# WORLD ALFALFA CONGRESS, 2022

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# Economics of World Forage Trade

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# International Trade in Forage is Driven by the Same Forces Affecting other Agricultural Products

1. Domestic supply and demand in exporting and importing regions.

(Relative resource costs, inflation, interest rates, income growth …)

2. Water costs drive hay costs and cost of competing crops; inflation affects both costs and returns, but interest rate increases affect those crops with the biggest up-front investment.

3. Hay is an input, so the demand for the animal products drive hay demand.

4. Exchange rates affect diverges in the price change buyers see or sellers see in their own local currency. That affects all trade not just forage

# Cost side of Alfalfa Relative to Competing Crops Water and Labor

Can't export if you can't compete on the supply side!

1. Alfalfa demands high water input per unit of output value.
2. But trees, almonds, walnuts and fruits are also higher water demand as is corn silage and such.
3. The economics of flexibility pays. Year to year and in some places month to month.

- Hired labor is just a few % of production costs for alfalfa (similar to other field crops such as grains and oilseeds).
- Hired labor is more than 50% of costs for tree fruits or table grapes
- Tree nuts are machine-harvested, labor is 15% of costs.

Labor pressure in the Western US can drive acreage to hay.

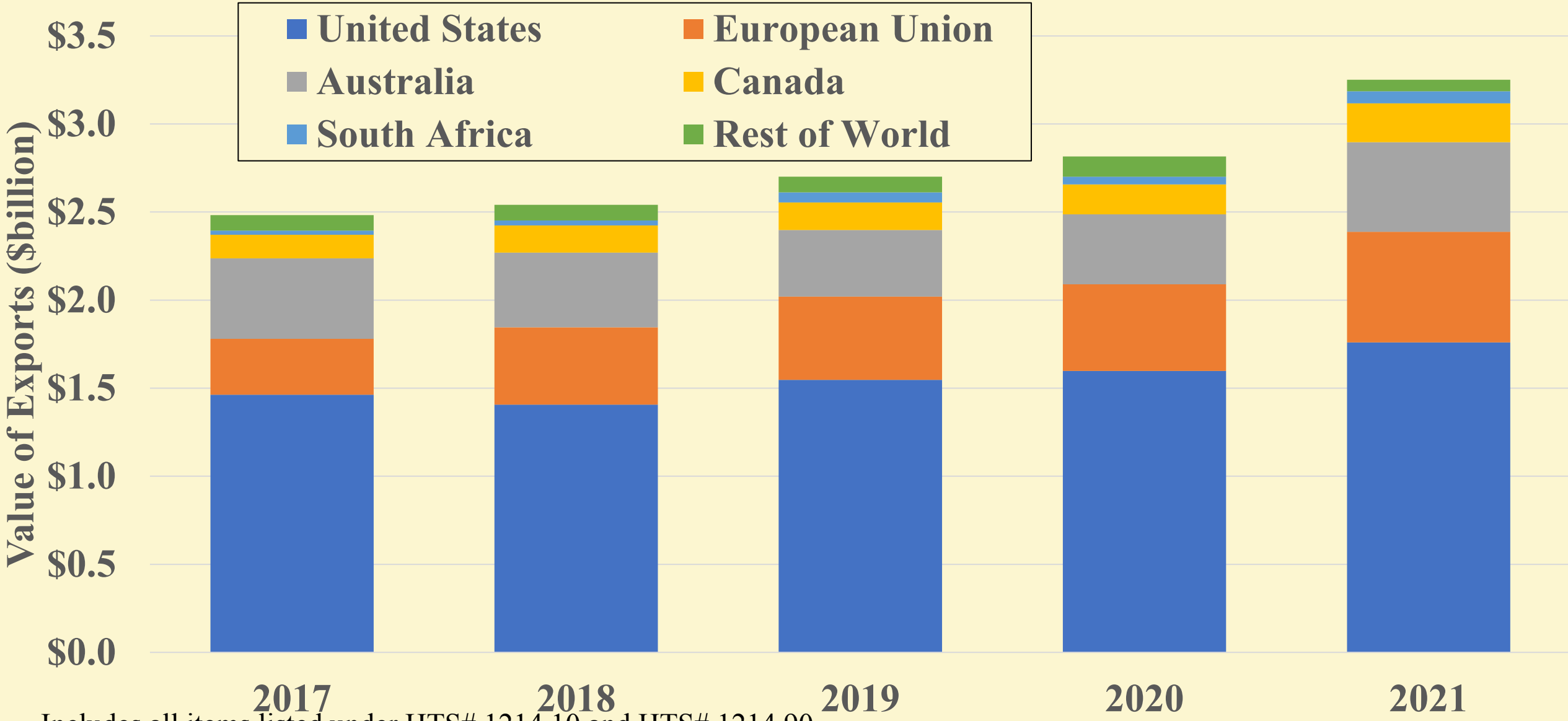
# Interest rates and hay supply

- Investment in tree and vines is more costly with high interest rates.
- Waiting 7 years for revenue from walnuts or pistachios is hard to make profitable with high interest rates.
- Low-investment annual crops make economic sense with high interest rates
- Alfalfa is an intermediate crop in terms of investment versus annual costs

# Some recent data on export trends for alfalfa other forgage crops:

- Global export and import patterns.
- Prices (export unit values) differ by exporter source and over time

