



Caring for You and Your Farm®

- Professional Farm Management
- Farmland Sales & Acquisitions
- Farmland Auctions
- Trusted Farmland Appraisals





Caring for You and Your Farm®

**Landowner Educational Seminar
Summer 2022**

Supply Chain Issues in Agriculture



www.Hertz.ag



Supply Chain Issues in Agriculture

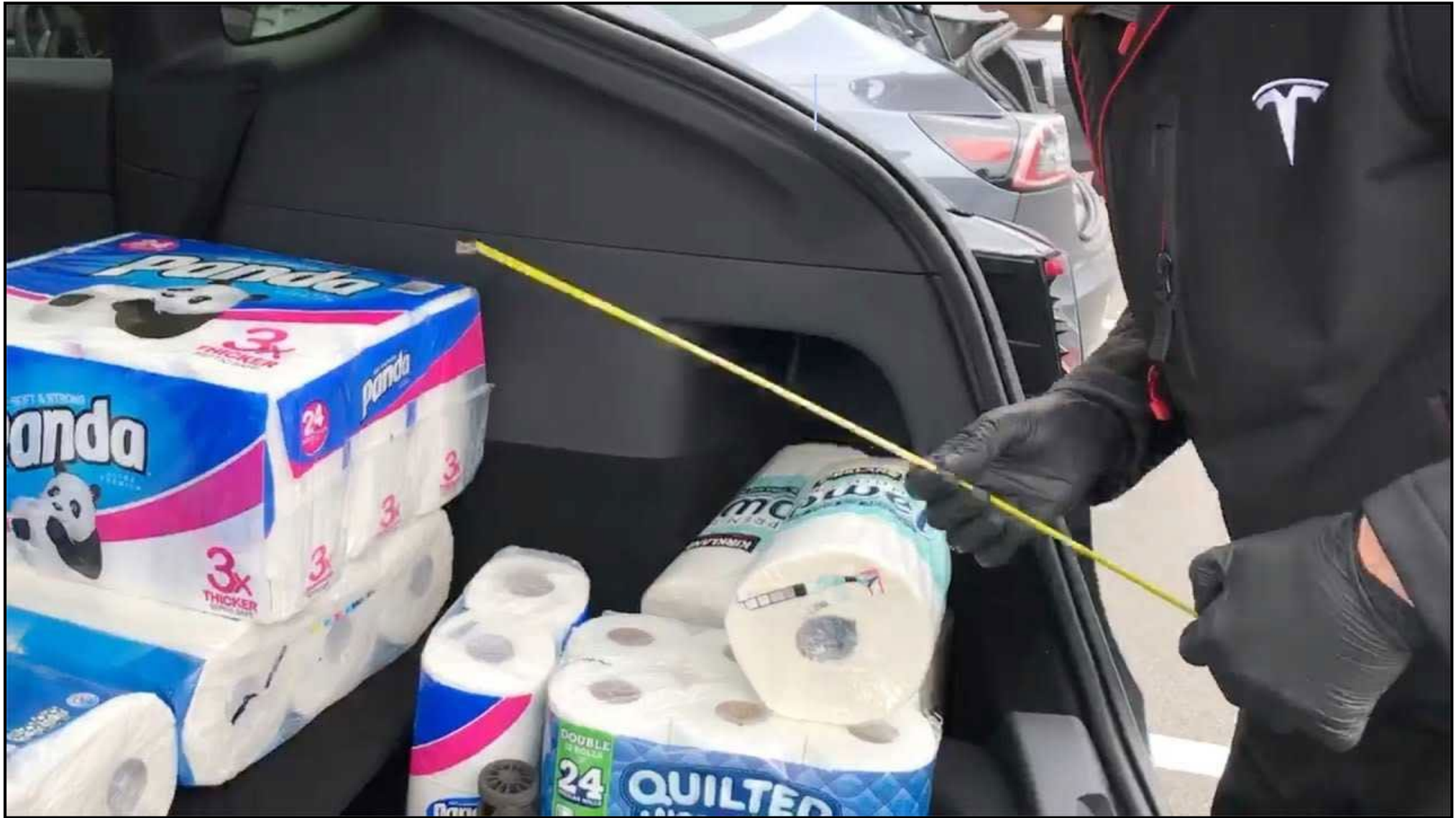
What's happening?

- Grain prices at historic levels
- Record high fertilizer/energy costs
- Limited supplies of crop input products

How did we get here?



Consumer Response to Product Shortages





www.Hertz.ag



Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

2018-19 U.S. – China Trade War

- 75% of all technical material to produce crop protection products is manufactured in China
- Tariffs created inefficient short-term trade workarounds

