



THE CURRENT & POTENTIAL

IMPACT OF EXPANDED

POTATO EXPORTS



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EXECUTIVE SUMMARY

The U.S. potato supply entails a wide spectrum of activity, from agricultural production, through wholesaling, processing, and distribution, and ending with consumer purchases of final products through retail channels or food service providers. In 2021 alone, the total economic contribution of the entire U.S. potato value chain was estimated at \$100.9 billion, supporting more than 714,000 domestic jobs in every corner of the country.

Currently, approximately 20 percent of all potatoes grown in the U.S. are destined to be exported, in either fresh or processed form, making trade a significant component of the \$100.9 billion U.S. potato industry.

- ANALYSIS**
- 1 Assesses the current economic contribution of exports of potatoes and potato products on the U.S. economy.
 - 2 Analyses the role that expanded trade opportunities would have on U.S. economic activity and jobs.

From July 2022 through June 2023, the U.S. exported \$2.2 billion in potatoes and potato products. The total economic contribution of exports of potatoes and potato products is estimated to be \$4.78 billion with an estimated impact on employment of approximately 33,846 jobs.



Based upon a conservative and achievable expansion in foreign market access and maturity (a 10 percent increase in exports to Canada, Japan, and South Korea; a 25 percent increase in exports to other East Asia markets, Mexico, and selected countries in the Middle East, and an additional \$100 million in fresh exports to Mexico and Japan) it is estimated that total U.S. Gross Domestic Product (GDP) would increase by \$1.024 billion and create an additional 5,600 domestic jobs. This expansion represents an increase of about 21 percent compared to the current impact of potato exports annually.



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INTRODUCTION



This study assesses the potential economic impact of potato exports to selected countries.



It also analyzes major markets and those markets that have a high potential for growth.



It looks at exports of table stock potatoes, frozen potato products, potato chips and dehydrated potato products.

The major markets analyzed are Mexico, Canada, Japan, South Korea, the Philippines, and Taiwan.



The markets with strong potential for growth are Saudi Arabia, and the Gulf States, Indonesia, Singapore, Vietnam, and China.



Different scenarios are used to analyze the economic impact of expanded exports. We estimate the impact of a 10 percent increase in exports to Canada, Japan, and South Korea; and a 25 percent increase in exports to Mexico, other East Asian countries, and selected countries in the Middle East. Also, fresh exports of \$100 million each to Mexico and Japan are considered. IMPLAN, a standard economic impact software package, is used to generate the estimates of the impacts. In addition to the direct impacts of increased exports, impacts of related industries in the supply chain (indirect impacts), and impacts resulting from household spending (induced impacts) are estimated. Should such export expansion occur, this assessment estimates that the additional potato supply chain activity would boost national output by \$1.024 billion per year, support approximately 5,600 jobs with annual wages of just approximately \$311 million. **This would represent an increase of 21 percent over the current economic impact potato exports of \$4.78 billion, and an employment of approximately 33,846.**

Issues and barriers to export growth are discussed. Such impediments include tariffs, quotas phytosanitary restrictions, and other policies that restrict trade, and trade value uncertainties due to exchange rate fluctuations. One way to address some of these problems is through USDA Export Programs (such as the Market Access Program and the Technical Assistance for Specialty Crops program). Funded by the Farm Bill, the Market Access Program is designed to promote exports of U.S. farm and food products. This program is especially important for specialty crops such as potatoes. The Technical Assistance for Specialty Crops program is also part of the trade title of the Farm Bill and was used very effectively to combat legal impediments in Mexico and ultimately open their market entirely to fresh potato exports.

THE ECONOMIC IMPACT OF EXPANDED EXPORTS



10% increase in exports to Canada, Japan, and South Korea.

25% increase in exports to Mexico, other East Asian countries, and selected countries in the Middle East.



The additional potato supply chain activity would boost national output by

\$1.024 billion per year,

Support approximately **5,600 jobs**

With annual wages of just approximately **\$311 million.**

ROLE OF TRADE



Table 1 shows the exports of fresh potatoes by major market. Relative to the \$4.17 billion in value of U.S. potatoes produced in 2021 (Knudson and Miller, 2023), fresh exports are a small but important market for potato growers. **Fresh potato exports from July of 2022 to June of 2023 totaled \$310.378 million.** In value terms, Mexico accounted for a third of all exports, and Canada accounted for 30 percent. The market for fresh potato exports from the U.S. is mostly consolidated as the top 11 importing countries make up about 94 percent of the value of exports. Japan, Taiwan, Honduras, and South Korea are also major outlets for U.S. produced fresh potatoes.



TABLE 1:
Exports of Fresh Potatoes
July 2022 to June 2023

COUNTRY	EXPORTS
Mexico	\$103,110,564
Canada	91,618,510
Japan	21,066,346
Honduras	15,653,460
Taiwan	14,707,796
South Korea	14,698,572
Philippines	10,273,021
Dominican Republic	7,304,664
Malaysia	4,470,682
Guatemala	5,568,155
Cayman Islands	2,995,637
Rest of the World	18,911,491
TOTAL	\$310,378,892

Source: U.S. Department of Commerce



International markets are relatively important for dehydrated potatoes. U.S. exports of dehydrated potato products are shown in Table 2. The major markets for U.S. dehydrated potatoes are similar to those for fresh potatoes. Accordingly, Canada, Japan, and Mexico are the largest markets for dehydrated potatoes, where Canada accounted for 46 percent of total U.S. exports while Japan and Mexico accounted for 16 and 15 percent of exports, respectively. It may be interesting to note that while Taiwan is a primary importer of fresh potatoes, it is more of a secondary market for dehydrated potatoes. Conversely, the United Kingdom is not a dominant destination for fresh potatoes but is for dehydrated. Like that for fresh potato exports, total dehydrated potato exports are largely consolidated to top importers. **That is, the top 11 importing countries make up over 95 percent of the value of dehydrated potato exports.**



TABLE 2:
Exports of Dehydrated Potatoes
July 2022 to June 2023

COUNTRY	EXPORTS
Canada	\$119,202,043
Japan	41,392,717
Mexico	37,677,559
United Kingdom	11,933,538
Australia	9,861,483
South Korea	8,484,252
Indonesia	3,534,867
Malaysia	4,148,752
China	4,096,890
New Zealand	1,738,440
Israel	1,586,445
Taiwan	1,520,765
Rest of the World	11,787,253
TOTAL	\$256,965,003

Source: U.S. Department of Commerce



The export market for frozen potato products is considerably different than that of fresh and dehydrated potatoes. **Exports for frozen potato products from July 2022 through June of 2023 totaled \$1.43 billion and is shown in Table 3.** This is more than double the value of fresh and dehydrated potato exports combined. Compared to fresh and dehydrated potatoes, Canada is a comparatively small importer of frozen potato products accounting for 5.2 percent of all exports. Mexico is a major importer of frozen potato products accounting for 20 percent of U.S. exports. The major market for frozen potato products is Asia, especially East Asia, where Japan accounts for approximately 26.6 percent of all exports, and South Korea accounts for 8.7 percent of U.S. exports. Finally, the export market for frozen potato products is more diversified, as the top 11 importing countries only occupies around 81 percent of the total value of U.S. exports.



TABLE 3:
Exports of Frozen Potatoes
July 2022 to June 2023

COUNTRY	EXPORTS
Japan	\$380,614,689
Mexico	287,219,965
South Korea	125,044,311
Philippines	90,799,437
Canada	73,919,799
Taiwan	73,254,463
Malaysia	59,214,700
Guatemala	54,594,357
Saudi Arabia	43,252,777
Hong Kong	35,320,076
Singapore	33,889,564
Rest of the World	273,273,000
TOTAL	\$1,430,397,138

Source: U.S. Department of Commerce



The last major category of potato exports is that of chips. Table 4 shows the 11 major export markets for U.S. potato chips. In this regard, export figures show that **Canada and Mexico are the largest markets for chips. Exports to Canada accounted for 27.8 percent**, and Mexico accounted for 18.2 percent of the total. Unlike other potato products, the Gulf States and Saudi Arabia are comparatively large importers of U.S. potato chips. Similar to that of frozen potatoes, the market for U.S. exports of potato chips is mostly diversified, with the top 11 countries only making up about 22 percent of total U.S. exports of chips.



TABLE 4:
Exports of Potato Chips
July 2022 to June 2023

COUNTRY	EXPORTS
Canada	\$56,458,986
Mexico	39,765,679
United Arab Emirates	26,320,615
Philippines	18,017,424
Japan	7,136,948
Qatar	6,999,624
Saudi Arabia	6,121,121
South Korea	4,604,185
Kuwait	4,334,778
Australia	3,812,557
Venezuela	3,594,018
Panama	2,329,496
Rest of the World	39,535,612
TOTAL	\$219,031,043

Source: U.S. Department of Commerce



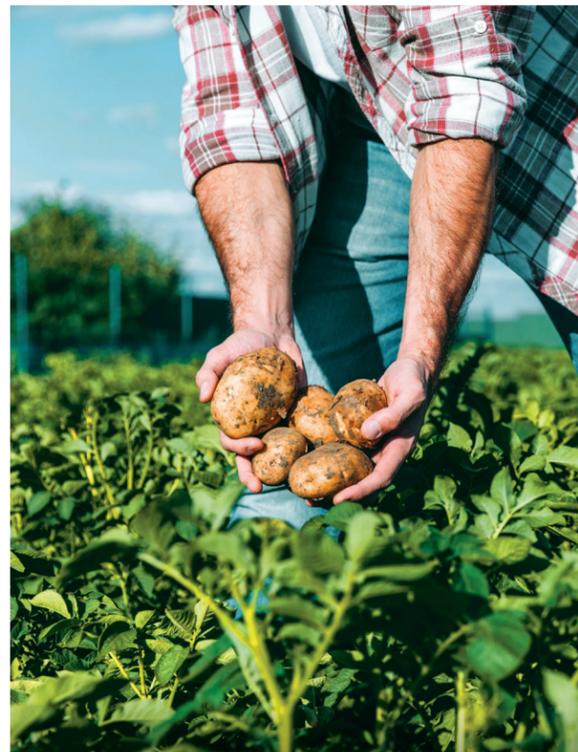
MAJOR MARKETS FOR U.S. POTATOES & POTATO PRODUCTS

For the most part, the major international markets for U.S. potatoes and potato products are developed but retain significant growth opportunities. Growing populations, increased access to markets and a growing global middle class provide opportunities for export growth. The major markets are Canada, Japan, Mexico, South Korea, and the Philippines. Some economic and demographic data on these markets are shown in Table 5. Most measures in Table 6 are in 2021 values.