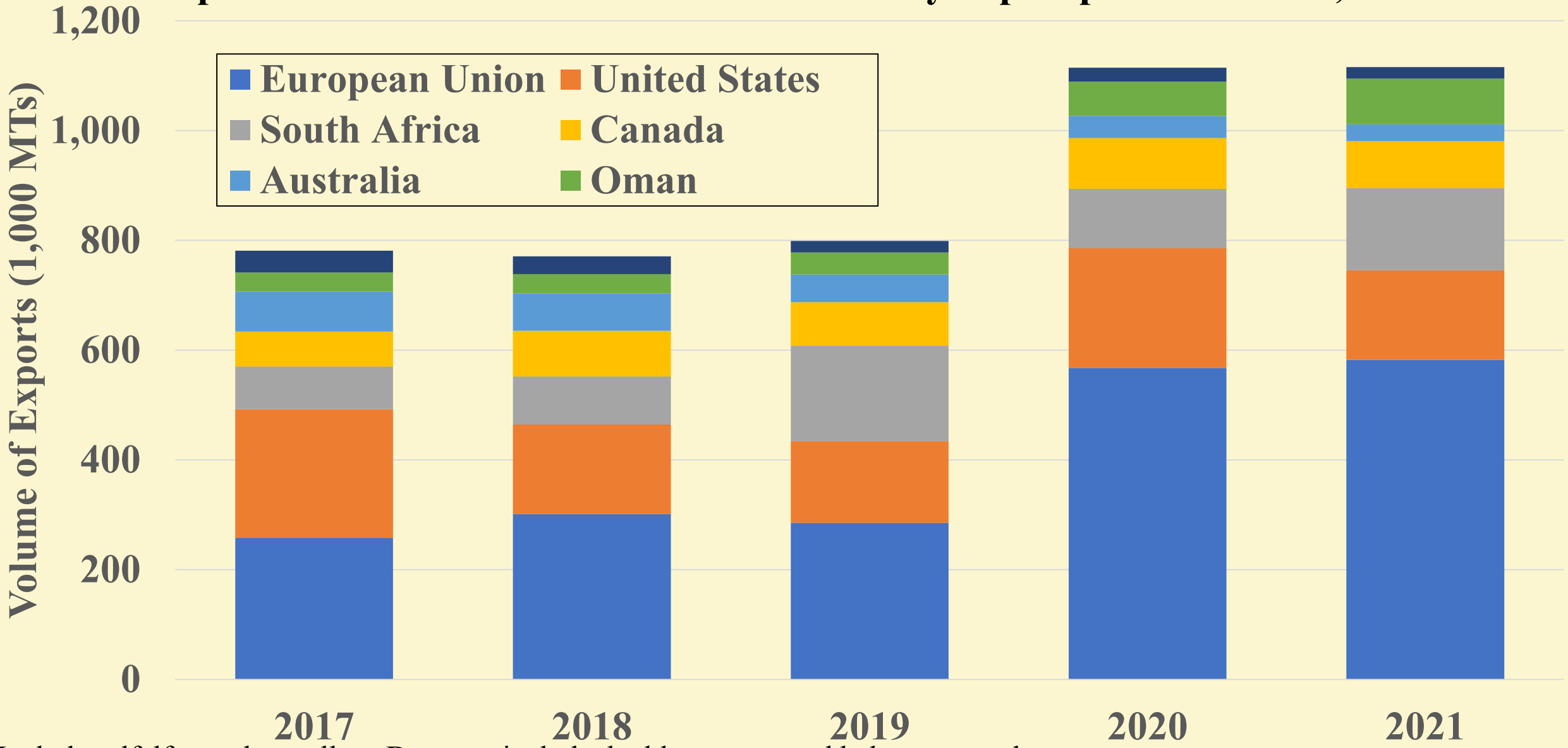
# Value of Annual Forage Product Exports by Top Exporting Countries, 2017-2021




Includes all items listed under HTS# 1214.10 and HTS# 1214.90.

Source: World Integrated Trade Solutions at Worldbank.org

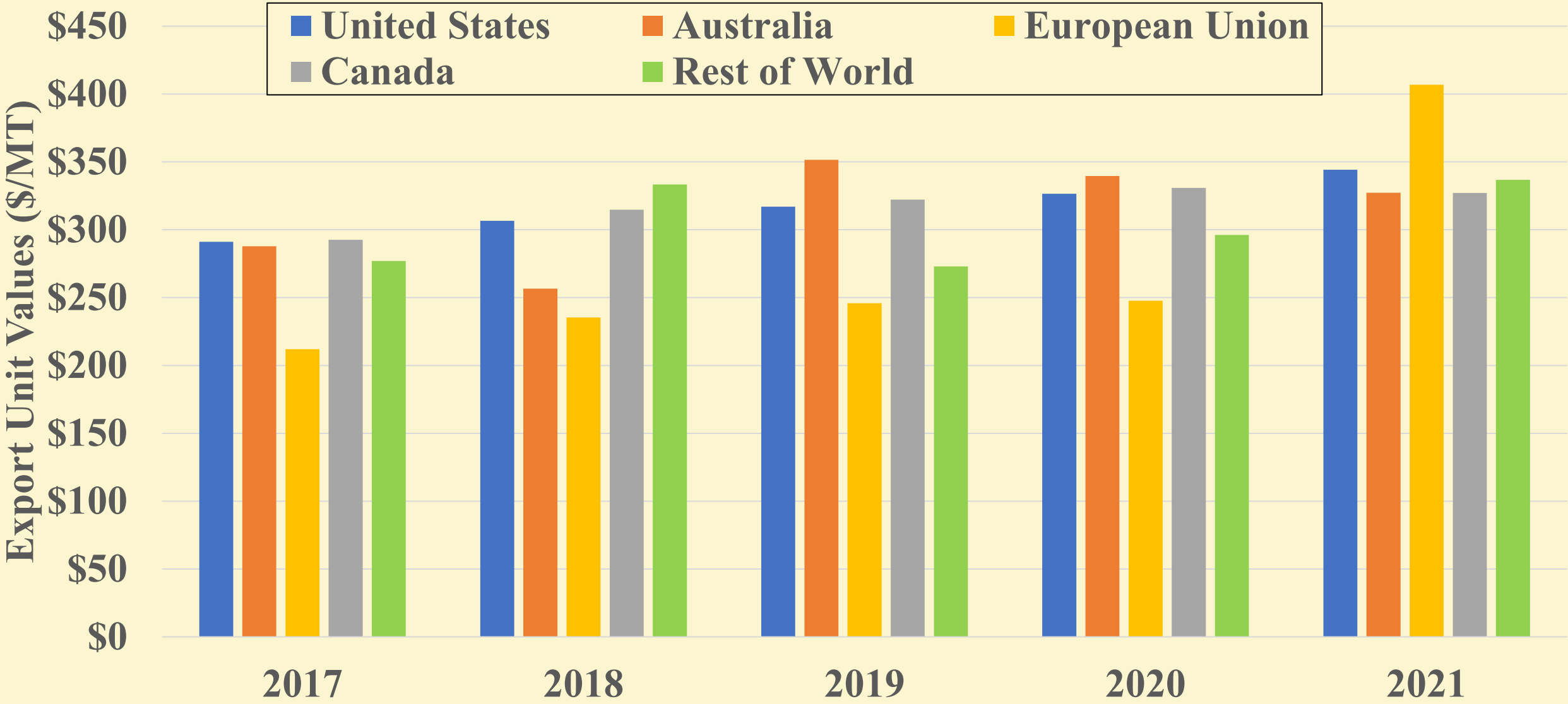
# World Export Volumes of Alfalfa Meal and Pellets by Top Export Countries, 2017-2021




Includes alfalfa meal or pellets. Does not include double compressed bales or grass hay.