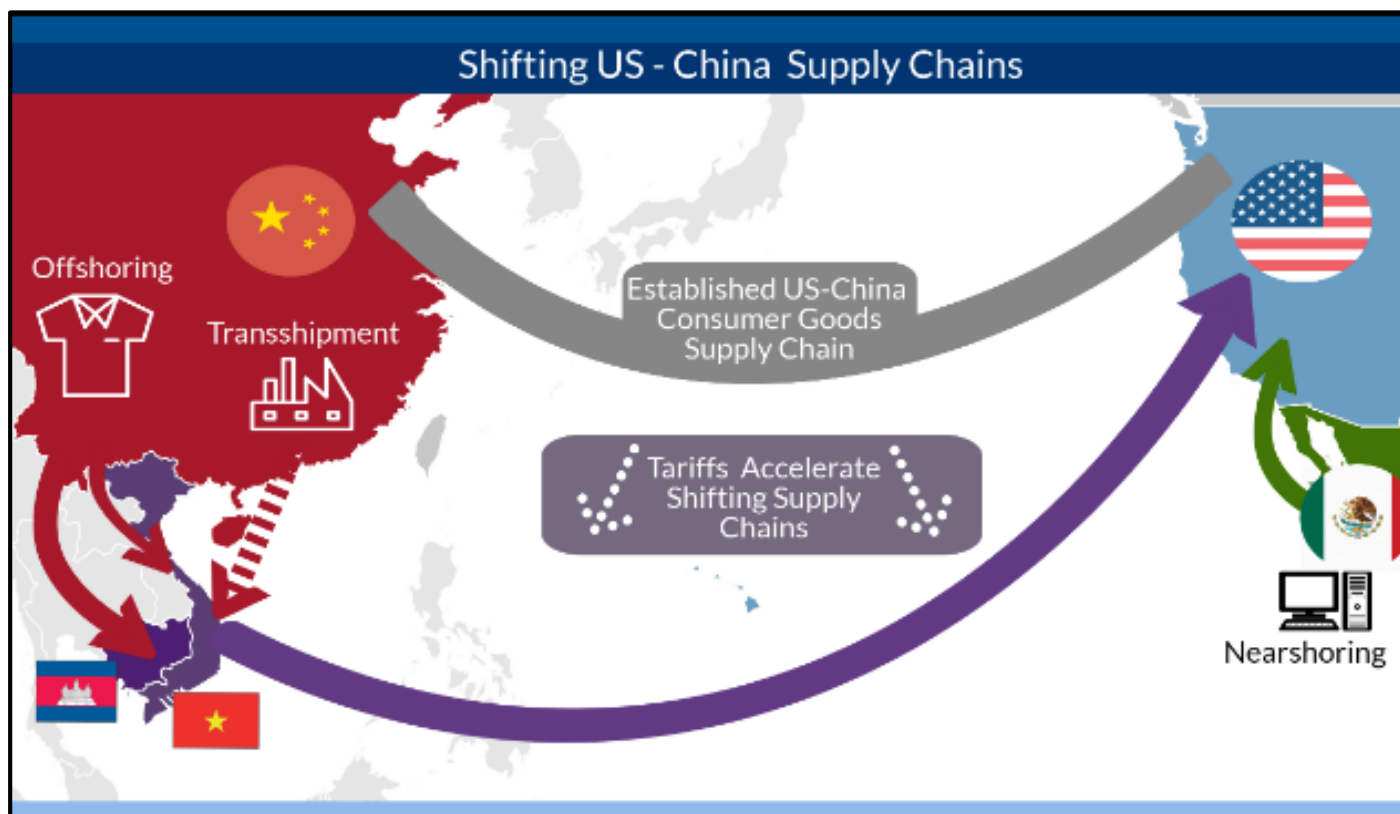


Image Source: EconoGraphics

www.Hertz.ag

Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

COVID-19 Impacts on Supply Chain

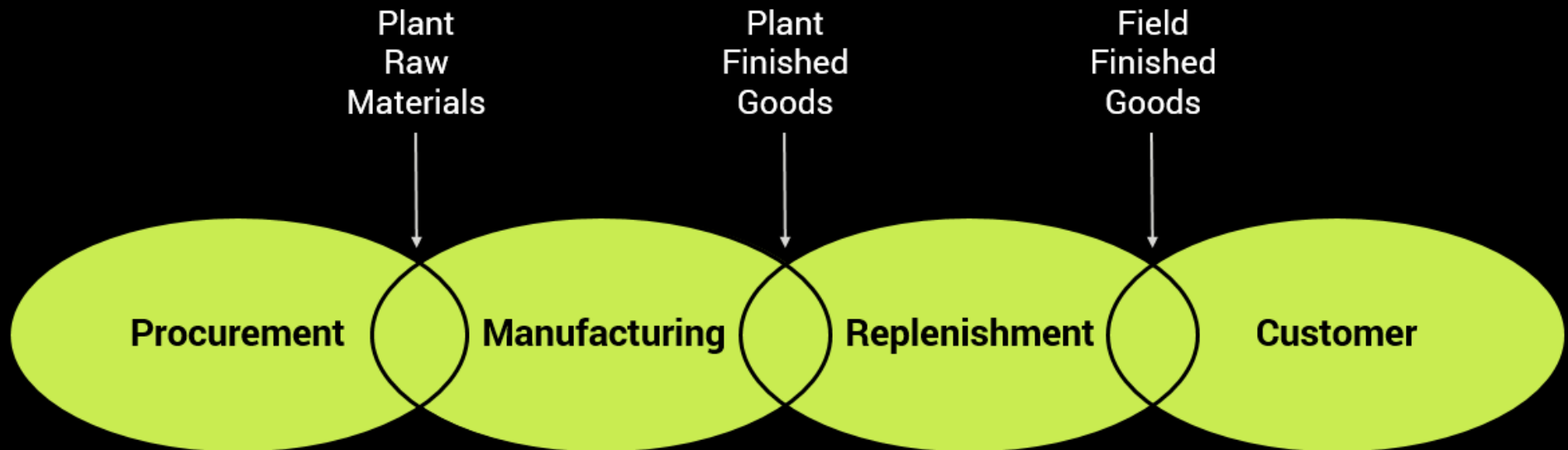
- City lockdowns/“Work From Home”
 - Demand Crisis!!
- Worker shortages
- Transportation complication
- Eventual shortages of component products
- Supply chain disruptions have a long tail