TABLE 5: Economic and Demographic Aspects of Major Importers of U.S. Potatoes and Potato Products

	Canada	Japan	Mexico	South Korea	Phillippines	Taiwan
Population (Millions)	38.52	123.72	129.88	59.97	116.40	23.59
Population Growth Rate	0.73%	-0.41%	0.61%	0.23%	1.58%	0.03%
Median Age	41.8	48.6	29.3	43.2	24.1	42.3
Percent 65 and Older	20.50%	29.20%	8.00%	18.38%	5.45%	18.10%
Real GDP Per Capita	\$47,900	\$40,800	\$19,100	\$44,200	\$8,100	\$47,800€
GDP Growth Rate (2021)	4.54%	1.66%	4.72%	4.15%	5.70%	2.70%£

Source: Central Intelligence Agency 2019 values

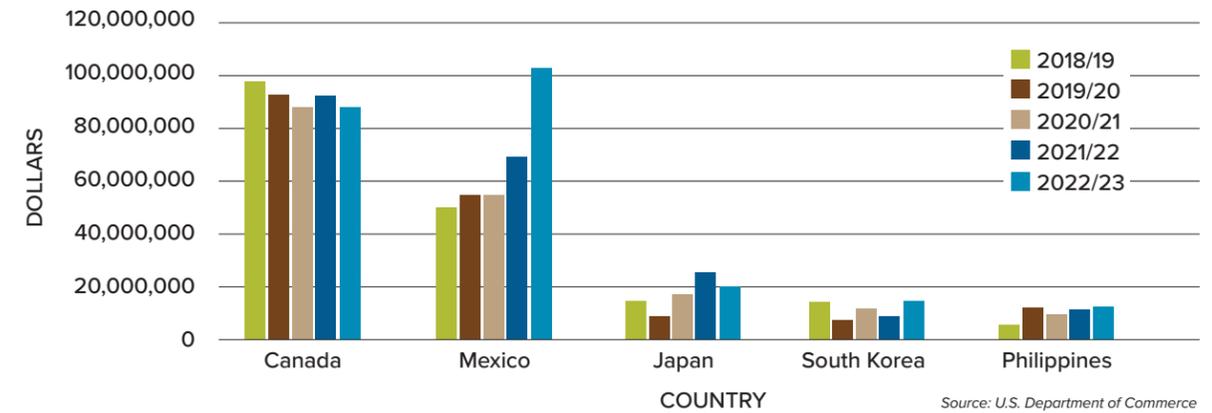


Of these markets, Mexico and the Philippines have the most potential for growth. They have growing populations, and growing economies. The populations are also comparatively young; less than 6 percent of the Filipino population is over 65 and only 8 percent of the Mexican population is over 65. If this trend continues, disposable income should increase as these populations mature, allowing market expansion for potato-derived products to persist well into the future.

While Canada will likely remain a major market for U.S. potatoes, growing other markets may require more targeted promotion. In addition to its proximity to the U.S. and similar tastes and preferences in food products, Canada is affluent. Its population is growing, although at a relatively slower rate than many developing markets. Japan, South Korea, and Taiwan face headwinds with respect to market growth. These countries are aging rapidly with relatively low rates of immigration. The population of Japan is currently in decline, while that of South Korea is expected to decline in the near future. The average age of each of these countries is above 40 and in the case of Japan approaching 50.

Figure 1 shows the level of exports of fresh potatoes to these markets from 2018/19 through 2022/23. Reported market years follow a July 1 through June 30 of the next year.

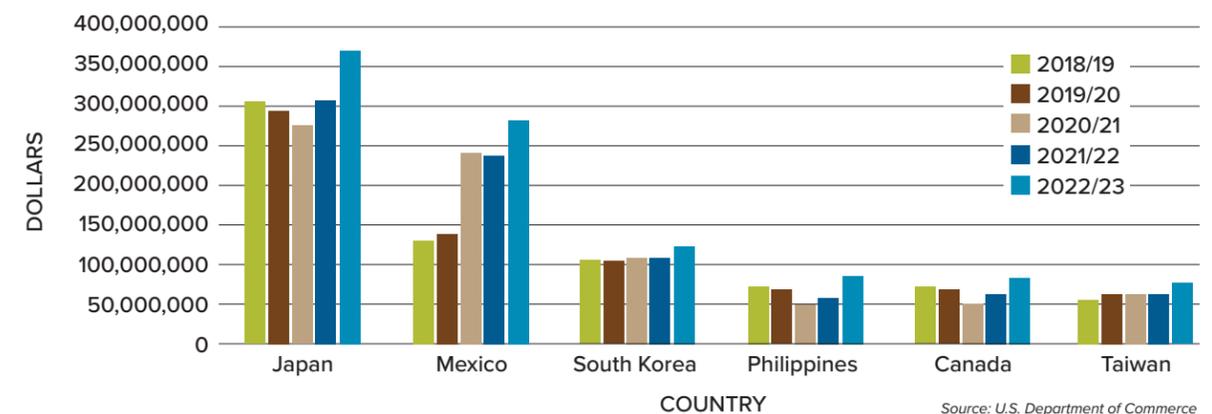
FIGURE 1: Fresh Potato Exports to Major Markets 2018/19 through 2022/23



Canada and Mexico are the dominant markets for fresh potatoes. Canada has traditionally been the largest market at just less than \$100 million a year. Exports of fresh potatoes to Canada have slowly been declining. The biggest rate of growth has been Mexico, where exports to Mexico more than doubled from \$49.3 million in 2018/19 to \$103.1 million in 2022/23 as full market access was achieved in Spring of 2022. Alternatively, there appears no discernable trends for Japan, South Korea, and the Philippines. The former two countries are constrained by market access issues. Japan does not provide fresh potatoes access to the U.S. or any country, while South Korea operates under a supply-limiting tariff quota regime.

Similar to Figure 1, Figure 2 shows the exports of frozen potato products to the large markets. The dollar value of U.S. exports of frozen potatoes far exceeds that of fresh potatoes to the same markets. Relative to trend, 2022/23 was an excellent year for frozen potato exports, with the top four importers commanding significant increases in orders for the year. For example, exports to Japan increased from \$302.3 million in 2021/22 to \$380.6 million in 2022/23. As is the case with fresh potatoes, Mexico has seen the biggest increase in imports from the U.S. Exports to Mexico more than doubled from 2018/19 to 2022/23 from \$128.0 million to \$287.2 million. Exports to South Korea, the Philippines and Taiwan also registered gains in 2022/23. Exports to Canada remain steady.

FIGURE 2: Exports of Frozen Potatoes 2018/19 through 2022/23



MAJOR MARKETS FOR U.S. POTATOES & POTATO PRODUCTS CONT.

Figure 3 shows the exports of potato chips to these countries. The export market for potato chips is interesting. In volume terms, Mexico is the largest importer of U.S. potato chips. In dollar value, Canada is the largest market. It may be the case that Mexican consumers are more value conscious and buy lower priced chips. While not on the list, The United Arab Emirates is the third highest volume foreign market for U.S. chips. South Korea shows consistent growth although from a low base. In volume terms, exports of chips to South Korea exceeded those of Japan in 2022/23. Unlike other potato products, Taiwan is not a major importer of chips, and the trend is downward.

FIGURE 3: Exports of Potato Chips to Major Markets 2018/19 through 2022/23

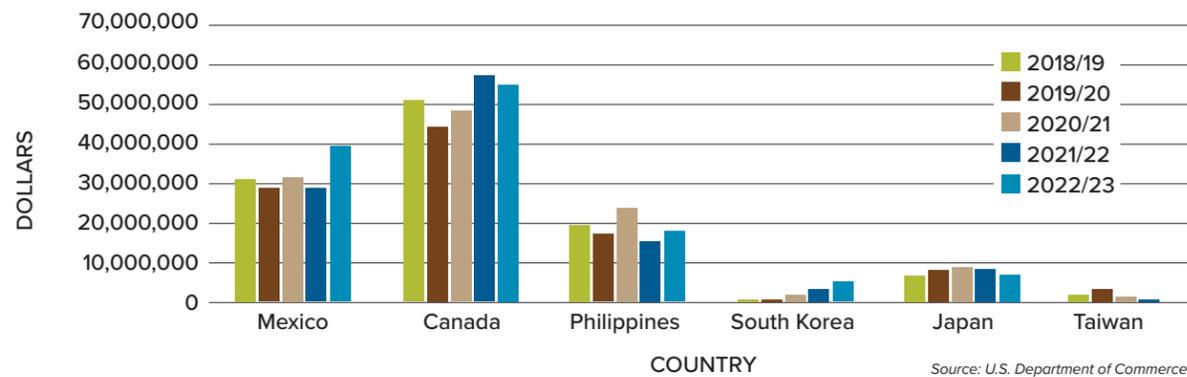
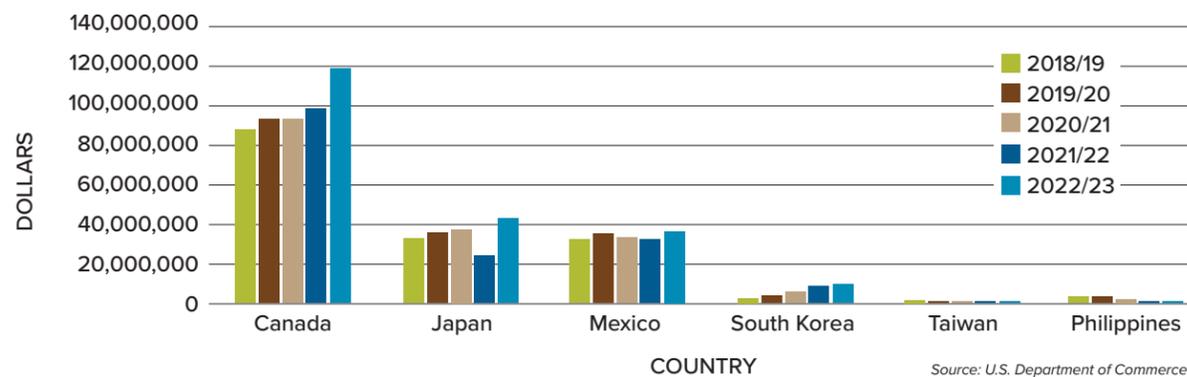