**Source: World Integrated Trade Solutions at Worldbank.org**

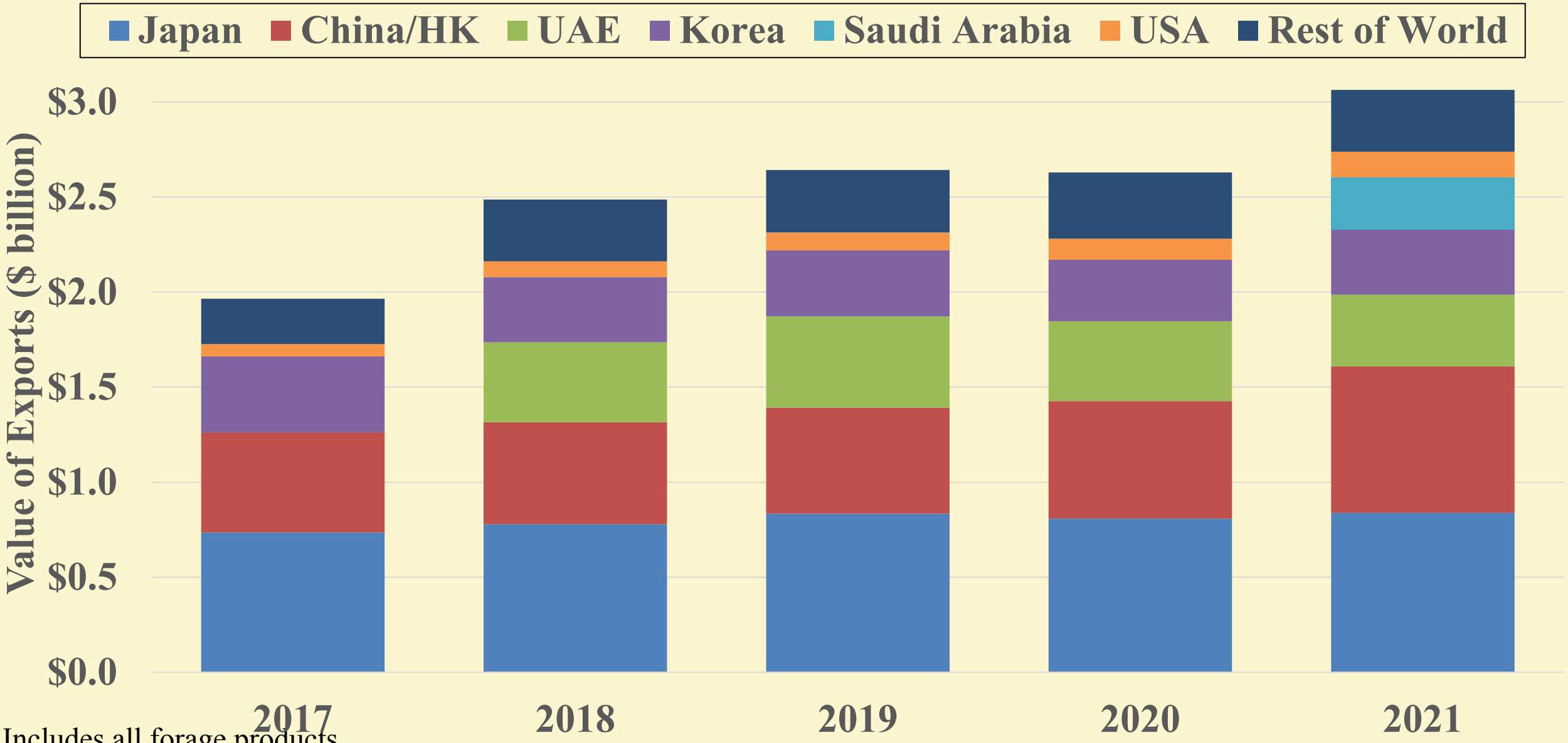
# Average Unit Values of Annual Hay Exports by Top Exporting Countries, 2017-2021




Includes alfalfa and grass hay bales. Does not include meal and pellets.

Source: World Integrated Trade Solutions at Worldbank.org

# Value of Global Imports of Forage Products by top Importing Countries, 2017-2021




Includes all forage products.

Source: World Integrated Trade Solutions at Worldbank.org

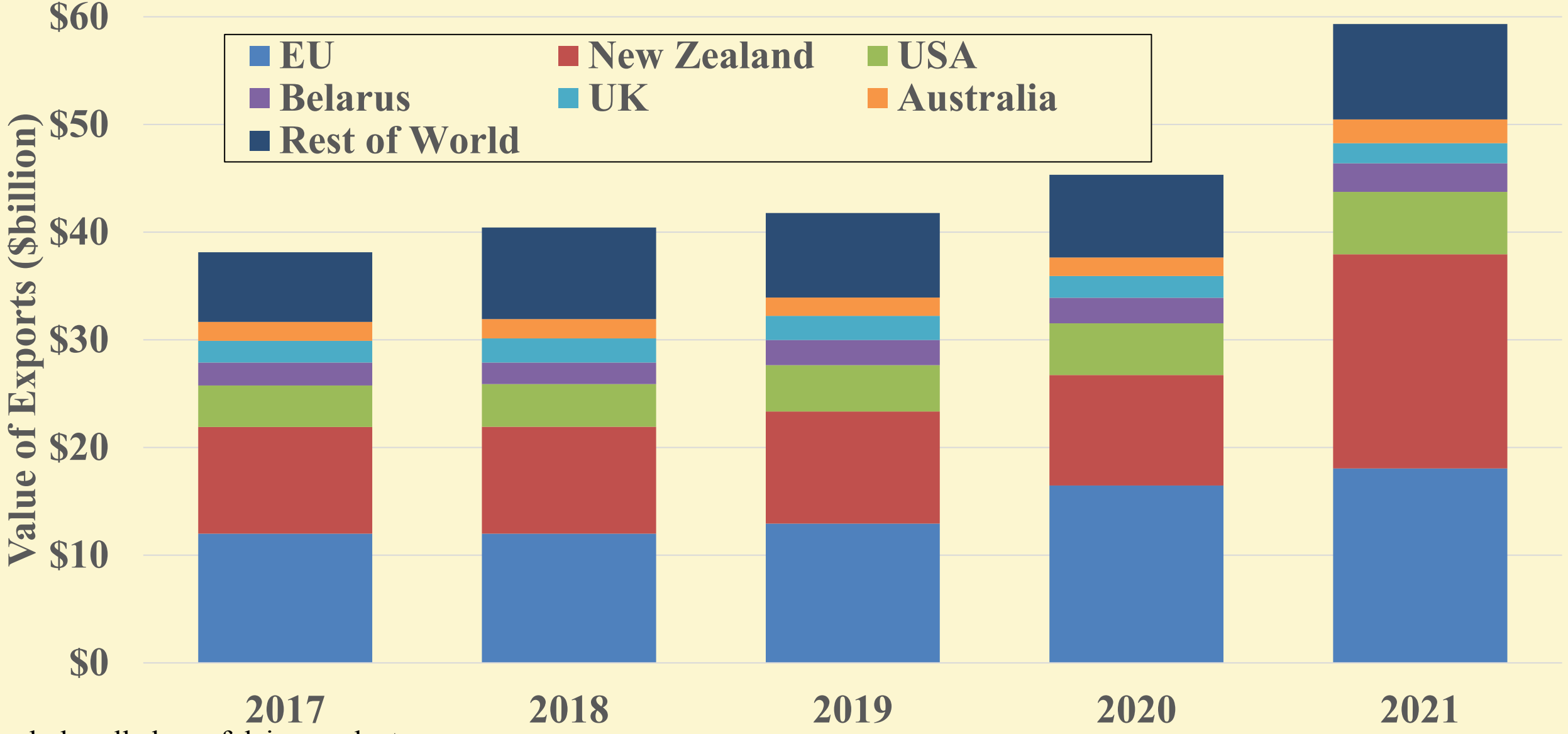
# Milk and Alfalfa are Substitutes for Export and Import