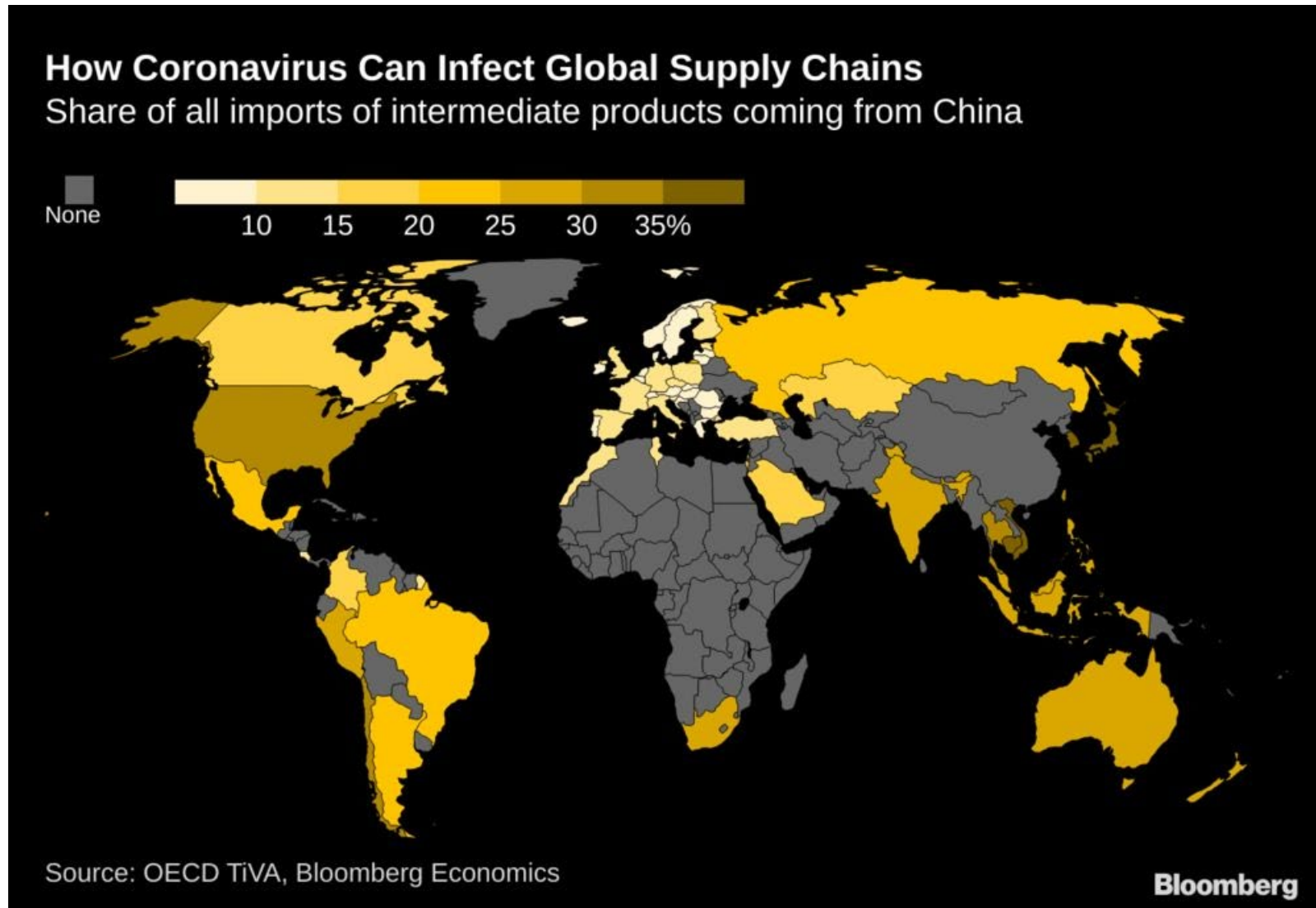
Supply Chain Issues in Agriculture

SUPPLY CHAIN MANAGEMENT

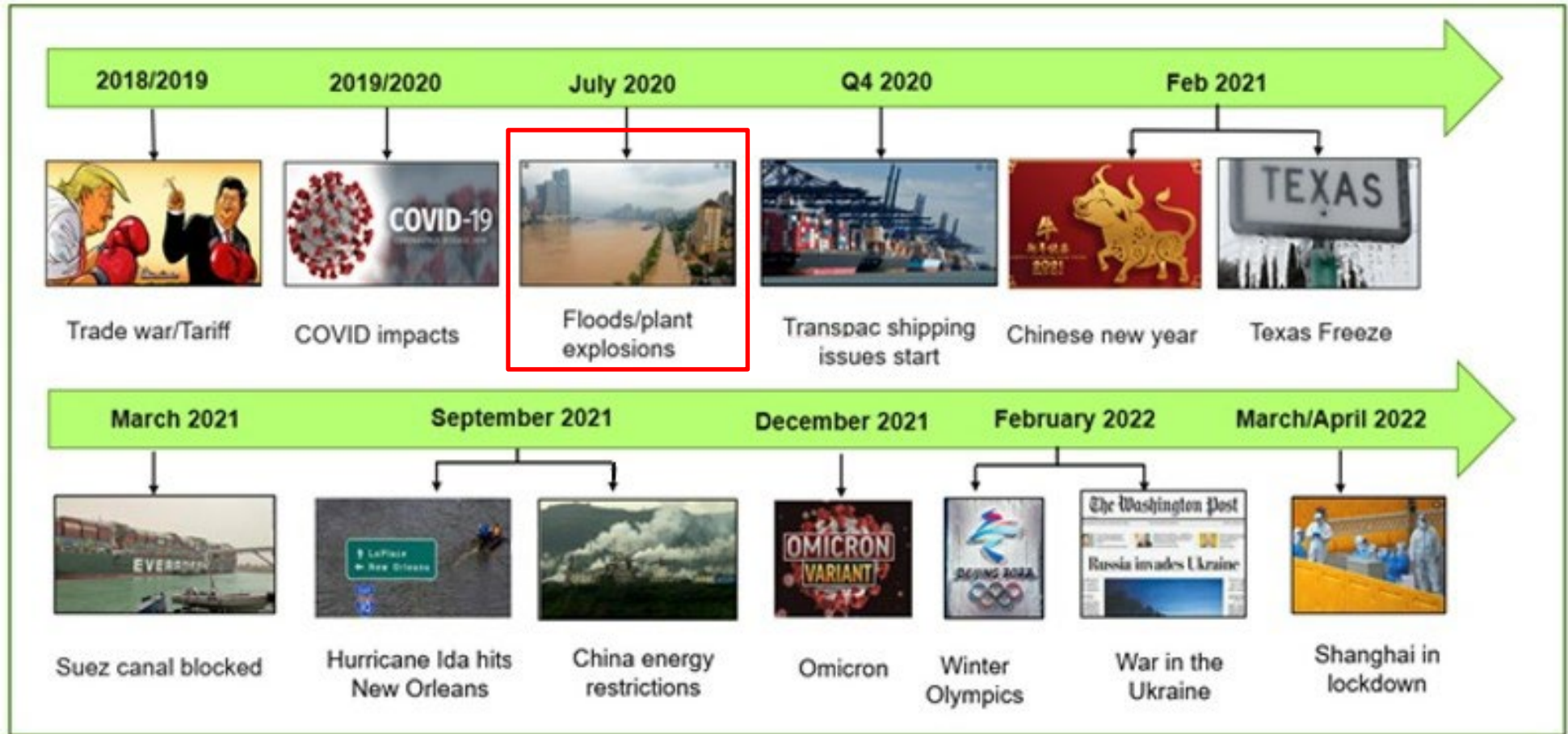
Supply Chain Order Cycles



Impact of China's “Zero-COVID” Policies



Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

Historic Flooding in China – July 2020



Image Source: CNN

www.Hertz.ag

Chemical Factory Explosions in China



Image Source: New York Post

www.Hertz.ag

Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

CONTAINER SHIPPING SEES AN 'UNUSUAL' FOURTH QUARTER BECAUSE OF COVID-19

Ocean freight demand and rates remain high in Q4 2020 as countries enter different phases of the pandemic.



- Lower consumption in early 2020 prompted “catch-up effect”
- Oct. 2020: Only 1.6% of the world’s shipping fleet was inactive
- Record volume at ports
- Ships sailed below full capacity due to container shortages



Image Source: DHL

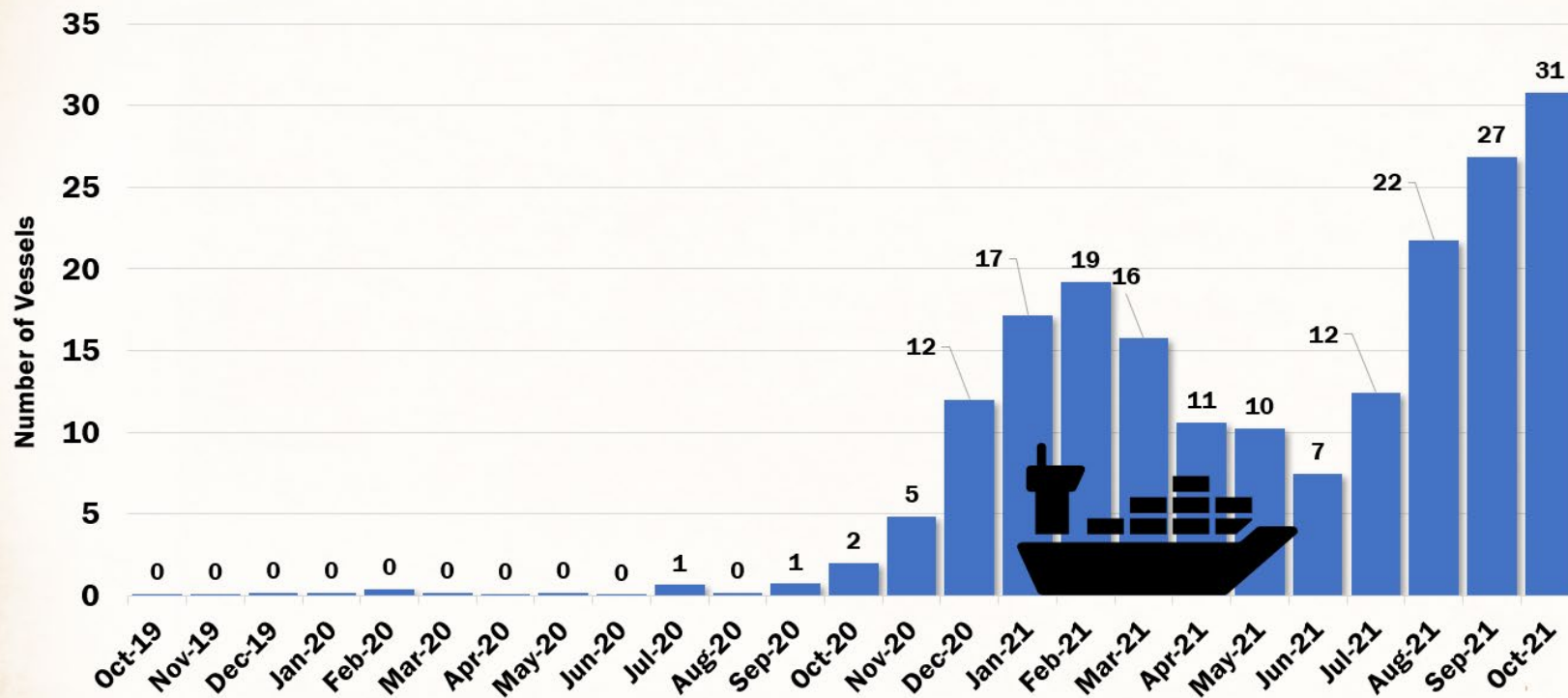
www.Hertz.ag



Port Congestion Issues

FIGURE 2: VESSELS WAITING AT ANCHOR | PORT OF LOS ANGELES

Oct. 2019 – Present | Daily Average per Month



AMERICAN FARM BUREAU FEDERATION*

Source: Port of Los Angeles

Source: American Farm Bureau Federation

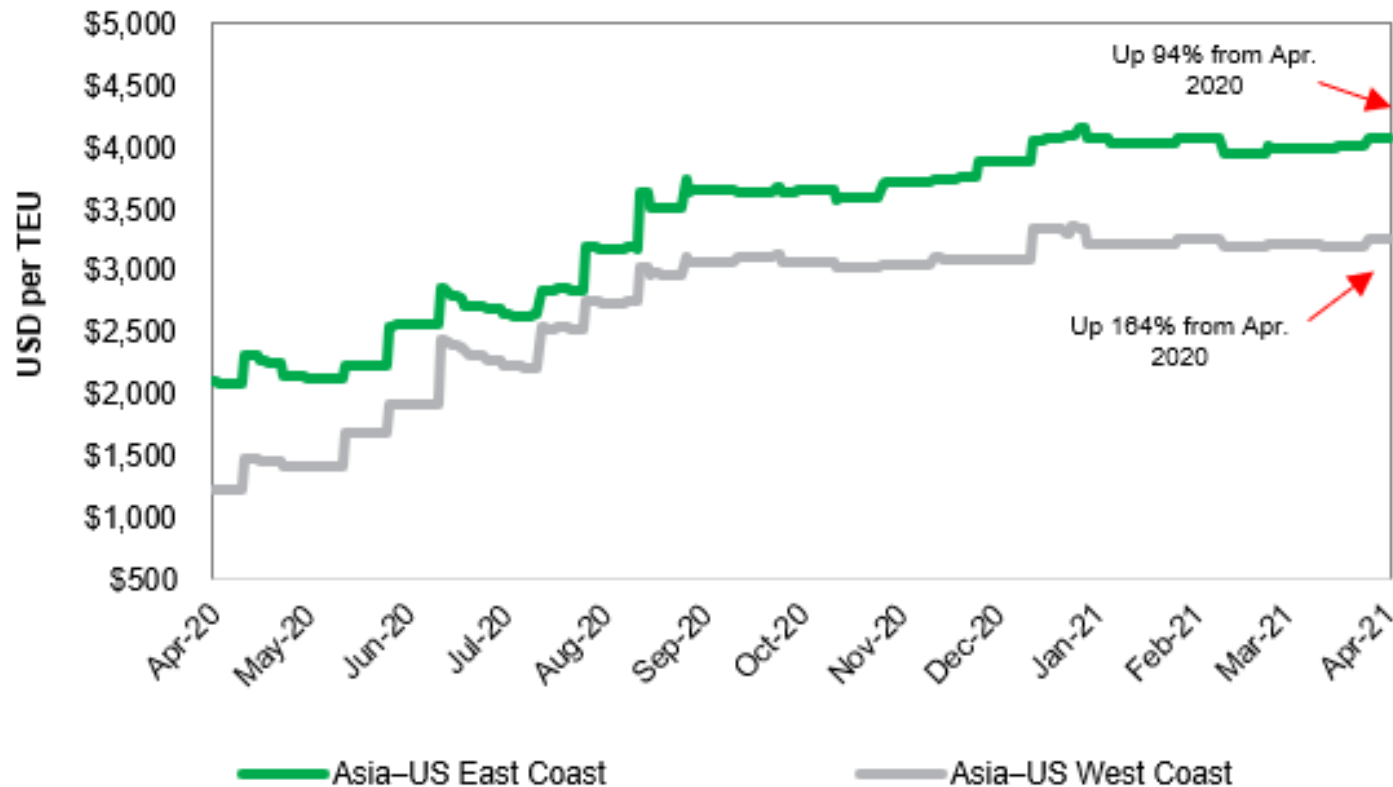
www.Hertz.ag



Shipping Demand Surges

Eastbound trans-Pacific container spot rates hold steady after record run

Average Asia-US container freight rates on short-term contracts of 32 days or less