Figure 4 shows the major export markets for dehydrated potatoes from 2018/19 through 2022/23. While most markets exhibit stability to growth, growth in the value of dehydrated potatoes to Canada has been steep and steady. Exceeding trend, the value of exports in 2022/23 to Canada was \$119.2 million compared with \$88.2 million in 2018/2019. Japan has also seen overall growth in imports of dehydrated potatoes, rising from \$31.3 million in 2018/19 to \$41.4 million in 2022/23. However, the trend in Japan and other importing countries was temporarily disrupted in 2021/22 with no lasting effect. As is the case with chips, exports to South Korea are increasing although from a small base. Alternatively, exports to the Philippines are declining, despite the favorable demographic conditions the country exhibits. Alternatively, export trends to Taiwan show no sure direction.

FIGURE 4: Major Export Markets for Dehydrated Potatoes 2018/19 through 2022/23



EAST ASIA EXPORT MARKETS

While not as large as traditional export markets, there is potential for growth in selected East Asian countries. The markets considered are Indonesia, China, Singapore, and Vietnam. Table 6 shows selected economic and demographic information for these countries.

TABLE 6: Economic and Demographic Aspects of Selected East Asian Markets of U.S. Potatoes & Potato Products

	China	Indonesia	Singapore	Vietnam
Population (Millions)	1,413.14	279.48	6.00	104.8
Population Growth Rate	0.18%	0.76%	0.90%	0.93%
Median Age	38.4	31.1	35.6	31.9
Percent 65 and Older	14.11%	7.68%	13.70%	7.87%
Real GDP Per Capita	\$17,600	\$11,900	\$106,000	\$10,600
GDP Growth Rate (2021)	8.11%	3.69%	7.61%	2.56%

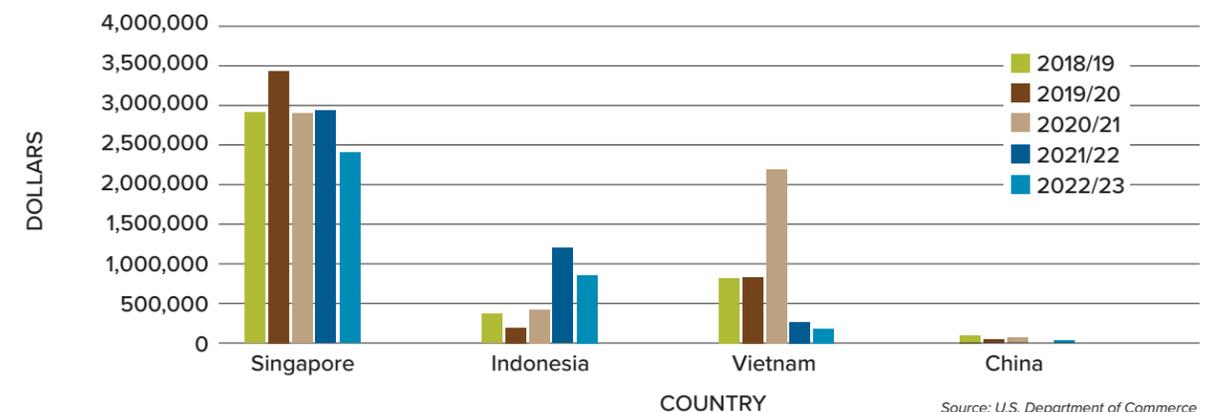
Source: Central Intelligence Agency 2019 values



With the exception of Singapore, these countries have large populations. With the exception of China, the population growth rates are also comparatively high. These are also young societies with comparatively high rates of economic growth. Singapore is one of the world's richest countries, while the others are quickly becoming middle income countries with a growing middle class. All these factors have the potential to expand U.S. potato exports. Despite the current level of contentiousness between China and the U.S., a market of 1.4 billion people who are increasingly middle class cannot be ignored.

Figure 5 shows the U.S. exports of fresh potatoes to these countries. Singapore is the dominant fresh potato market among these countries. Exports to Indonesia also appears to be trending upward. Exports to Vietnam peaked at an excess of \$2.0 million in 2020/21 but have declined since then primarily due to tariff disparities between the U.S. and competitors. Exports of fresh potatoes to China are minimal as market access was gained in 2020 just before COVID and few Chinese facilities are currently approved for export.

FIGURE 5: U.S. Exports of Fresh Potatoes to Selected East Asian Markets 2018/19 through 2022/23



EAST ASIA EXPORT MARKETS CONT.

Figure 6 shows the exports of frozen potato products to these markets. Frozen potatoes are the dominant product form in terms of exports. In the late 2010s China was a major importer of U.S. frozen potatoes, with exports to that country exceeding \$80 million. Exports have significantly declined since then. Exports to Vietnam have also been declining, while those to Indonesia appear stable except for a temporary decline during the Covid years. Exports to Singapore have remained consistent at about \$30 million a year, while trending toward growth.

FIGURE 6:
U.S. Exports of Frozen Potatoes to Selected East Asian Markets from 2018/19 through 2022/23

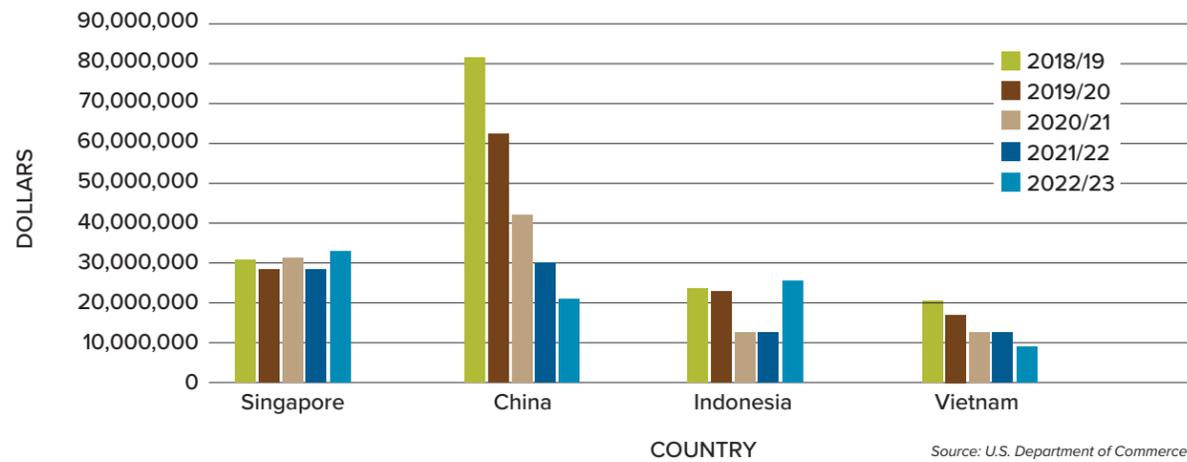
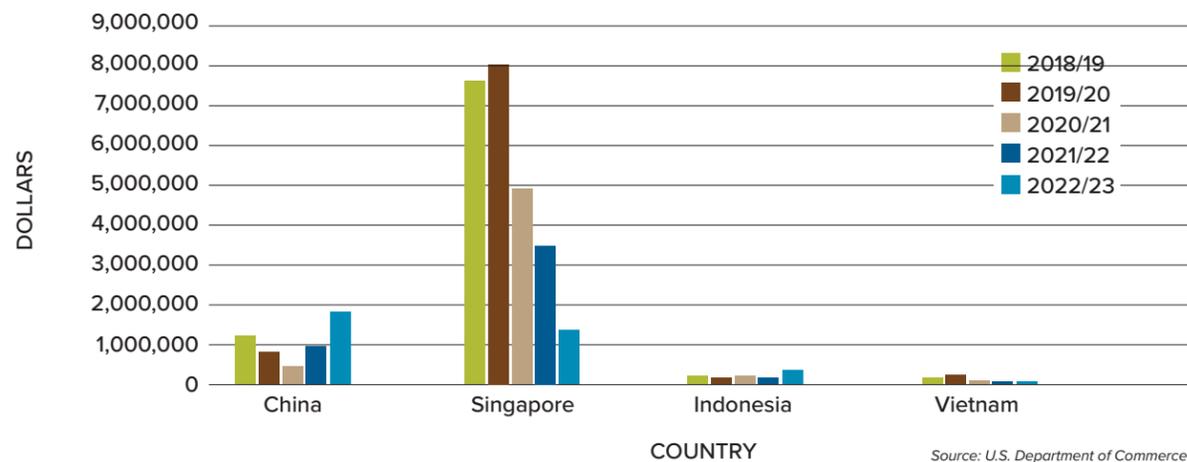


Figure 7 shows the export trends of chips to these countries from 2018/19 through 2022/23. Singapore has traditionally been the largest market for chips, but there has been a significant decline since 2019/20. Exports to China appear to be increasing but from a very low level, while exports to Indonesia and Vietnam are minimal. Collectively, exports in the late 2010s for the region were about \$10 million but have fallen to less than \$5 million in 2022/23.