1. Import the hay and produce milk or import the milk
2. Alfalfa is produced and exported from some of the same places (Western USA) that also produces and exports milk products!

3. For alfalfa prices it may not matter too much if the hay is shipped or the milk is shipped as long as the demand (export or domestic) stays strong

4. Some alfalfa importers may import hay to produce some local milk and also import milk products cheese, powder and butter.

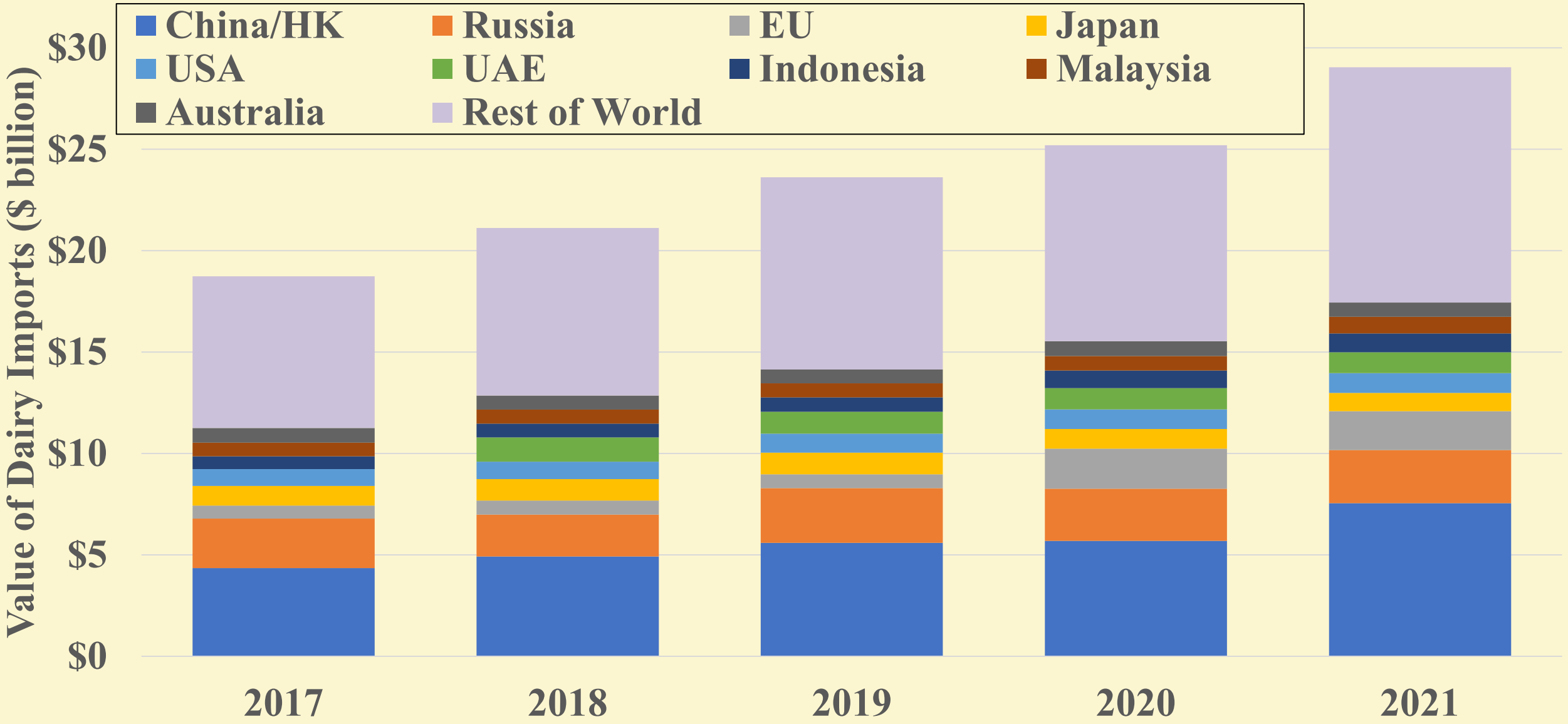
# Value of Annual Global Dairy Product Exports by Top Exporting Countries 2017-2021




Includes all class of dairy products.