Source: Xeneta

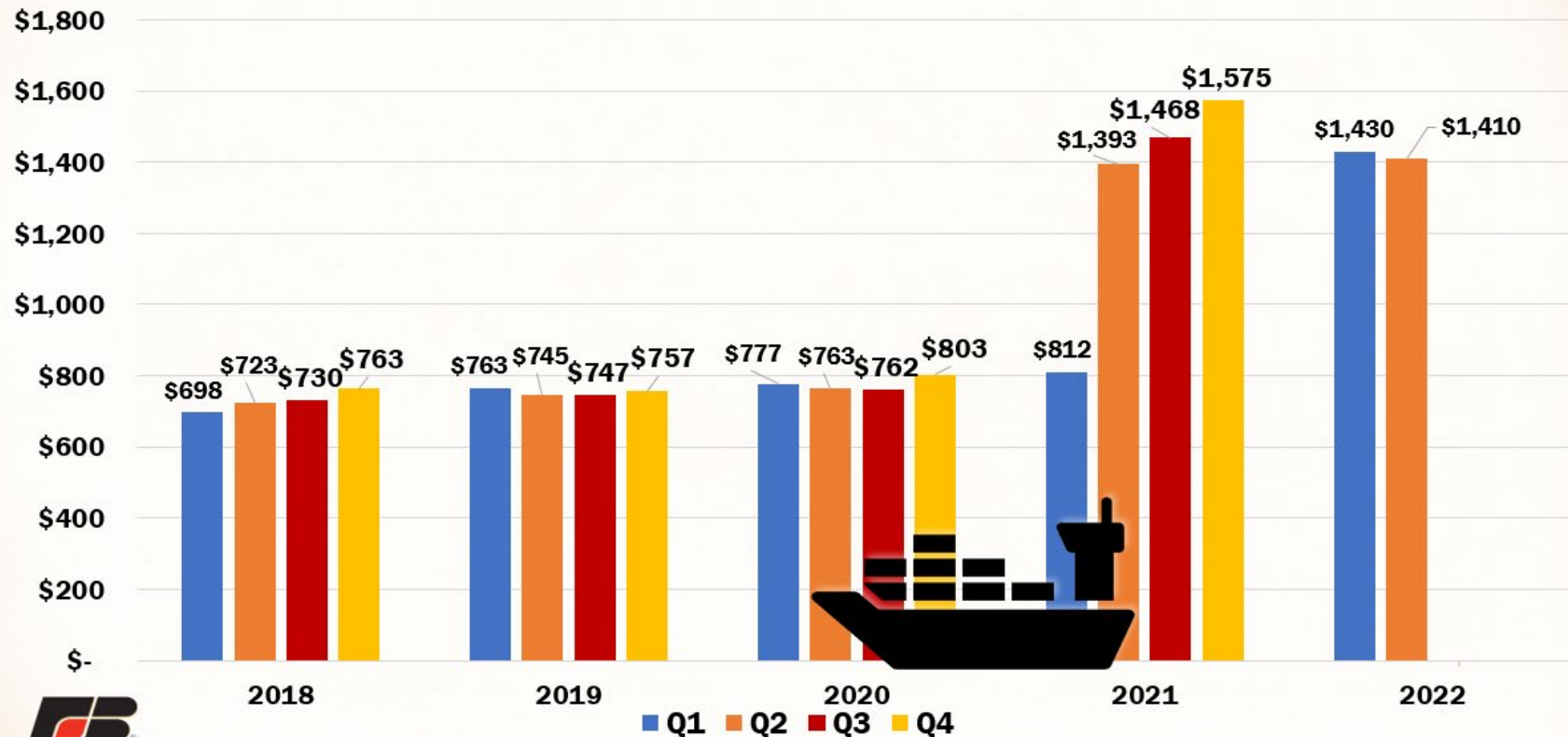
© 2021 IHS Markit



Shipping Demand Surges

FIGURE 8: AVERAGE OCEAN FREIGHT RATES | LOS ANGELES → SHANGHAI

20 & 40 FT CONTAINERS | Quarterly



AMERICAN FARM BUREAU FEDERATION*

Source: USDA AMS



Source: American Farm Bureau Federation

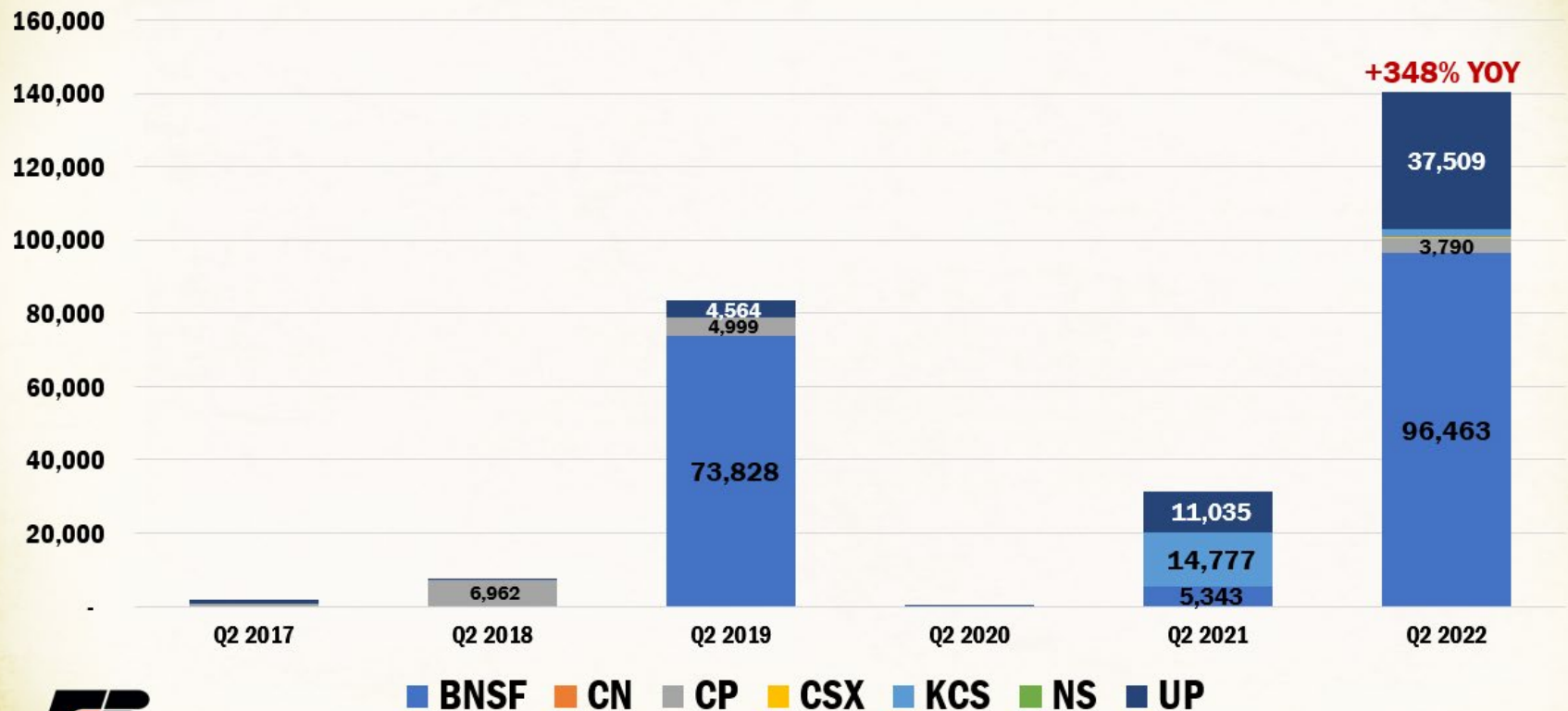
www.Hertz.ag



U.S. Grain Railcar Delays

FIGURE 2: UNFILLED GRAIN CAR ORDERS: 11+ DAYS OVERDUE

Quarter 2 | 2017 - 2022



AMERICAN FARM BUREAU FEDERATION*

Source: AFBF Calculations, USDA Agricultural Marketing Service



Source: American Farm Bureau Federation

www.Hertz.ag



Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

Chinese New Year - 2021

- Thousands of factories shut down for several weeks
- Production slows as demand spikes
- Increased shipping congestion



Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag



Texas Freeze – Feb. 2021

- Mass blackouts led to factory shutdowns
- Supply chain impact like a hurricane
- Diversion of natural gas production for fertilizer use
- Petrochemicals/plastic shortages
- Trucking disruptions



Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

Suez Canal Blocked – Mar. 2021

- *Ever Given* stuck in canal for six days
- 30% of global container traffic uses canal annually
- Smaller ports unable to take on large ships
- Delayed returns of empty containers to Asia



Image Source: Time

www.Hertz.ag

Suez Canal Blocked – Mar. 2021

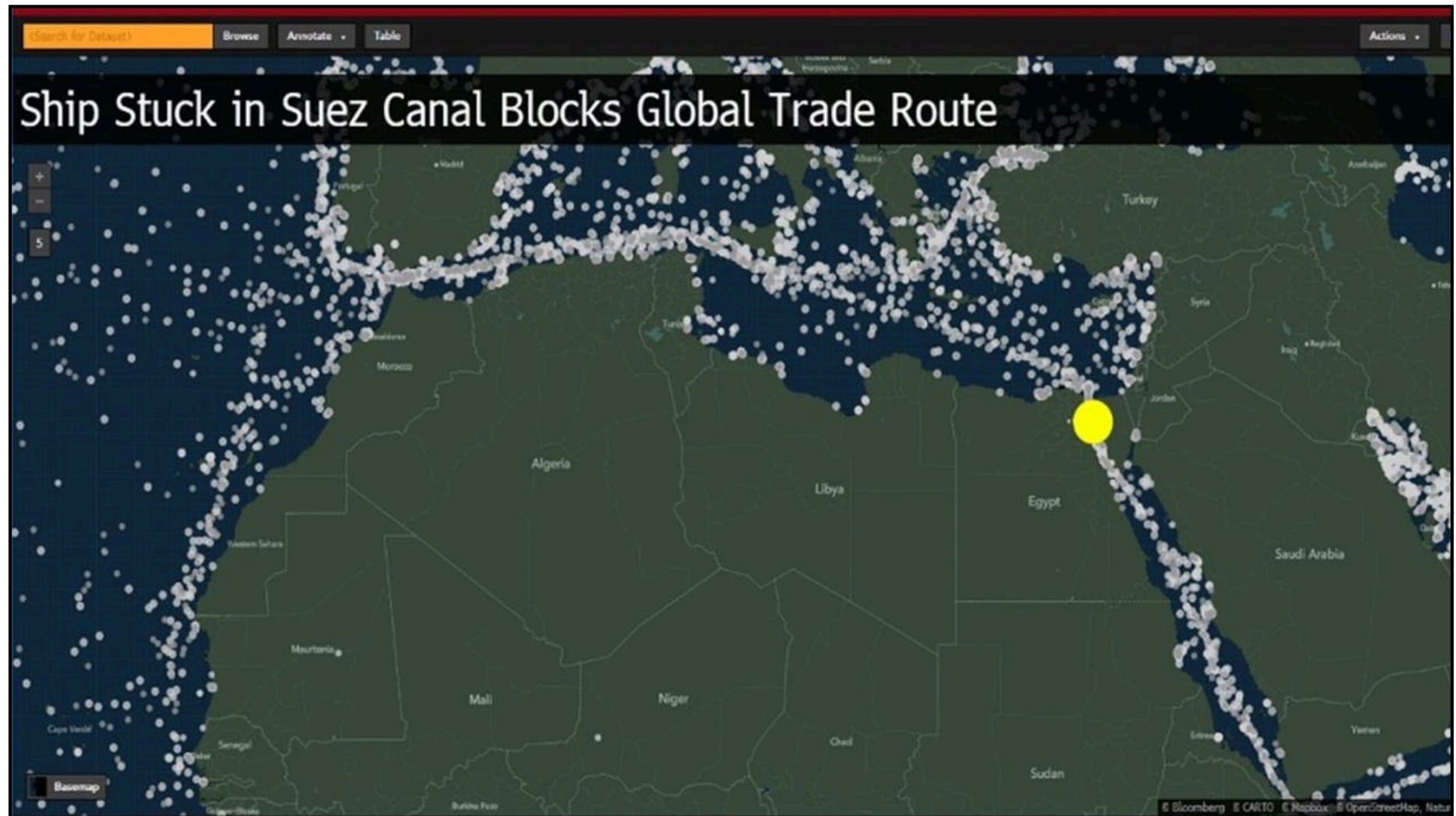


Image Source: Bloomberg

www.Hertz.ag



Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

Hurricane Ida – Sept. 2021

- Increased Pressure on Input Costs
 - Damage shuts down largest U.S. glyphosate production facility
 - Fertilizer production plants idled
 - Grain & fertilizer shipping logistics strained



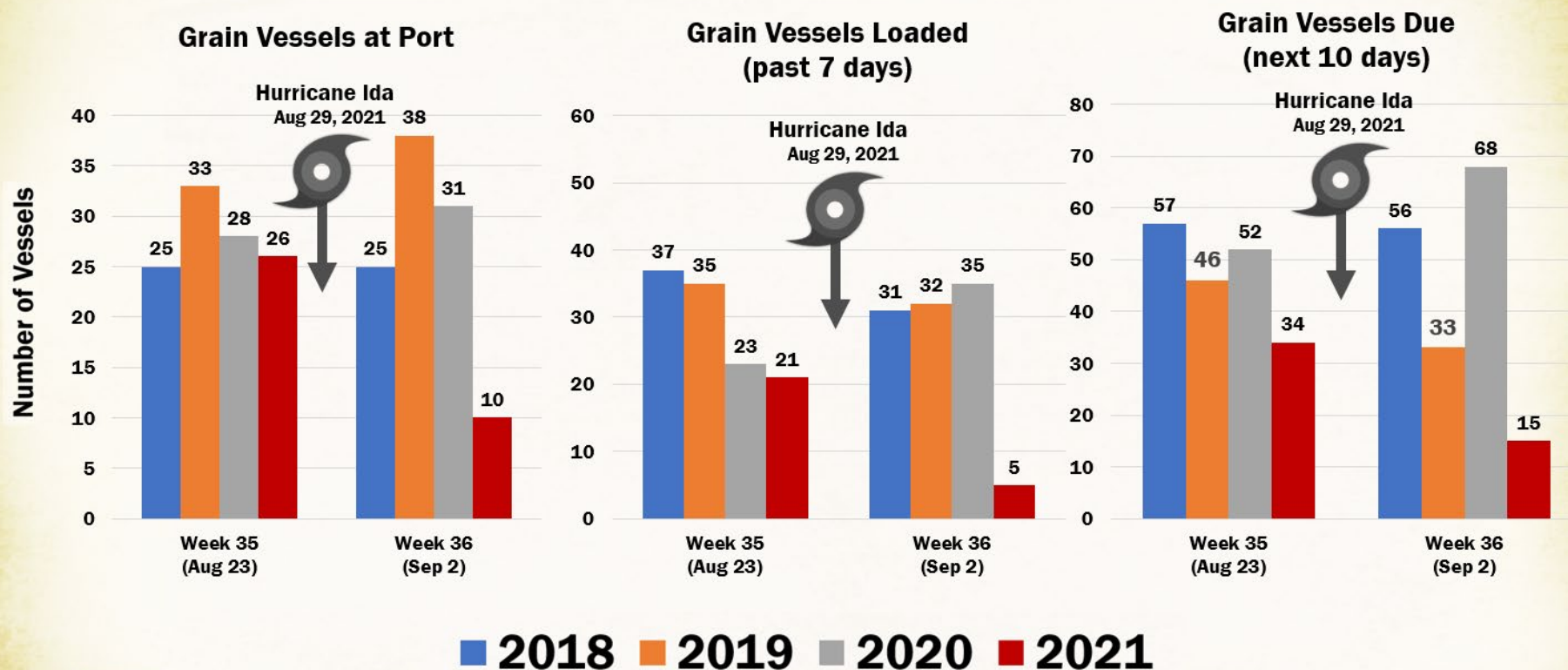
Source: USA Today

www.Hertz.ag

Hurricane Ida – Sept. 2021

FIGURE 2: GULF COAST PORT TRAFFIC

Louisiana and Texas Ports



AFB
AMERICAN FARM BUREAU FEDERATION®

Source: USDA, Agricultural Marketing Service

Source: American Farm Bureau Federation

www.Hertz.ag

Hertz
Farm Management, Inc.

Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

Chinese Energy Restrictions

- China's power supply becomes limited late 2021
 - Summer flooding in key coal producing areas
 - Sharp increase in production as demand spiked
 - CCP goal for a carbon neutral China by 2060
- Skyrocketing energy costs
- Rolling blackouts
- Limited factory operations

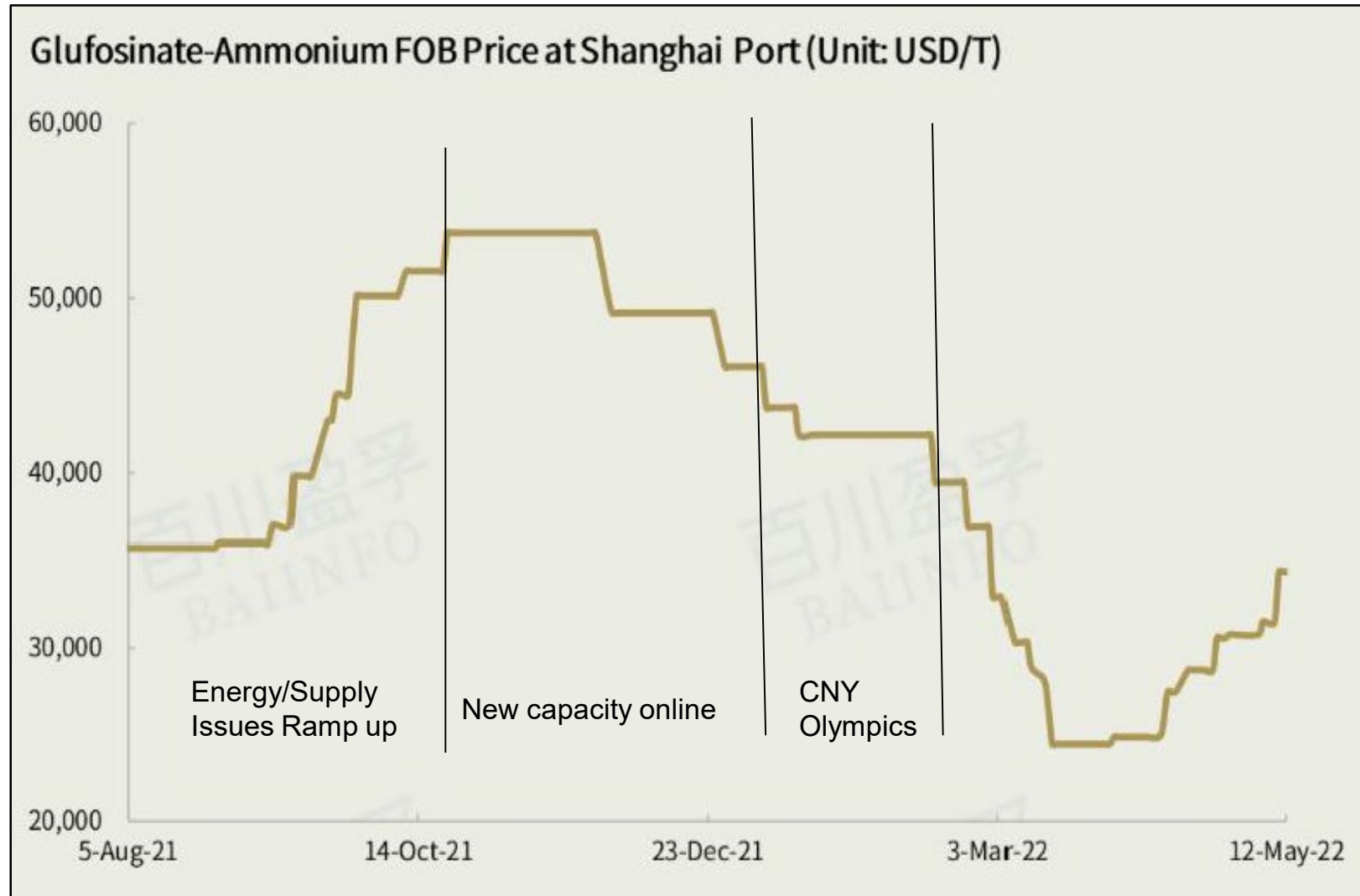


Image Source: The Lantau Group

www.Hertz.ag



2022 Input Costs Skyrocket

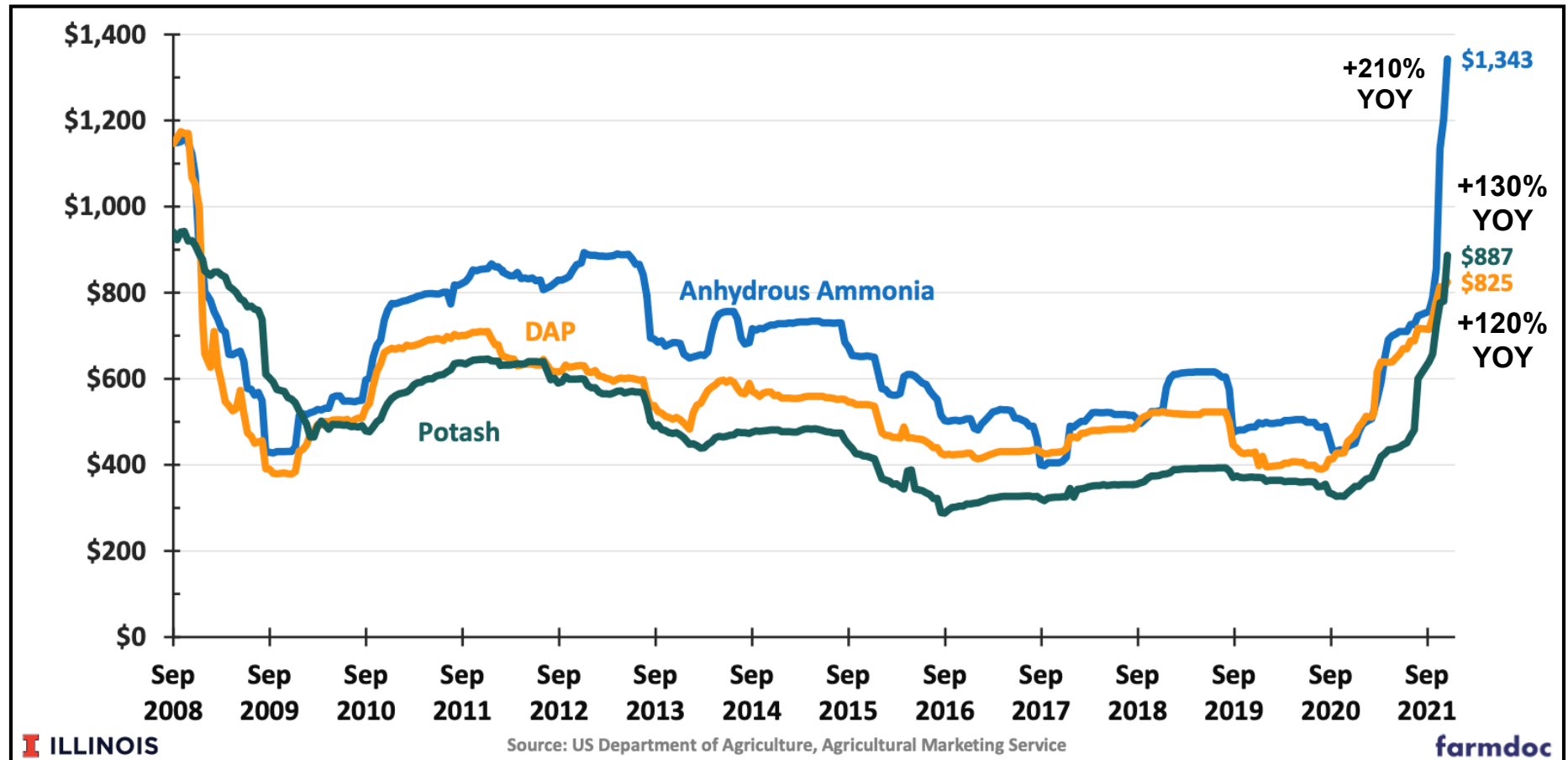


Source: Nutrien Ag Solutions

www.Hertz.ag



2022 Input Costs Skyrocket



Source: University of Illinois

www.Hertz.ag



2022 Input Costs Skyrocket

- Crop protection product costs spike
 - Production limitations in China
 - Hurricane Ida
- Fertilizer prices increase 2x+ from Fall 2020 to Fall 2021
 - Increase in natural gas prices worldwide
 - International anti-dumping trade disputes
 - Texas Freeze/Hurricane Ida
 - COVID disruptions to production plants
 - Narrow demand in 2020 followed by rapid expansion as commodity prices increased
 - China restricts exports to ensure domestic supplies
- *Back to the toilet paper theory...*
 - Appearance of extreme limited supply = consumer crisis



Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag

2022 Beijing Olympics

- China adds further energy restrictions prior to 2022 Winter Olympics to reduce smog
- Enhanced lockdowns for “zero-COVID” games
 - Quarantine impacts on container shipping & air travel
- Chinese New Year compounds effects



Image Source: NBC Sports

www.Hertz.ag



Supply Chain Issues in Agriculture

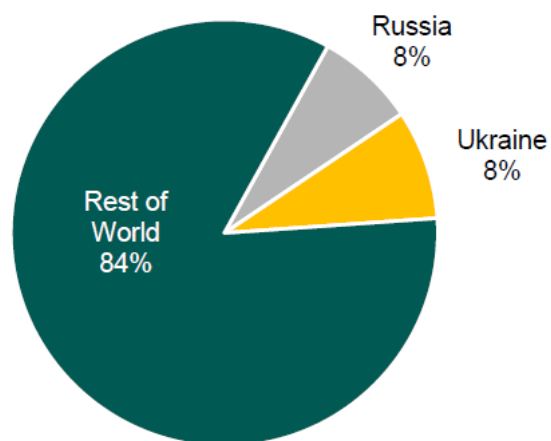


Source: Nutrien Ag Solutions

www.Hertz.ag

War in Ukraine

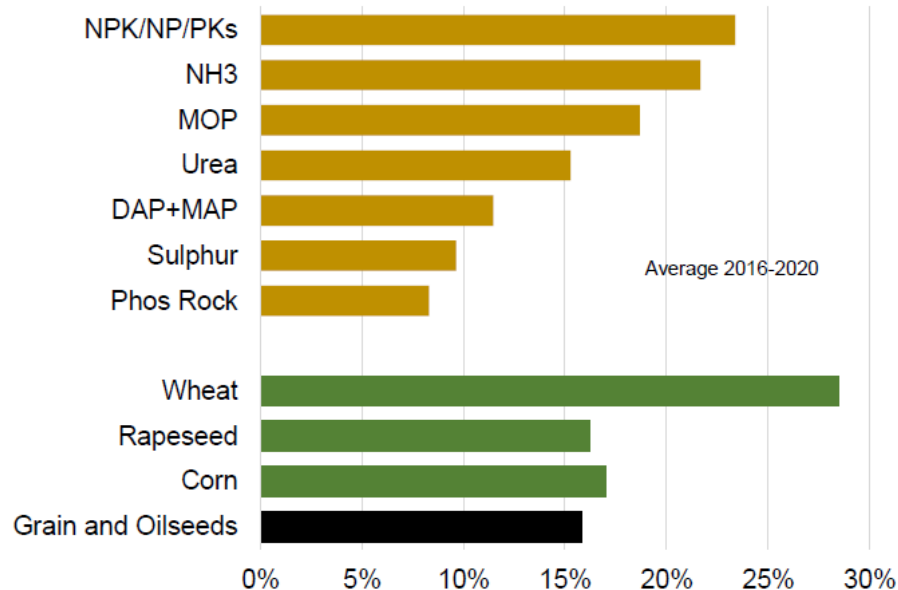
Global Grain & Oilseed Exports



* Share of global exports (2016-2020)
Source: USDA

- Russia and Ukraine are major ag commodity exporters, with each accounting for ~8% of global grain and oilseed trade.

Russia + Ukraine Exports
as percent of global trade



Source: USDA, Argus, CRU, Mosaic

- Russia and Ukraine (particularly Russia) are key exporters across the N, P and K space as well.
- Over half of the major fertilizers and crop outputs are typically exported.