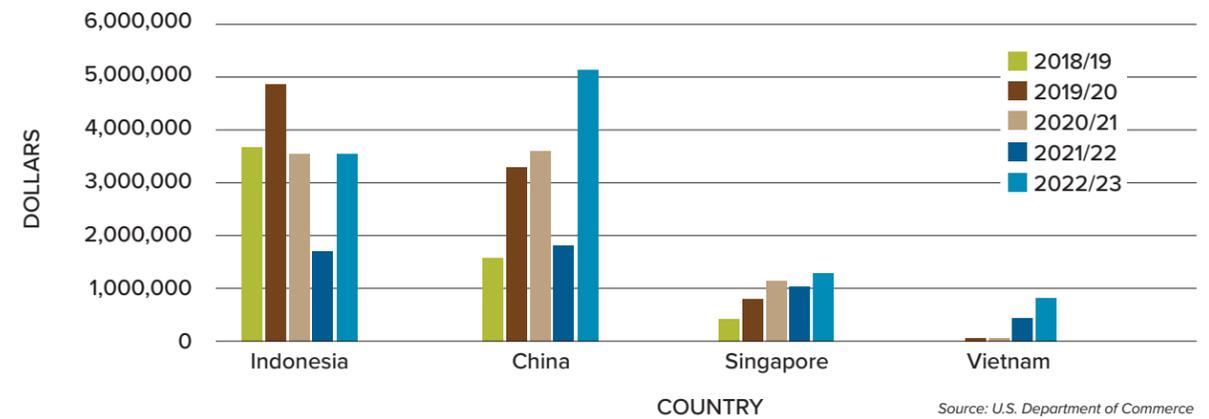
FIGURE 7:
Exports of Potato Chips to Selected East Asian Countries 2018/19 through 2022/23



EAST ASIA EXPORT MARKETS CONT.

Figure 8 shows the exports of dehydrated potatoes to these countries from 2018/19 through 2022/23. The two largest markets for dehydrated potatoes are Indonesia and China, though exports to Singapore and Vietnam appear to be increasing. It should be noted that total exports of dehydrated potatoes to these nations are about \$10 million a year.

FIGURE 8:
Exports of Dehydrated Potatoes to Selected East Asian Countries from 2018/19 through 2022/23



While not as large as traditional export markets, there is potential for growth in selected East Asian countries.



SAUDI ARABIA & THE GULF STATES

United Arab Emirates (UAE), and Bahrain. With the exception of Saudi Arabia and the UAE, these countries have small populations, but they are growing faster than many other countries. They are also very young populations; the average age in every country is under 40. Table 7 shows selected demographic and economic data for these countries.

TABLE 7: Demographic and Economic Data of Saudi Arabia and the Gulf States

	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	United Arab Emirates
Population (Millions)	1.55	3.10	3.83	2.53	35.94	9.97
Population Growth Rate	0.85%	1.13%	1.80%	0.86%	1.65%	58.00%
Median Age	32.9	29.7	26.2	33.7	30.8	38.4
Percent 65 and Older	4.03%	3.40%	3.95%	1.41%	4.19%	2.00%
Real GDP Per Capita	\$49,400	\$43,900	\$34,300	\$92,900	\$44,300	\$69,700
GDP Growth Rate (2021)	2.23%	-8.86%	3.09%	1.59%	3.24%	3.92%

Source: Central Intelligence Agency £ 2020 values



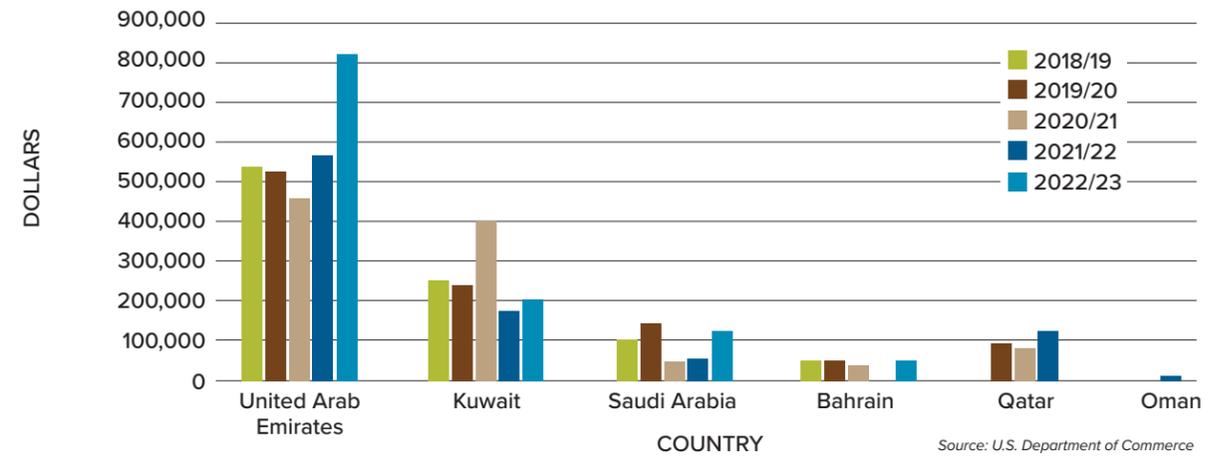
There are two interesting aspects of these countries. The first is that immigrants are an important source of workers and demand for products in these countries. In the UAE, 88.1 percent of the population is comprised in immigrants, in Kuwait 70 percent of the population in non-Kuwaiti, and 88.4 percent of the population in Qatar are non-Qataris. Even in Saudi Arabia 38.3 percent of the population is comprised of non-Saudis. Most of these immigrants and their children are from South Asia (India, Bangladesh, and Pakistan) (CIA). The second is that despite the fact that the per capita GDPs in these countries are comparatively high, incomes may not be distributed evenly. That is, income disparity is significant in these countries and many workers work in relatively low paid service jobs.

Most of these countries experienced significant economic growth over the last ten years, though 2021 GDP growth was largely mixed in 2021. While the price of oil is a major factor in determining GDP in many of these countries, concerted efforts to diversify the economies are under way, providing renewed sources of growth and greater overall economic stability than afforded as oil-dominated economies.

Figure 9 shows the U.S. exports of fresh potatoes to this region. Overall, the U.S. does not export many fresh potatoes to these countries. No country exported more than \$1 million during this period. The UAE and Kuwait are the only countries with significant imports of fresh potatoes. It is also difficult to identify salient trends in the market for U.S. imported potatoes. While the UAE sharply increased imports in 2022/21, it does not appear to exhibit a trend. Kuwait had a similar spike in imports in 2019/20. Similarly, there does not appear to be an immediate trend in annual imports of fresh potatoes.



FIGURE 9: Exports of Fresh Potatoes to Saudi Arabia and the Gulf States from 2018/19 through 2022/23



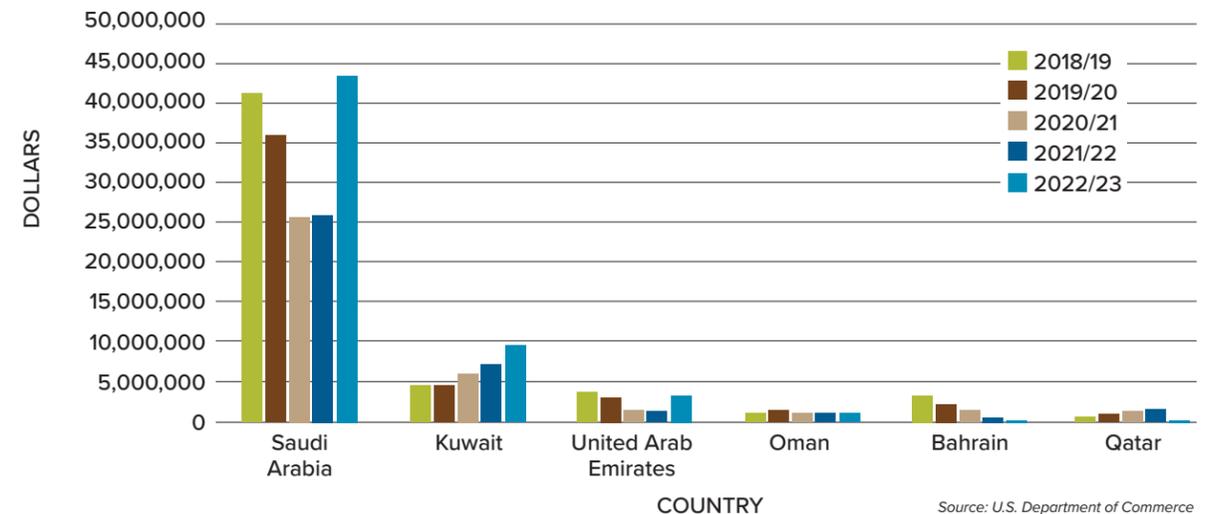
Source: U.S. Department of Commerce

Figure 8 shows the exports of dehydrated potatoes to these countries from 2018/19 through 2022/23. The two largest markets for dehydrated potatoes are Indonesia and China, though exports to Singapore and Vietnam appear to be increasing. It should be noted that total exports of dehydrated potatoes to these nations are about \$10 million a year.

Exports of frozen potatoes from 2018/19 through 2022/23 are shown in Figure 10. Unlike fresh potatoes, the market for frozen potatoes in some countries is comparatively large. The largest market by far is Saudi Arabia. After declining from 2019/20 through 2021/22, exports rebounded to about \$43.3 million in 2022/23. While starting from a smaller base, exports to Kuwait show consistent growth and approached \$10 million in 2022/23. The other countries are not major importers of frozen potatoes from the U.S. and show varying degrees of trends by country.