Source: World Integrated Trade Solutions at Worldbank.org

# Value of Annual Global Dairy Imports by Top Importing Countries 2017-2021



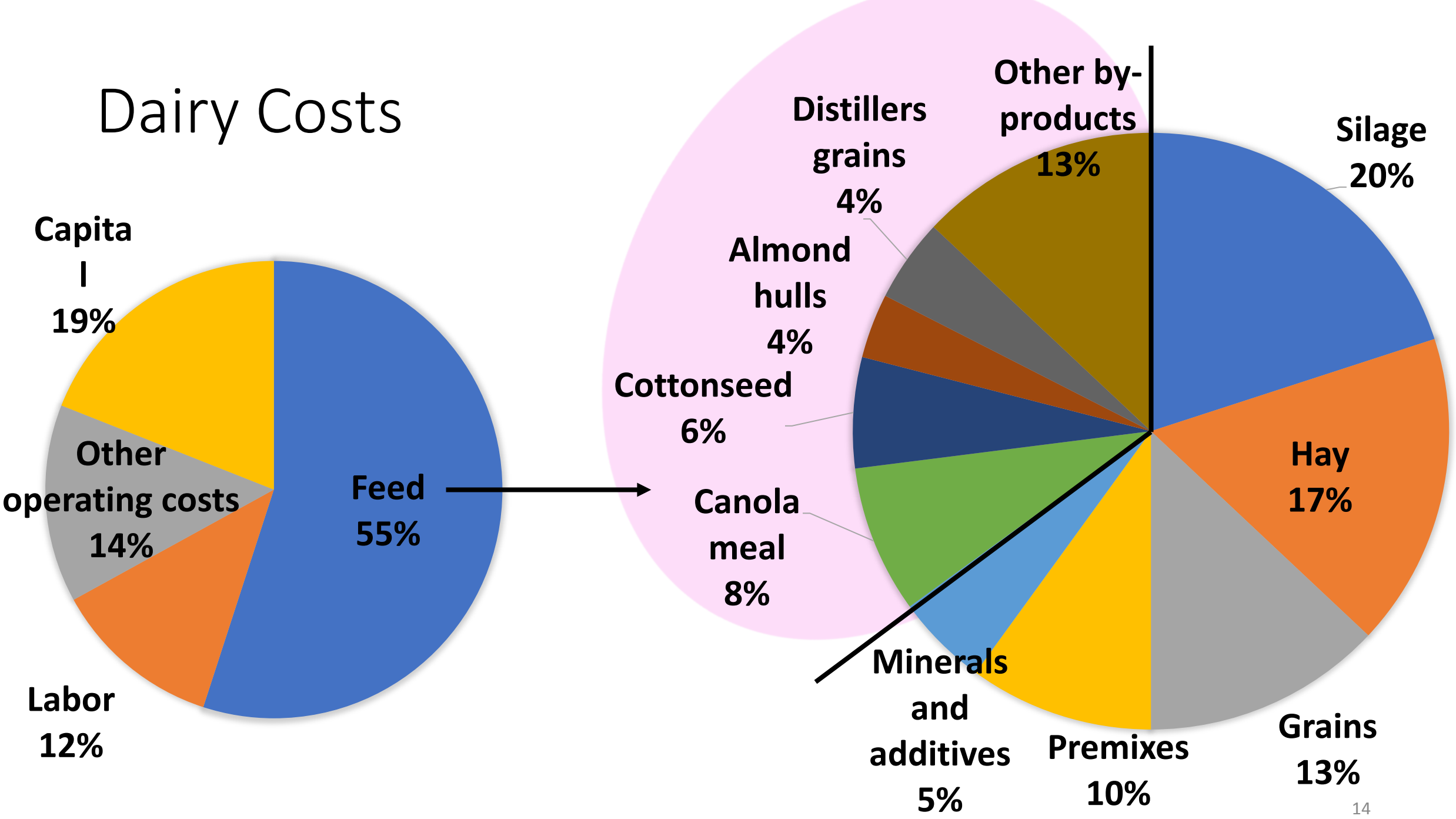

Includes all class of dairy products.

Source: World Integrated Trade Solutions at Worldbank.org

# Dairy is Central to Western US Hay and Alfalfa Exports

- Milk is a big share of value of output
- Milk processing is a vital industry
- Dairy cow forage (hay and silage) uses about one million acres about 15% of all irrigated crop acres in California.
- Big share in Idaho as well

# Dairy Costs


Capital
19%
Other operating costs
14%
Feed
55%
Labor
12%
Distillers grains
4%
Other by-products
13%
Silage
20%
Almond hulls
4%
Cottonseed
6%
Canola meal
8%
Hay
17%
Minerals and additives
5%
Premixes
10%
Grains
13%

# Dairy prospects affect forage, especially alfalfa prospects

1. Dairy growth... past 15 years showed new realities
2. Farm costs have risen relative to other competitive regions
3. Producers elsewhere have adapted innovations, while keeping their feed, labor and other cost advantages
4. Dairy feed crops face much competition for land and water near California cows and processing plants
5. Relative milk processing costs have risen, => lower local farm prices and lower demand for alfalfa.
6. Markets for California milk are global and highly competitive, so low-cost producers dominate.

# Massive jump in milk production costs in the US in 2021 continuing in 2022

1. Feed costs jumped 25% driven by feed that is mostly used for beef, pork and poultry (not forage)
2. Labor cost and labor shortages
3. High meat prices mean costly replacement heifer and pressure to cull cows.

Milk prices also very high and dairy profits drive high forage demand.

# US Dairy Farm Costs, 2021

| (USDA ERS) | California Average | US average 2000+ Cows |
|---|---|---|
| Total, feed costs | 13.78 | 14.02 |
| Hired labor | 2.44 | 2.30 |
| Total, operating costs | 16.36 | 16.54 |
| Other Costs | 2.58 | 2.52 |
| Total | 19.12 | 18.96 |

# Hulls are twice the weight of kernels

# What if 15% more almond hulls were available? (This seems likely over the next decade)

## Our simulations show:

- More by-products, average dairy feed ration costs would fall by about 1%, and lower cost would imply more California milk.

- Rations would include less alfalfa hay and silage (from California) and less corn grain, but maybe more canola meal to balance protein

