13)	(0.13)	(0.13)	(0.16)
Processed food				
Between members	0.721**	-0.61	0.41***	1.144***
	(0.33)	(0.45)	(0.11)	(0.10)
Non-member imports	0.338***	0.335***	0.365***	0.464***
	(0.09)	(0.09)	(0.09)	(0.11)
Non-member exports	0.218*	0.238**	0.07	0.243*
	(0.12)	(0.12)	(0.14)	(0.14)
	286,810	**286,810**	**286,810**	**286,810**
	0.993	**0.993**	**0.993**	**0.993**

from non-member countries increase by 43.04%, 44.34%, and 67.87%, respectively. For the Panama-BTA, the positive and significant coefficient estimate for I_{ijt} indicates that trade increases only for imports from non-member countries by 43.48%.

For the processed food commodity, the Colombia-BTA and Peru-BTA lead to trade creation, as the positive coefficient estimates for intra-member trade (B_{ijt}) imports from non-member countries (I_{ijt}) and exports to non-member countries (E_{ijt}) are all statistically significant. In addition, intra-member trade, imports from non-member countries, and exports to non-member countries increases by 105.65%, 47.40%, and 24.36% for the Colombia-BTA and by 213.93%, 59.04%, and 27.51% for the Peru-BTA. For the Panama-BTA, the coefficient estimate for intra-member trade is insignificant, while the positive and significant estimates for I_{ijt} and E_{ijt} indicate that imports from non-member countries increases by 39.79% and exports to non-member countries rise by 26.87%. Therefore, the Panama-BTA increased processed food trade only with outside countries. The insignificance of intra-member trade could be explained because, prior to the Panama-BTA, over 99% of Panamanian agricultural products entered the U.S. market duty free because of the Caribbean Basin Initiative; the reduction of the average tariff of 15% on U.S. products entering Panama did not result in a statistical significance estimate. Therefore, even with small average tariff reductions and no intra-member trade, this BTA results in a trade-expansion effect, with out-side members used as resources more efficiently. For the Chile-BTA, as with agricultural trade, the results indicate trade expands only for intra-member trade (50.68%) and imports from non-member countries (44.05%), as the coefficient estimates for these variables are positive and significant; however, the coefficient estimate for exports to nonmember countries is positive, but statistically insignificant.

Summary and Conclusion

The results for the two-commodity model show U.S., Colombian, Panamanian, Chilean, and Peruvian consumer, farmers, and food producers benefit from these bilateral agreements. Therefore, we could expect that continued liberalization through trade agreements in Latin American countries will likely bring similar benefits.

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SECTION III. WASHINGTON DATA

Washington ($1,000)	2016	2017	2018	2019	2020
Gross cash income	**11,389,041**	**11,457,557**	**10,711,100**	**10,422,139**	**12,041,764**
All commodity receipts	**10,620,731**	**10,594,571**	**10,088,730**	**9,753,243**	**10,237,697**
Crop receipts	7,916,944	7,903,576	7,422,627	6,951,874	7,401,169
Animals and products receipts	2,703,787	2,690,995	2,666,103	2,801,369	2,836,528
Cash farm-related income	**507,844**	**629,755**	**411,652**	**432,594**	**804,151**
Forest products sold	17,286	17,948	21,712	13,650	6,733
Machine hire and custom work	100,194	110,328	23,842	56,329	133,006
Other farm income	390,364	501,480	366,097	362,615	664,412
Total direct government payments	**260,465**	**233,230**	**210,719**	**236,302**	**999,916**
Cash expenses	**8,391,168**	**8,279,108**	**8,140,210**	**7,233,505**	**9,143,348**
Interest	**361,511**	**372,858**	**404,579**	**404,951**	**380,439**
Nonreal estate	136,009	146,370	160,533	154,190	135,576
Real estate	225,502	226,489	244,045	250,761	244,863
Labor expenses	**2,289,932**	**2,263,165**	**2,220,778**	**2,314,211**	**2,626,380**
Property taxes and fees	**265,353**	**226,016**	**254,269**	**212,525**	**300,004**
Farm origin	**1,417,741**	**1,703,121**	**1,448,583**	**1,137,887**	**1,503,939**
Feed purchased	926,981	1,205,281	930,939	662,405	892,616
Livestock and poultry	144,538	201,998	185,930	212,623	279,186
Seed	346,222	295,842	331,714	262,859	332,136
Manufactured inputs	**1,472,134**	**1,446,213**	**1,273,356**	**1,095,715**	**1,627,646**
Electricity	135,776	161,680	104,721	98,413	154,575
Fertilizer and lime	558,422	449,241	406,617	368,003	529,342
Fuel and oil	286,525	221,694	248,396	208,725	289,836
Pesticides	491,411	613,598	513,622	420,575	653,893
Other intermediate expenses	**2,102,948**	**1,853,655**	**2,257,892**	**1,829,199**	**2,120,802**
Net rent to landlords	**481,549**	**414,080**	**280,754**	**239,017**	**584,139**
Net cash income	**2,997,873**	**3,178,448**	**2,570,890**	**3,188,634**	**2,898,416**

Data reported in Real 2021 dollars

Source: USDA ERS Farm Income and Wealth Statistics