FIGURE 10: Exports of Frozen Potatoes to Saudi Arabia and the Gulf States from 2018/19 through 2022/23

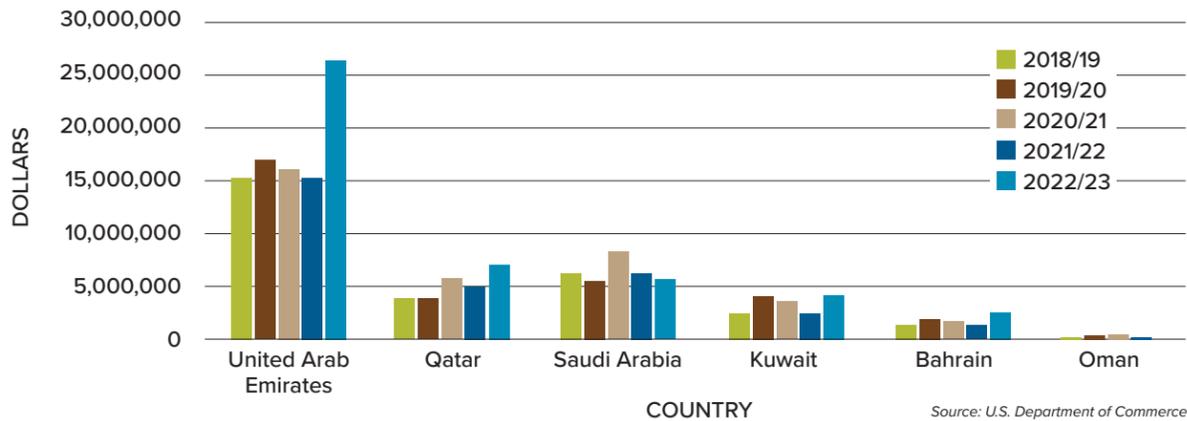


Source: U.S. Department of Commerce

SAUDI ARABIA & THE GULF STATES CONT.

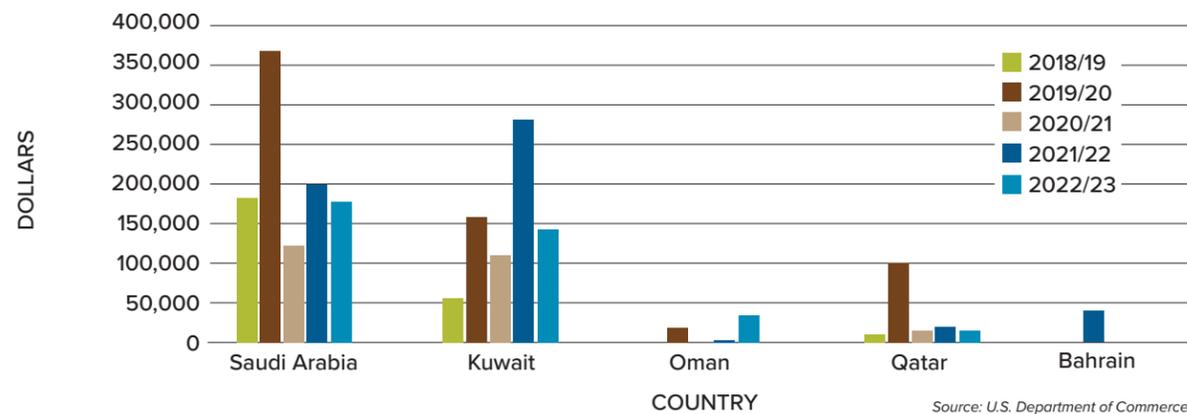
Figure 11 shows the exports of potato chips to these countries from 2018/19 to 2022/23. The UAE is the primary market for chips in this part of the world. Exports to the UAE were \$26.3 million in 2022/23. Qatar showed some growth during this time although this may be due to the World Cup soccer tournament being held there. Exports to Saudi Arabia also exceed \$5 million a year during this time. Kuwait and Bahrain also make up significant imports of chips. Alternatively, Oman imports few potato chips from the U.S.

FIGURE 11: Exports of Potato Chips to Saudi Arabia and the Gulf States 2018/19 through 2022/23

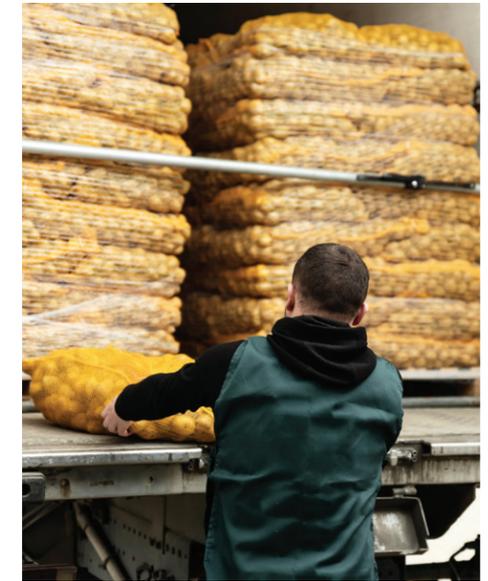


Sales of dehydrated potatoes to the region from 2018/19 through 2022/23 are shown in Figure 12. Unlike frozen potatoes and chips, exports of dehydrated potatoes to this region are minimal. While there appears to be a wide variation from year to year it is important to note that total exports to the region never exceeded \$700,000 during this time period. Saudi Arabia and Kuwait are the two largest markets and the overall trend in volume appears unstable over time.

FIGURE 12: Sales of Dehydrated Potatoes to Saudi Arabia and the Gulf States from 2018/19 through 2022/23



BARRIERS TO EXPORTS

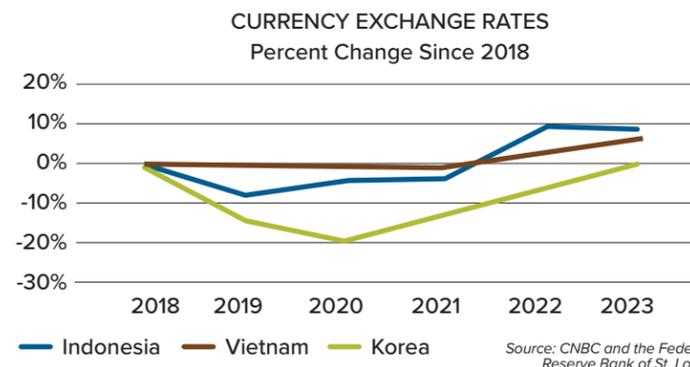


In addition to increased global production of potatoes, the U.S. potato sector faces three barriers to exports. The first are tariffs and quotas which are taxes or limits imposed by foreign countries on imports from the U.S. They can be imposed on specific countries and commodities for various reasons. Tariffs effectively raise the price of a product in the importing country and therefore reduce the amount demanded by consumers. Tariffs are generally applied to the purchase price of the commodity imported. Quotas are direct limits on the amount of a product that can be imported.

In markets where the U.S. has negotiated free trade agreements, tariffs are normally not a barrier. However, the U.S. has not negotiated a new free trade agreement for many years. As a result, there are markets where tariff barriers remain an issue for U.S. potato exports. Tariffs in China, the Philippines, and Vietnam are particularly challenging because they are higher for the U.S. than competitors who have negotiated trade agreements with lower potato tariffs.

Given the current political environment, reducing Chinese tariffs will be difficult. Reducing tariffs in Taiwan and Vietnam may be easier but, increasingly, tariff reductions tend to be part of a larger discussion on reducing trade barriers on a wide range of products in both countries. Reducing agriculture tariffs in trade agreement negotiations is not a high priority for the current administration.

FIGURE 13: The Value of the Indonesian Rupiah, The Vietnamese Dong, and the Korean Won to the U.S Dollar 2018 through Oct. 2023



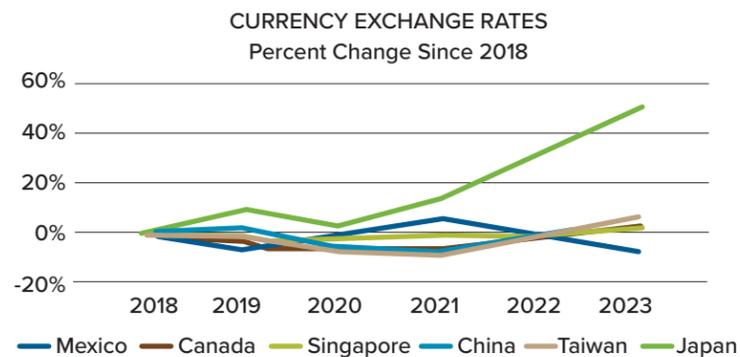
The second issue is the value of the U.S. dollar. Higher interest rates in the U.S. have strengthened the position of the U.S. dollar compared to many currencies, especially the Japanese yen. This impacts potato exports by making U.S. potatoes more expensive in markets with weak currencies. It should be noted that the value of the dollar has no impact in Saudi Arabia or the Gulf States, as these countries have fixed their currencies to the dollar.

Figures 13 and 14 show the value of the foreign currencies relative to the U.S. dollar. An increase in the exchange rate means that it requires more local currency to equal a set value in U.S. dollars. That is, the value of the U.S. dollar is increasing for that market. For most of these currencies there has been a noticeable decline since the end of 2021, though most (excluding Japan) show a high degree of stability. When currencies like the Japanese yen lose value against the dollar, U.S. goods become more expensive. Conversely, a decrease in the exchange rate makes U.S. goods less expensive.

As shown in Figure 13, the Korean won has been relatively steady during this time at about 1,300 won per dollar although it did appreciate compared to the dollar in 2019 and 2020. The value of the Vietnamese dong has declined by 7.6 percent since 2021 and is approaching 25,000 dong per dollar. The value of the Indonesian rupiah has declined by 11.9 percent since 2021.

The value of the Canadian and Singapore dollars relative to the U.S. dollar have been consistent at about 1.36 to one U.S. dollar. However, in the case of Canada the value is high by historical standards. The value of the Chinese yuan has declined by about 14.8 percent since the end of 2021 and the value of the Taiwanese dollar has declined by 17.1 percent since 2021. The only currency that has appreciated relative to the U.S. dollar is the Mexican peso. Its value is up 11.3 percent since 2021. This strengthens Mexico’s potential as a market for U.S. potatoes.