- Fewer acres and acre-feet of water for feed produced in California

- Less corn shipped into California from the Midwest

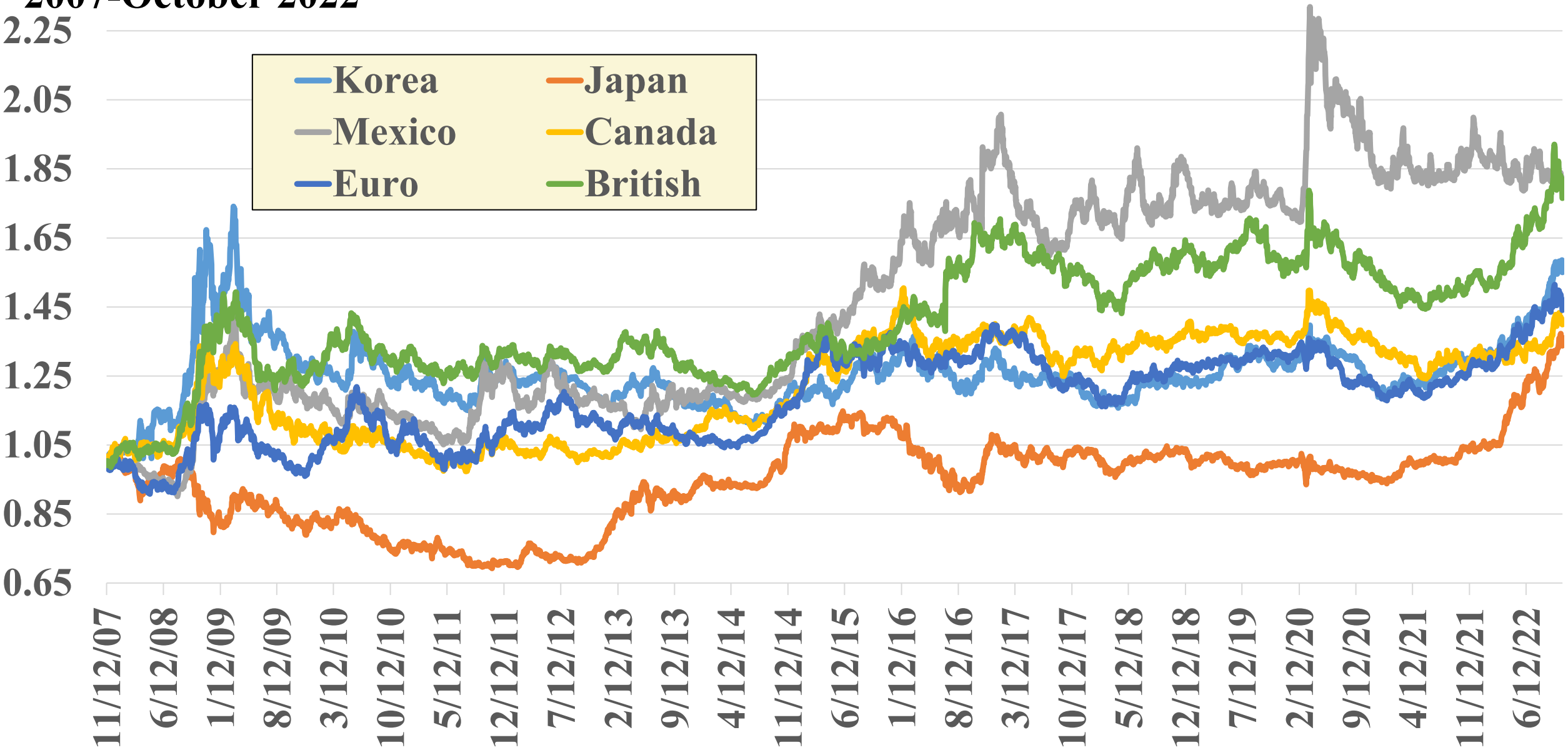
# Manure handling policy for climate change mitigation

- Manure is flushed out of barns and pens with water and stored in lagoons.
- THE anaerobic decomposition generates methane.
- Covering the lagoons captures the methane, but it must be cleaned up before it is used.
- Clean up is expensive.
- How expensive relative to the social cost of methane?

# Exchange Rates and Exports

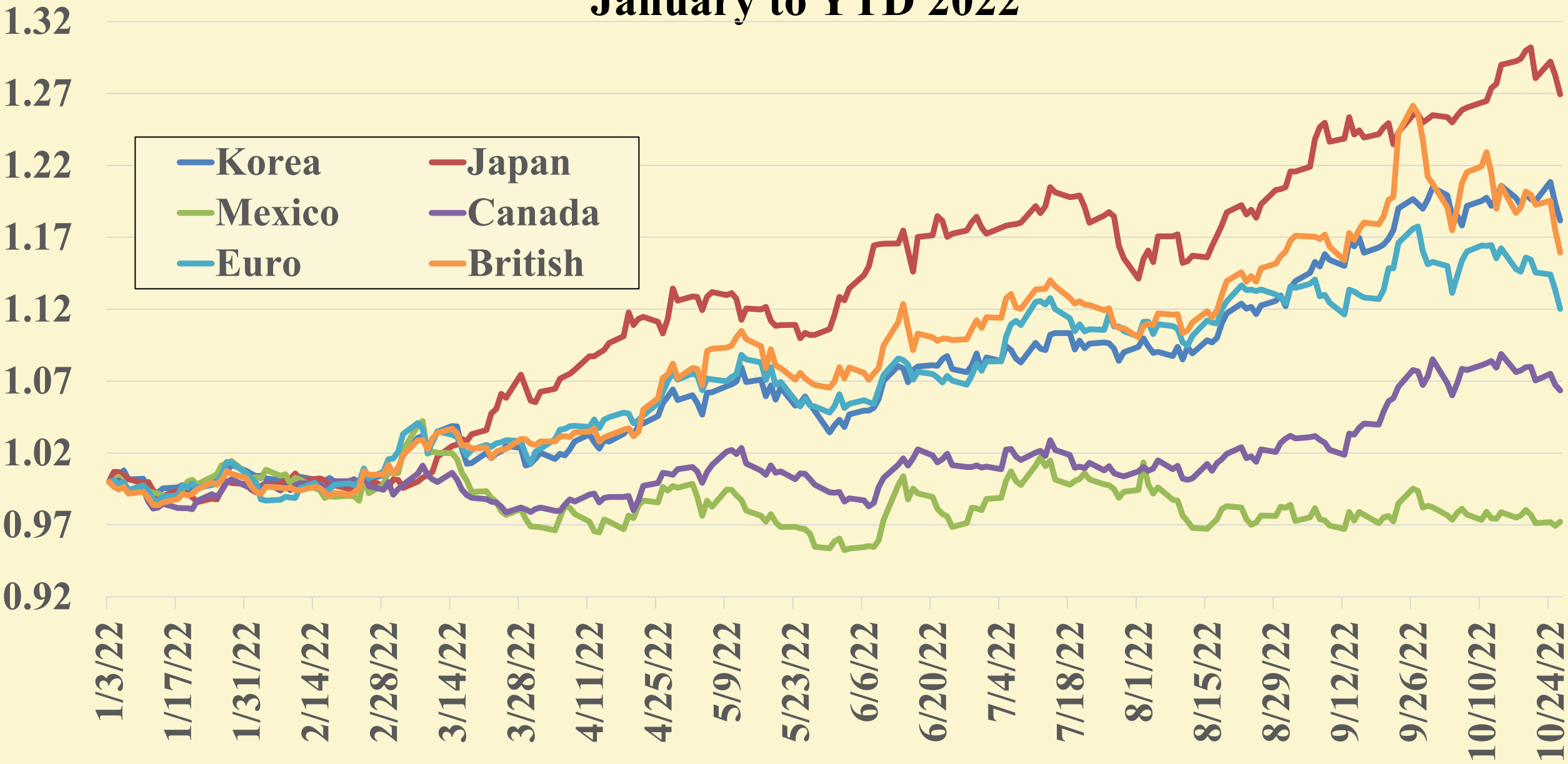
1. Stronger $ for US means more yen or euro or pounds for each $ of purchases
2. Anything we sell (alfalfa or milk) looks expensive to buyers.
3. Anything we sell also looks expensive compared to Canadian or A$ competitors.
4. Exchange rates are notoriously hard to forecast which add to risk and that by itself disrupts trade. Hedging (trading currencies to offset real goods trade) can mitigate currency risk but is costly.