FIGURE 14:
The Value of the Taiwan Dollar, Canadian Dollar, Mexican Peso, Singapore Dollar, Japanese Yen, and Chinese Yuan to the U.S. Dollar 2018 through Oct. 2023



Source: CNBC and the Federal Reserve Bank of St. Louis

Japan is a special case. The value of the yen has declined precipitously since 2018. It has declined by 13.4 percent since 2021 and by close to 50 percent since 2018. This reduces the potential to expand exports to Japan, a very important market for U.S. potato products. This can be offset if phytosanitary and transportation regulations on U.S. potatoes are altered to allow more potatoes to be exported to Japan.

The Market Access Program (MAP) program is funded by the U.S. Farm Bill and is designed to promote U.S. agricultural and food

products in foreign countries. To qualify for the program an organization must be a nonprofit U.S. agricultural trade organization, a cooperative, or a state agency (Federal Register 2020). The USDA funds those applications that it considers having the best opportunity for developing, maintaining, or expanding exports (Federal Register 2020). Organizations who qualify must provide some matching funding. Funds are used for promotion, market research, trade shows, and trade services (Somers et al. 2022).

Promotion is important because foreign consumers are more sensitive to changes in price than U.S. consumers (Richards 2021). Foreign consumers have more substitutes in terms of other products and other sources of potatoes than U.S. consumers.

For fiscal year 2023, a total of \$175.6 million was allocated for the program. Potatoes USA, (officially known as The National Potato Promotion Board) received slightly less than \$4.4 million (FAS). Total spending on Farm Bill Activities in Fiscal Year 2023 was \$196 billion (USDA 2019), of which approximately \$147 billion was spent on nutrition programs (Ziadeh 2023). Total MAP funding was less than 1 percent of total Farm Bill spending in fiscal year 2023.

Previous studies using both a benefit-cost ratio and return on investment indicate that the rate of the return range from 34 percent to more than 132 percent in both the short run and the long run (Richards 2021). Another study estimated that U.S. agricultural export value increased by \$24.50 for every dollar spent on export market development (Somers et al. 2022), giving standing to the need to continue funding this program within the Farm Bill.

The third limitation on exports includes sanitary and phytosanitary (“SPS”) and technical barriers to trade (“TBT”) issues. These impediments can outright block market access for agricultural products and are significant barriers, particularly when used improperly.

Both Japan and Mexico provided good examples of the impact of these regulations on U.S. exports. Japan limits ports of entry and restricts overland transportation of U.S. chipping potatoes to two ports (Satake 2023). Other soft barriers to trade include the mandate that processing facilities for imported potatoes, but not those for domestically produced potatoes, must have an incinerator and a wastewater treatment system on site. This adds to the costs of imported potatoes and protects domestic Japanese producers. Another barrier in place in Japan mandates that imported potatoes cannot be used as an input for other products (Kurai 2020). The biggest current trade barrier by far, however, is Japan’s stalling on market access for U.S. fresh potato exports using phytosanitary issues as an excuse. Because of this delay, Potatoes USA has estimated that roughly \$100 million in fresh potato exports are being lost each year in Japan.

Both Japan and Mexico are markets with a great deal of potential for expanded exports. Fully opening both of these markets to processed products and fresh potatoes could easily generate an additional \$200 million in U.S. exports. It should also be noted that these types of regulatory barriers are not unique to Japan and Mexico and that breaking down other tariff and non-tariff barriers to trade can further promote U.S. domestic production of potatoes and other similarly export-oriented commodities.



The U.S. potato sector faces three barriers to exports

- 1. Tariffs and quotas**
- 2. Value of the U.S. dollar**
- 3. SPS and TBT issues**



ECONOMIC IMPACT OF EXPANDED EXPORTS



Like all industries in the U.S., the domestic supply chain supporting the production of raw potatoes, processing them, and delivering them to consumers in fresh or processed form generates economic activities that exceeds the direct value of the final products sold for consumption. This section traces the transactions involved in the production of potatoes from the agricultural inputs all the way to the distribution of final goods for consumption. The corresponding economic contribution estimates recognize that directly associated transactions give rise to secondary transactions as dollars are spent and re-spent in the economy in a reciprocal fashion not unlike the ripples on water created by tossing a rock into an otherwise calm pond. That is, the estimates entail what is commonly referred to as an economic multiplier effect.

One should be careful to note that the estimation framework employed in this section reflects an economic contribution assessment, not an economic impact estimate. Economic impact estimates follow the same approach as economic contribution assessments. However, economic impact estimates must take into account all lost economic activities supplanted by the industry in question, while economic contributions

only account for the economic value of activities directly and indirectly attributed to the industry in question. For example, an economic contribution assessment of agricultural production of potatoes will measure the selling value of potatoes produced and the value of all the inputs required to make that output. An economic impact assessment of agricultural production of potatoes will also measure the economic value of the sold potatoes and the associated input values. However, it will go farther to recognize the lost activities associated with the alternative crops that would be grown in the absence of potatoes. For instance, the acres allocated to potatoes may supplant the sale and production values of corn on those same acres. Unfortunately, determining what production potatoes supplants can be challenging as this counter-factual state of production does not exist and cannot be observed directly. An economic contribution assessment does not require conjecturing the nature of agricultural production in the absence of potato production. In total, economic impact assessments impose significant barriers to estimation over that of economic contribution assessments.

One of the shortcomings of any economic contribution estimate, like that provided in this report, is that other supply chains can also be claimed for some associated economic activities. For example, the mashed potatoes that go into a frozen meal, like shepherd's pie, are co-mingled with other ingredients. Accordingly, the supply chain for minced beef or lamb can also assert ownership to the same value attributed to potatoes in the value of the finished good, shepherd's pie. While the estimates provided in this analysis shares out that portion of the finished good that can be attributed to potatoes, the very nature of the economic simulation model assures that if we were to measure the economic contributions of all inputs into final products entailing potatoes, the total economic contribution would entail excessive double-counting of effects across the multiple inputs.



DATA AND METHODS



The USDA, National Agricultural Statistics Service (NASS) is the primary source of information for potato production, sales, and trade. This agency also provides breakouts of commodity sales by form (frozen, fresh, dehydrated, etc.). The USDA Agricultural Marketing Services (AMS) provides in-depth coverage of trade flows of raw and processed potatoes. The U.S. Department of Commerce provides detailed transactions data called a social accounting matrix (SAM) that allows measures of inputs into the agricultural production process of growing potatoes, as well as that of processing, wholesaling, and retailing. The SAM traces all purchases and subsequent transactions along all supply chains and forks in channels from raw material inputs to final goods. As a social accounting construct, the SAM is a system of double entry accounting, where a receipt for one party is an expenditure of another. One's expenditure for potato inputs reduces their ability to spend on other things, and when one sells potatoes, the seller uses those revenues to make subsequent expenditures. Businesses take revenues from sales and restock inventories and pay for inputs and services. Those firms supplying inputs and services take these earnings and pay for inventory, inputs, and services. Firms also pay wages to workers and profits to shareholders, and these beneficiaries take these earnings and spend them on household expenditures, setting off subsequent rounds of transactions that cease only to the extent that purchases are made for goods and services rendered outside the local economy. These cycles continue indefinitely, mitigated only to the extent that individuals and institutions save, rather than re-spend from earnings and the extent to which subsequent purchases go to international suppliers.



The IMPLAN economic simulation model is used to model transactions and subsequent rounds of expenditures using the U.S. domestic SAM. IMPLAN is a well-established economic simulation model developed on over 50 years of economic research. It provides 544 distinct industry details, allowing for granular tracking of transactions. Consistent with the economic theory underlying the model, the IMPLAN simulation model is strictly backward looking. That is, modeling the economic transactions of agricultural output starts with the value of agricultural production and traces all the inputs required to make that output. It is mostly silent about what happens to that output after it leaves the farm. Similarly, if the analysis starts with the value of wholesale activities, the analysis will start with the value of wholesale sales of potatoes and work backward, capturing the value of agricultural production necessary to supply the wholesale sales of potatoes. However, measuring potatoes’ share of value becomes increasingly murky moving down the supply chain (Miller & Mann 2020), as potatoes are intermingled with other inputs, value added activities, and internationally traded goods and services. Because it becomes increasingly difficult to assign component contributions to final value as we move down the supply chain to retail and food service, the most precise measure of the value of potato production will be found at the farm gate. All value-added attributes beyond this point should be inferred based on the farm-gate values. We use the USDA Food Dollar Series (described below) to project value added along each step of the supply chain.



For estimating economic contribution along the supply chain, we turn to the USDA, Economic Research Service’s Food Dollar Series (USDA: Economic Research Service 2022). The Food Dollar Series breaks consumer expenditures on food into component parts based on the industry groups. Each industry group represents the share of value of consumer dollar captured. The Food Dollar Series provides two key measures used in this contribution assessment. First, it provides an objective means of measuring the value of final goods created by agricultural production of potatoes. Accordingly, the Food Dollar Series suggests that 7.4¢ out of every food dollar is captured by the farm. The expected value of consumer goods purchased through retail or food service channels can be estimated simply by taking the ratio of farmgate sales to this farmgate value. For instance, the USDA reports that farmgate sales potatoes were \$4.17 billion in 2021 (USDA: NASS 2022). Based on the Food Dollar Series, this suggests that the value of final goods for consumption would be \$55.95 billion in 2021. This would be an objective measure if all domestic production was processed and consumed domestically. However, as discussed above, trade constitutes small yet measurable components of the U.S. domestic potato production and demand. Based on volume, trade makes up about 0.34 percent of total domestic volume of potato consumption. While imports and exports can take place anywhere along the supply chain, for simplicity we assume it takes place from the farm gate and adjust farmgate sales down by 0.34 percent in the final estimates. Accordingly, we assert the final value of sales from domestic potato production and processing is \$55.76 billion in 2021.

In addition to providing an estimate for the value of final goods produced with potatoes, the Food Dollar Series (USDA: Economic Research Service 2022) also provides a means of breaking out value at each stage of the supply chain. Table 11 reproduces the USDA Economic Research Service Food Dollar Series industry component estimates. These objective measures should be consistent with the values used in the IMPLAN model in simulating economic contributions. The columns in Table 8 show the capture of primary factors of production – or the factor share of value created. With the total value of final domestic goods of \$55.76 billion and the industry group breakouts in Table 8 the economic contribution of the domestic potato production supply chain can be simulated and estimated.

TABLE 8:
Food Dollar Series – Industry Group Value Added by Factors

Industry Group	Total (cents)	Imports (cents)	Output Taxes (cents)	Property Income (cents)	Salary & Benefits (cents)
All industries	100	5.1	5.1	39.4	50.3
Agribusiness	2.2	0.6	0.1	1	0.6
Farm production	7.4	1	-0.4	5.2	1.7
Food processing	15.2	1.2	0.6	5.8	7.7
Packaging	2.9	1	0	0.8	1.2
Transportation	3.6	0	0	1.4	2.2
Wholesale trade	10.7	-0.3	1.7	4.2	5.1
Retail trade	12.7	0.3	1.9	3.9	6.7
Food services	33.6	0.6	0.7	12.2	20.1
Energy	3.2	0.4	0.3	1.6	1
Finance and insurance	3.6	0.1	0.1	1.4	1.9
Advertising	3.0	0.2	0	1.5	1.3
Legal and accounting	1.8	0.1	0.1	0.7	1.1

Note: Values may not add to totals due to rounding. Source: USDA, Economic Research Service, Food Dollar Series, 2022.

Each industry group can be modeled in isolation, netting out the simulation of other industry groups. Recall that the simulation model is backward-looking, such that all inputs are accounted for in the simulation up to the industry group being modeled. Hence, when modeling wholesale activities, for example, food processing, farm production and agribusiness activities are automatically built into the simulation. Not netting out these upstream activities will result in double counting those activities. Hence, direct expenditures of upstream activities are netted out in estimates for each leg along the supply chain.

Finally, IMPLAN provides multiple measures of economic effect. First, as established in the economic modeling literature, simulations are undertaken by tracking the value of transactions – also called output. However, other measures of economic activity can be reported. More common measures of economic activity include employment, labor income and value added. Each are estimated for each of the 544 industries and simulated based on a fixed relation to the level of output. Hence, there are four measures of economic activity, output, employment, labor income and value added, and each measure moves in proportion to the level of output by segment.

Three metrics make up economic contribution estimates, regardless of which measure is used to gauge the value of economic activity. The first is the direct effects, which from an output perspective, is the value of transactions directly observed by the industry group tracked – that is, along the potato industry supply chain. Secondary effects are the combined economic activities generated from secondary business-to-business transactions or those transactions made by recipients of the direct expenditures. As businesses spend from initial sale receipts and households spend from earnings garnered by expenditures along the supply chain, they set into motion secondary transactions not made by the supply chain participants but rather in response to supply chain expenditures. In summary, economic effects can be categorized as those arising from activities along the supply chain and those effects arising because of activity along the supply chain. The total economic effect is simply the sum of the direct and secondary effects and is relevant for all measures of economic activity.

ECONOMIC CONTRIBUTION ESTIMATES



Estimating the economic contribution of the U.S. Domestic potato supply chain starts with sequentially simulating industry group transactions, netting out the direct transactions of the previous industry group. The first industry group modeled was farm production and agribusiness, of which, the prior value is established by USDA statistics. The second can be estimated as 2.2 percent (See Table 8 of the value of final potato goods). Subsequently, wholesale and production activities are simulated and added to the economic contribution estimates of agricultural production. However, to control double counting, direct expenditures of agricultural production and agribusiness is subtracted from the wholesale economic effects. Retail and food service contributions were added – once again netting out prior leg direct effects, where prior leg direct effects had to be split between retail and food service channels. Prior leg direct effects were split based on share of the Food Dollar Series allocation to each of the two channels. The resulting estimates are shown in Table 9 where the Total is the sum of the estimated contributions by leg.

Accordingly, the estimates suggest that about 404,700 U.S. jobs can be directly linked to the U.S. domestic supply chain for potatoes and potato products. Once accounting for secondary effects, the estimates show that about 714,500 jobs are supported directly or indirectly by the domestic potato products supply chain. Relative to the size of the labor force, this suggests that about 0.4 percent of U.S. jobs can be attributed directly or indirectly to domestic potato production and marketing. About 66 thousand of those jobs can be tied directly or indirectly to agricultural production and agribusiness services. Food processing and wholesaling supports over 174,000 jobs, while just under 500 thousand retail and food services jobs can be linked to the domestic potato supply chain.

The approximate 714,500 jobs are estimated to generate around \$34.1 billion in annual labor income and boost annual national income by \$53.5 billion. These earnings are driven by around \$100 billion in direct and secondary transactions, while \$37 billion in spending can be directly linked back to the potato supply chain. Collectively, when accounting for all sources of earnings, the estimates anticipate that the domestic potato supply chain promotes annual gross domestic product by \$53.5 billion a year.

ECONOMIC EFFECTS OF EXPORT EXPANSION

The estimates of economic contribution in Table 9 forms the baselines for estimating the expected economic effects of expanding U.S. potato exports. This section explores those potential economic effects. In interpreting the estimates, it is important to remind that the resulting estimates are derived using economic contribution approaches to measuring economic effect. In doing so, the estimates implicitly assume that expanding potato production does not offset other domestically produced crops which often compete for agricultural lands.

TABLE 9:
Estimated Economic Contributions Along the Domestic Potato Supply Chain

AGRICULTURE

Impact Type	Employment	Labor Income	Value Added	Ouput
Direct Effect	29,023	\$1,228 Mil.	\$2,175 Mil.	\$4,170 Mil.
Secondary Effect	37,581	\$2,120 Mil.	\$3,535 Mil.	\$6,621 Mil.
Total Effect	66,604	\$3,348 Mil.	\$5,711 Mil.	\$10,791 Mil.

PRODUCTION & WHOLESALE

Impact Type	Employment	Labor Income	Value Added	Ouput
Direct Effect	55,392	\$3,779 Mil.	\$4,770 Mil.	\$12,998 Mil.
Secondary Effect	118,951	\$7,687 Mil.	\$12,950 Mil.	\$27,176 Mil.
Total Effect	174,343	\$11,466 Mil.	\$17,720 Mil.	\$40,174 Mil.

RETAIL

Impact Type	Employment	Labor Income	Value Added	Ouput
Direct Effect	73,082	\$1,938 Mil.	\$2,615 Mil.	\$3,527 Mil.
Secondary Effect	28,097	\$1,533 Mil.	\$2,828 Mil.	\$5,432 Mil.
Total Effect	101,179	\$3,471 Mil.	\$5,443 Mil.	\$8,959 Mil.

FOOD SERVICE

Impact Type	Employment	Labor Income	Value Added	Ouput
Direct Effect	247,235	\$7,772 Mil.	\$11,222 Mil.	\$16,466 Mil.
Secondary Effect	125,143	\$8,051 Mil.	\$13,439 Mil.	\$24,519 Mil.
Total Effect	372,378	\$15,823 Mil.	\$24,662 Mil.	\$40,985 Mil.

TOTAL

Impact Type	Employment	Labor Income	Value Added	Ouput
Direct Effect	404,733	\$14,717 Mil.	\$20,782 Mil.	\$37,161 Mil.
Secondary Effect	309,771	\$19,390 Mil.	\$32,754 Mil.	\$63,747 Mil.
Total Effect	714,504	\$34,107 Mil.	\$53,536 Mil.	\$100,909 Mil.

Totals may not sum due to rounding error.

Exports can be especially impactful to the health of an economy as the value of exports generated is also the measure of global wealth captured by the domestic economy. That is, exporting countries draw in revenues from the rest of the world. Alternatively, net importing countries draw down wealth to accumulate goods and services. In the modern economy, wealth transfers through trade are measured in the accumulation of foreign currencies. Domestic producers require payment in dollars. So foreign buyers must first exchange their foreign currencies for dollars, usually from a U.S. bank or the U.S. Federal Reserve System. The foreign currency reserves provide U.S. businesses and consumer purchasing power to buy goods from overseas providers. While such trade-oriented effects on global purchasing power are real, this analysis largely abstracts from such effects. Such omissions will largely be immaterial, as the short-term ebb and flow of foreign exchange markets largely reflects speculative finance rather than the trade of goods and services along a single industry, but this is not to belittle the effect, as the long-term health of a currency depends on the underlying health and outlook for the economy that backs it.

Two sets of simulations are undertaken. The first assumes expansion of exports of potatoes at the farmgate, while the second presents the expected economic impact of expanding a combination of farmgate potatoes and processed potatoes in proportion to production totals. In these analyses, economic impact estimates are derived by modeling the direct and secondary transactions from a hypothesized increase in fresh and processed potato export sales.

The first export expansion assessment assumes that Japanese and Mexico exports increase by \$100 million each. Collectively, this amounts to a \$200 million increase in farmgate sales of potatoes that then are directly exported to Mexico and Japan. This represents a 60 percent increase in the total value of potato exports to Mexico and a 54 percent increase to Japan.

While there may be differences in the costs and economic effect of brokering and facilitating the export to these two markets, the analysis assumes that the economic effect of third-party handling of international shipments is equal across the two export channels. Because the domestic supply chain of these potatoes ceases upon export, the economic simulation does not include wholesale, retail and food service activities found in the overall economic impact estimates in Section IX.

Table 10 shows the estimated macroeconomic effects of expanding exports of fresh potatoes by \$200 million by expanding exports to both Mexico and Japan by \$100 million each. As opposed to the supply chain breakout provided in Table 12, only the aggregated effects are reported in Table 13. This is because nearly all simulated effects arise from the agricultural sector. Other supply chain segments include a small share allocated to transportation.

TABLE 10:
Estimated Economic Contributions of Expanded Exports of Fresh Potatoes to Mexico and Japan

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	1,393	\$59 Mil.	\$104 Mil.	\$200 Mil.
Secondary Effect	1,805	\$102 Mil.	\$170 Mil.	\$318 Mil.
Total Effect	3,199	\$161 Mil.	\$274 Mil.	\$519 Mil.