# Index of Daily Exchange Rates of US$ Dollar to Select Foreign Currencies November 2007-October 2022




Source: Wall Street Journal

# Index of Daily Exchange Rates of US$ Dollar to Select Foreign Currencies, January to YTD 2022

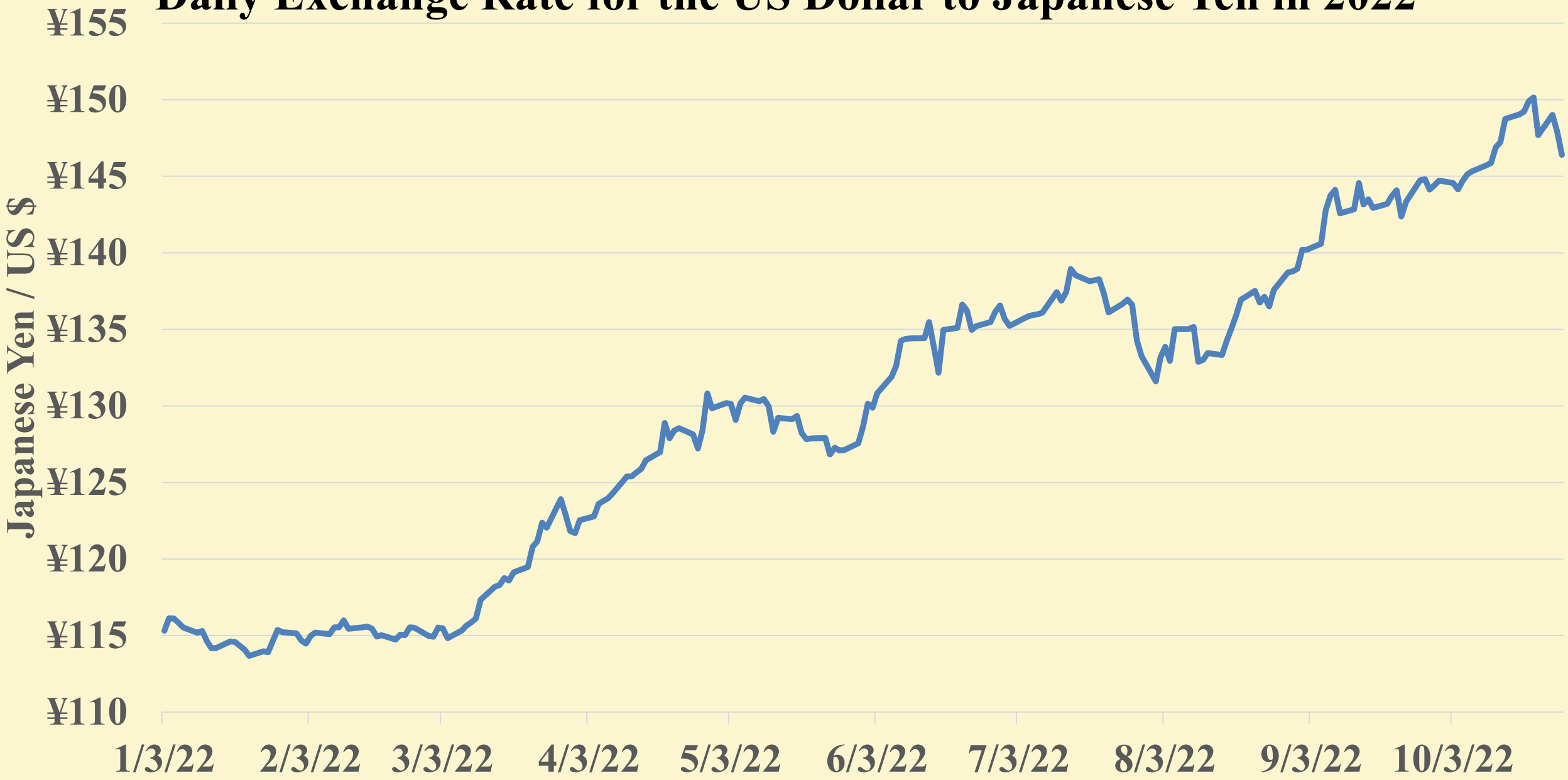



Source: Wall Street Journal

# Daily Exchange Rate for the US Dollar to Korean Won in 2022

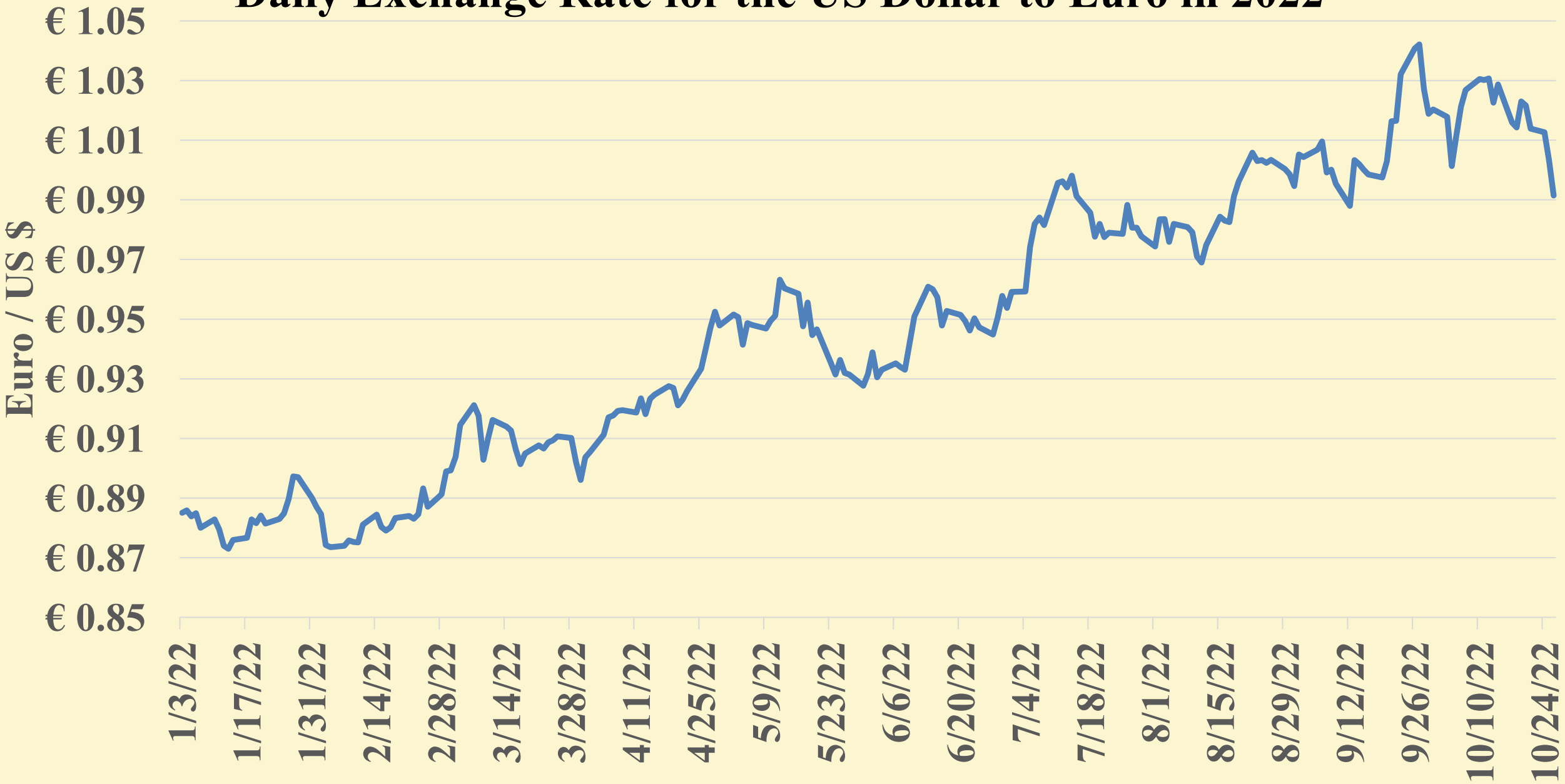

Source: Wall Street Journal

# Daily Exchange Rate for the US Dollar to Japanese Yen in 2022



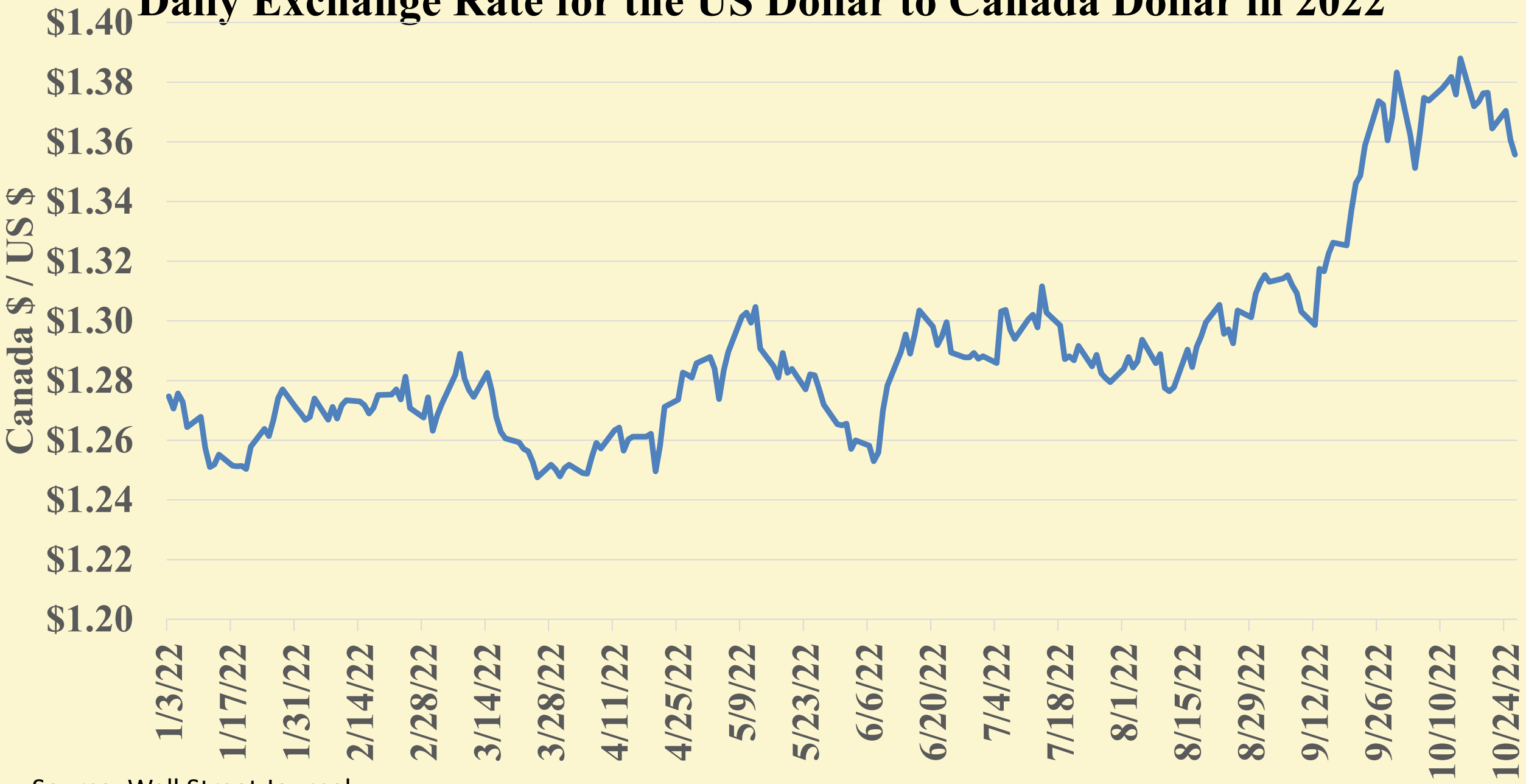

Source: Wall Street Journal

# Daily Exchange Rate for the US Dollar to Euro in 2022




Source: Wall Street Journal

# Daily Exchange Rate for the US Dollar to Canada Dollar in 2022




Source: Wall Street Journal

# Final Remarks

1. Basic local supply and demand are fundamental to trade, but the comparative advantage drives trade. Relative local costs and local demand determine imports and exports.
2. Milk competitiveness drives up local demand for hay and reduces exports (or increases imports).
3. Exchange rate movements can drive trade in the short run, exchange rate risk reduces trade.
4. A strong US$ now is a drag on hay and milk exports.