Totals may not sum due to rounding error.

As shown in Table 10 direct employment effects, largely captured by agricultural production, are expected to be just under 1,400 workers with annual labor income of \$59 million. Secondary effects will add an additional 1,800 workers in the farm support industries. Once accounting for all direct and secondary effects, the simulation estimates that expanding exports of fresh potatoes by \$200 million per year will support just under 3,200 commanding around \$161 million in wages per year. It would also boost annual gross domestic product (value added) by \$274 million and produce around \$519 million in new transactions (output) per year.

The second export expansion assessment assumes that the value of potato exports increases by 10 percent for Japan, South Korea, and Canada. By assumption, other export markets increase purchases by 25 percent. These export gains are proportional to five-year average exports by market and by product form (fresh, frozen, dehydrated and chip). The hypothesized export increases are shown in Table 11, where processed potato export sales are aggregated into a single category called Processed. The scenario posits just over a 17 percent overall growth in export sales of U.S. potatoes. Such increases can come about from international marketing efforts, reductions of tariffs or deliberate policy objectives with trading countries. This assessment assumes that the increase in the volume of potatoes exported is proportional to the increase in export sales. That is, prices remain constant in both the domestic and international market for potatoes.

TABLE 11:
Hypothesized Export Growth by Market and Major Commodity Category

	Hypothesized Change in Exports		
	Baseline Exports	Fresh	Processed
Canada	\$316,483,183	\$9,435,076	\$22,213,242
Mexico	\$340,800,853	\$16,506,932	\$68,693,281
Japan	\$372,698,022	\$1,781,387	\$35,488,415
South Korea	\$128,975,027	\$1,070,025	\$11,827,478
Singapore	\$40,000,845	\$731,331	\$9,268,881
Indonesia	\$25,298,044	\$155,433	\$6,169,078
Vietnam	\$15,974,865	\$210,346	\$3,783,371
China	\$51,602,159	\$15,642	\$12,884,897
United Arab Emirates	\$20,924,144	\$145,775	\$5,085,261
Kuwait	\$10,493,572	\$63,531	\$2,559,862
Saudi Arabia	\$43,720,000	\$24,032	\$10,905,968
Bahrain	\$2,822,785	\$8,195	\$697,501
Qatar	\$6,401,795	\$11,959	\$1,588,490
Oman	\$1,585,361	\$898	\$395,442
Philippines	\$100,950,616	\$2,119,653	\$23,118,001
Taiwan	\$66,459,389	\$0	\$16,614,847
Total	\$1,545,190,661	\$32,280,216	\$231,294,015

Totals may not sum due to rounding error.

Exports of fresh and processed potatoes follow different supply chains. They also exhibit shorter supply chains than those sold through domestic retail and food service channels, as the latter has a longer domestic supply chain. That is, once the commodity is exported, it ceases to generate subsequent transactions downstream from the farm or the food processor and ultimately to the final consumer. Fresh potatoes are purchased at the farmgate, while all processed potatoes are exported at their respective processor prices and assumed to no longer generate transactions in the domestic market after the point of export. This means that no retail and food service impacts are realized by exported potatoes.

Table 12 shows the resulting economic contribution estimates. Agriculture effects include direct sales of fresh potatoes for exports plus the agricultural share of processed potato sales by category. Across all processed segments, the agricultural sales made up about 44 percent of the value of processed sales. As discussed above, secondary effects measure all upstream purchases necessary to produce the direct value of output for the agriculture segment. For the production segment, secondary effects entail all necessary upstream purchases less agricultural inputs. When comparing the agricultural and production economic contributions, the results suggest that promoting fresh and processed potato exports will have fairly equitable distribution of effects across the agricultural and production sectors. It is interesting to note, however, that multiplier effects tend to be larger for the production segment than for the agricultural segment. Collectively, the export growth scenario explored shows that the approximate 17 percent increase in exports, as outlined in Table 11 would support about 2,415 U.S. domestic jobs with annual salaries of just under \$150 million. Such will also boost annual gross domestic product by \$230 million per year, based on 2023 dollars and support about \$505 million in transactions annually.

TABLE 12:
Estimated Economic Contributions of Expanded Exports of Fresh and Processed Potatoes

AGRICULTURE

Impact Type	Employment	Labor Income	Value Added	Ouput
Direct Effect	835	\$40 Mil.	\$59 Mil.	\$134 Mil.
Secondary Effect	359	\$31 Mil.	\$51 Mil.	\$115 Mil.
Total Effect	1,594	\$81 Mil.	\$126 Mil.	\$261 Mil.

PRODUCTION & WHOLESALE

Impact Type	Employment	Labor Income	Value Added	Ouput
Direct Effect	498	\$36 Mil.	\$53 Mil.	\$130 Mil.
Secondary Effect	723	\$41 Mil.	\$66 Mil.	\$126 Mil.
Total Effect	1,220	\$77 Mil.	\$120 Mil.	\$256 Mil.

TOTAL

Impact Type	Employment	Labor Income	Value Added	Ouput
Direct Effect	1,333	\$75 Mil.	\$113 Mil.	\$264 Mil.
Secondary Effect	1,082	\$73 Mil.	\$117 Mil.	\$241 Mil.
Total Effect	2,415	\$148 Mil.	\$230 Mil.	\$505 Mil.

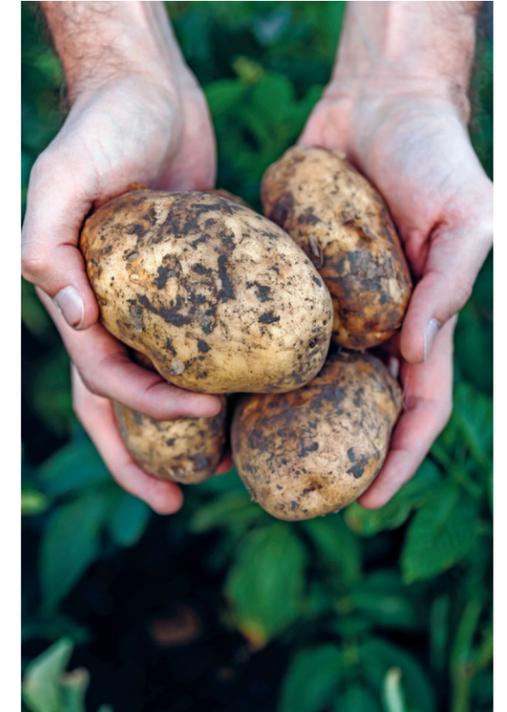
Totals may not sum due to rounding error.

Compared to the first scenario, the second generates a higher level of total exports, measured in dollars, but generates an overall smaller economic effect. This is because the \$263.6 million in exports under the second scenario accrues to fresh, frozen, chips and dehydrated segments, where the latter three are value-added segments to the initial fresh segment. Each of these segments have different economic effect profiles. Accordingly, the agricultural segment of the potato export supply chain is more impactful than the secondary processing sectors, in the aggregate.

When the two scenarios are added together, the total economic impact is estimated to be \$1.024 billion. Total employment is estimated to increase by approximately 5,600 jobs. Total exports would increase by approximately \$463 million, which would represent a 21 percent increase in exports. It is important to note that this analysis does not consider the potato sector's ability to increase exports by this amount. However, these figures were suggested by industry leaders.



SUMMARY & CONCLUSION



This report outlines the U.S. domestic supply chain of potatoes, recognizing the U.S. as one of the largest potato-producing countries in the world. In order, frozen potato products, fresh potato exports and dehydrated potato products are the top exports for the U.S. industry. Fresh potato exports do have some of the largest relative growth opportunities for the U.S. industry, especially in Mexico and Japan. Potato production is expansive throughout the world, reflecting the relative hardiness of potatoes relative to other agricultural commodities and generating market access challenges from competing domestic industries. The space of potato-based products with value-added properties, like dehydration, frozen for processing and finished consumer products, exports may generate less protectionist challenges.

We use baseline industry statistics to estimate the overall economic contribution, or significance, of the U.S. potato supply chain. The supply chain represents all the legs of production from raw materials, like seed, fertilizer, and soil, to finished goods for consumption. Finished goods can be fresh and processed potatoes for home preparation and prepared meals containing potatoes for home consumption. It also includes salty snacks made from potatoes, like potato chips and shoestring potatoes. It also entails processed and fresh potatoes used in food services and the food service jobs supported by on-premise sales and preparation of meals entailing potatoes. The estimates also entail all handling of potatoes and potato-related products from raw material to final purchase for consumption.

The estimates suggest that about 714,000 domestic jobs can be directly or indirectly attributed to the U.S. domestic supply chain of potatoes. These jobs command about \$34.1 billion in wages and salaries per year and contribute \$53.5 billion to annual gross domestic product. To place these findings into context, about 0.4 percent of the U.S. domestic workforce is supported by the domestic potato industry supply chain. An aggressive but viable push to promote export growth from 11 to 25 percent for key markets is expected to broaden job support by just under 2,500 jobs with annual payrolls of just under \$150 million in 2023 prices, and increase gross domestic product by approximately, \$230 million. While this represents a modest increase in the overall economic footprint of the potato industry, it posits a real potential for sustained economic growth in promoting U.S. exports.

Expanded exports to Mexico and selected Asian and Middle Eastern markets were considered. This includes a \$100 million increase in fresh exports to Japan and Mexico respectively, and an additional \$263 million in increased exports in other countries and other product forms. This represents a 21 percent increase in exports. This study does not estimate the ability of the potato sector to increase exports without impacting other agricultural activities that are not related to potato production, processing, distribution, wholesaling, and retailing.

In consultation with industry experts, exports are estimated to increase by \$463 million. The total impact on U.S. GDP is estimated to be \$1.024 billion with approximately 5,600 jobs created. This would represent an increase of 21 percent from the current level of economic contribution and employment resulting from potato exports.

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