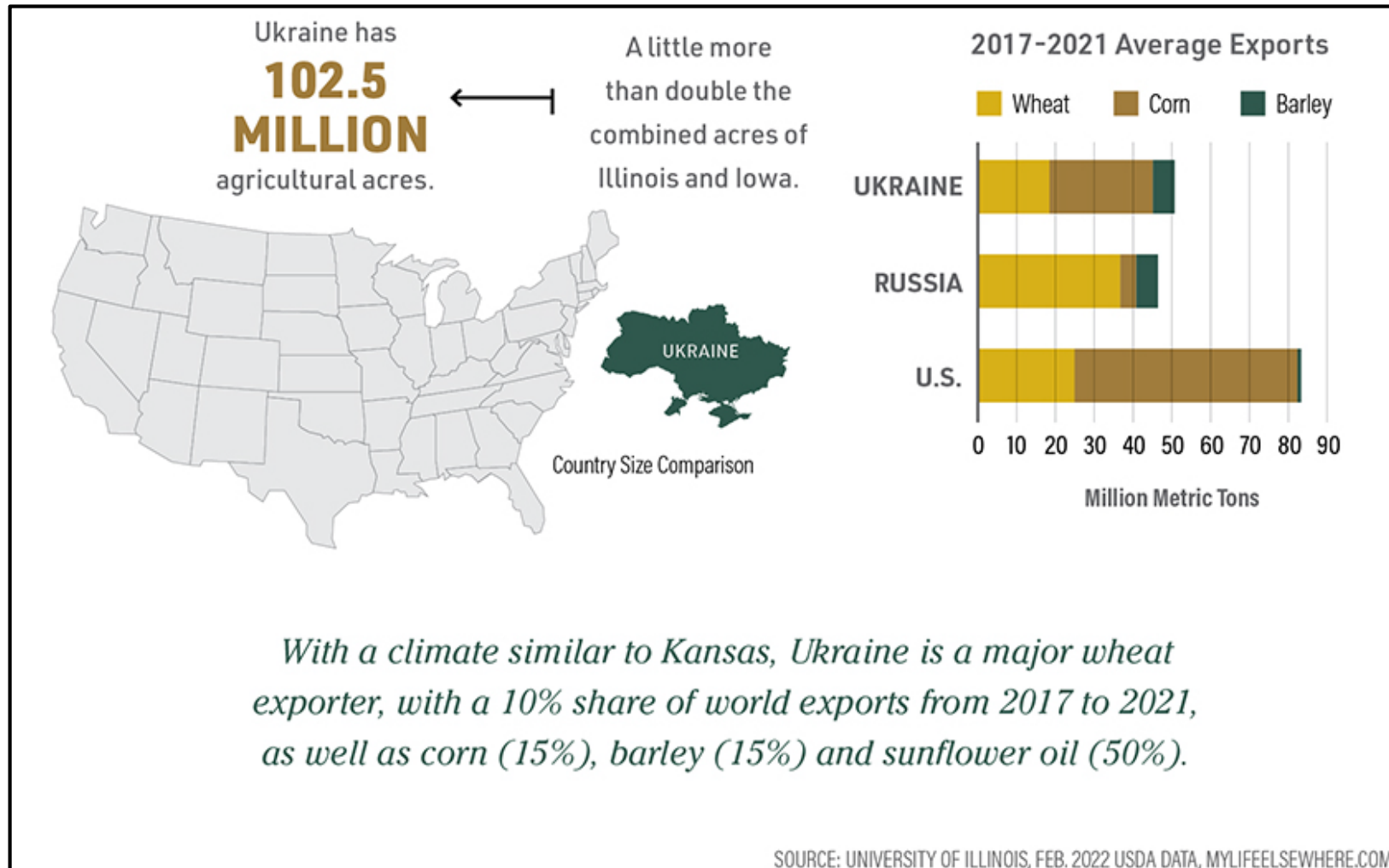


Source: Nutrien Ag Solutions

www.Hertz.ag



Ukrainian Crop Production



Source: AgWeb

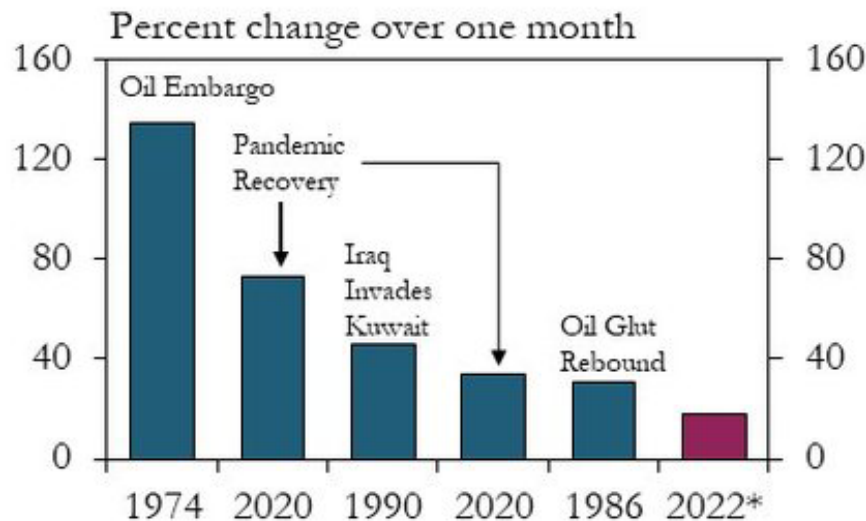
www.Hertz.ag



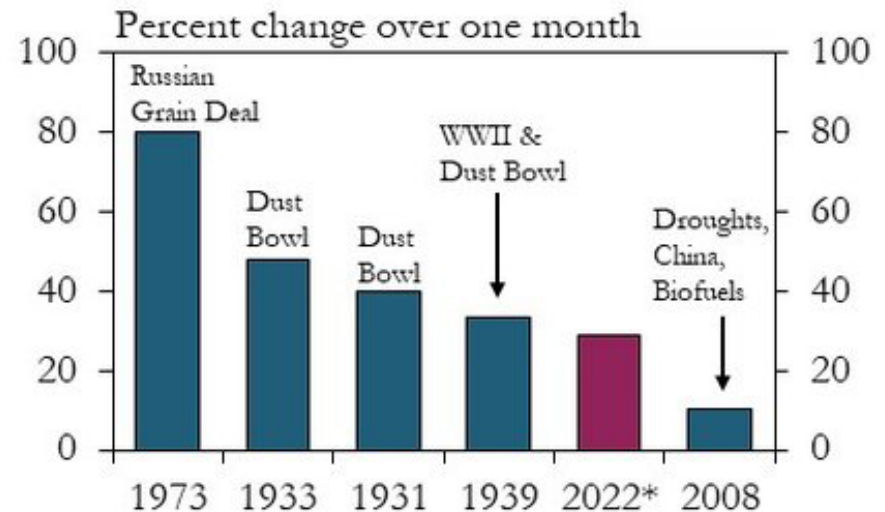
War in Ukraine

Chart 1: Historical Monthly Price Movements for Oil and Wheat

Largest Increases in Crude Oil Prices since 1946



Largest Increases in Wheat Prices since 1908



* The change in oil prices from February 2022 to March 2022 was the 16th largest on record, and the change in wheat prices in March 2022 was the seventh largest on record, after the Russian Grain Deal and Dust Bowl/WWII period (three months in 1933 were in the top six, and two of those months are excluded for brevity). Note: Historical crude oil prices are available back to 1946 via the Federal Reserve Bank of St. Louis, and the U.S. Department of Agriculture provides data on wheat prices back to 1908. Source: The Federal Reserve Bank of St. Louis and USDA.



Source: Federal Reserve Bank of Kansas City

www.Hertz.ag



War in Ukraine

WORLD

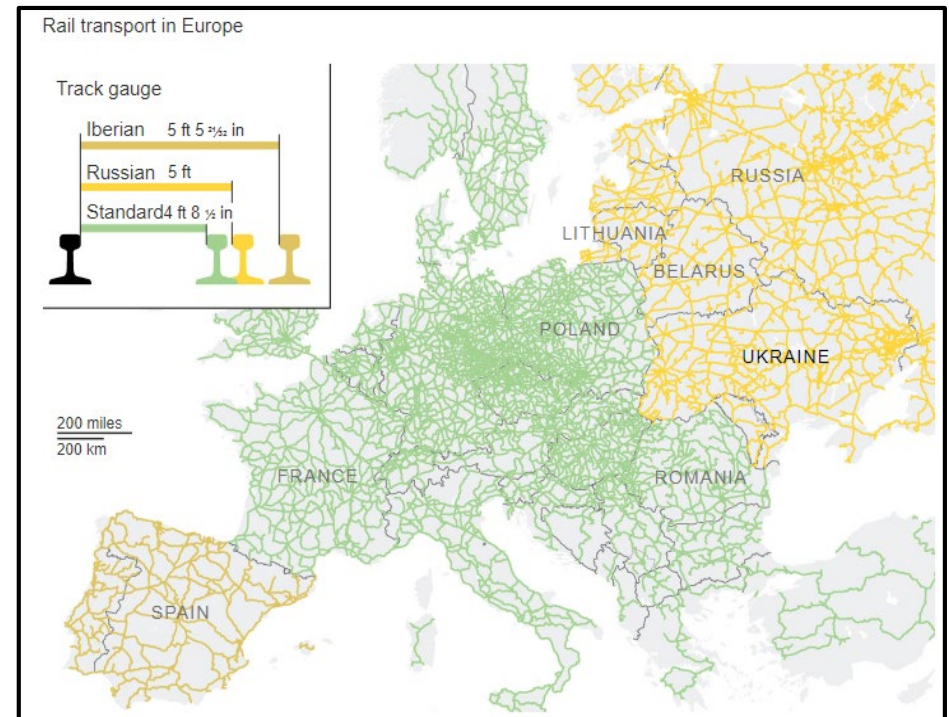
Ukraine Is Struggling to Export Its Grain, and Here's Why

After Russia's blockade of Black Sea routes, Ukraine looks for alternative shipping options to help stave off global food shortages

Alternate Grain/Vegoil Export Routes



Differences in Railway Track Gauge

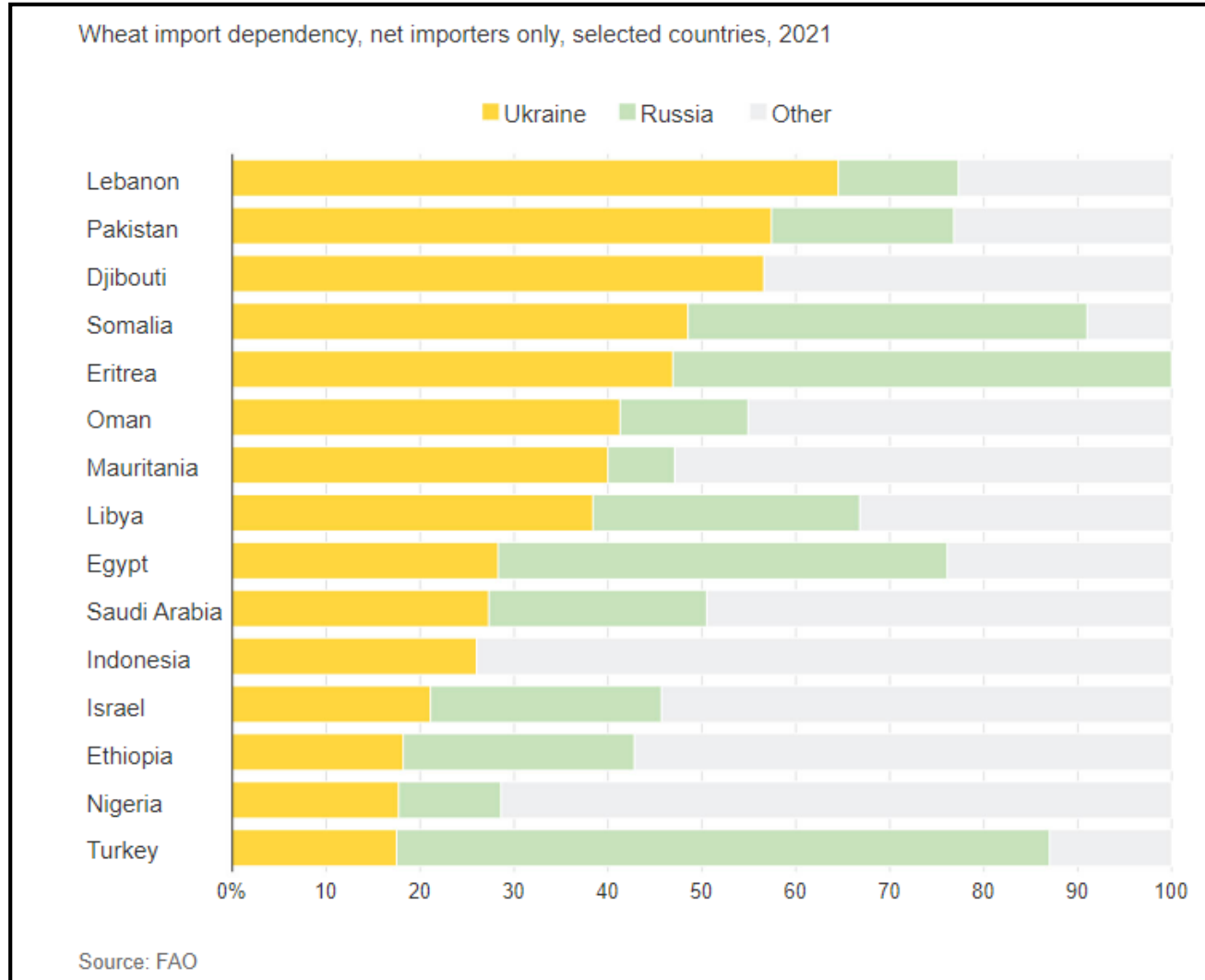


Source: Wall Street Journal

www.Hertz.ag



Food Insecurity Impact

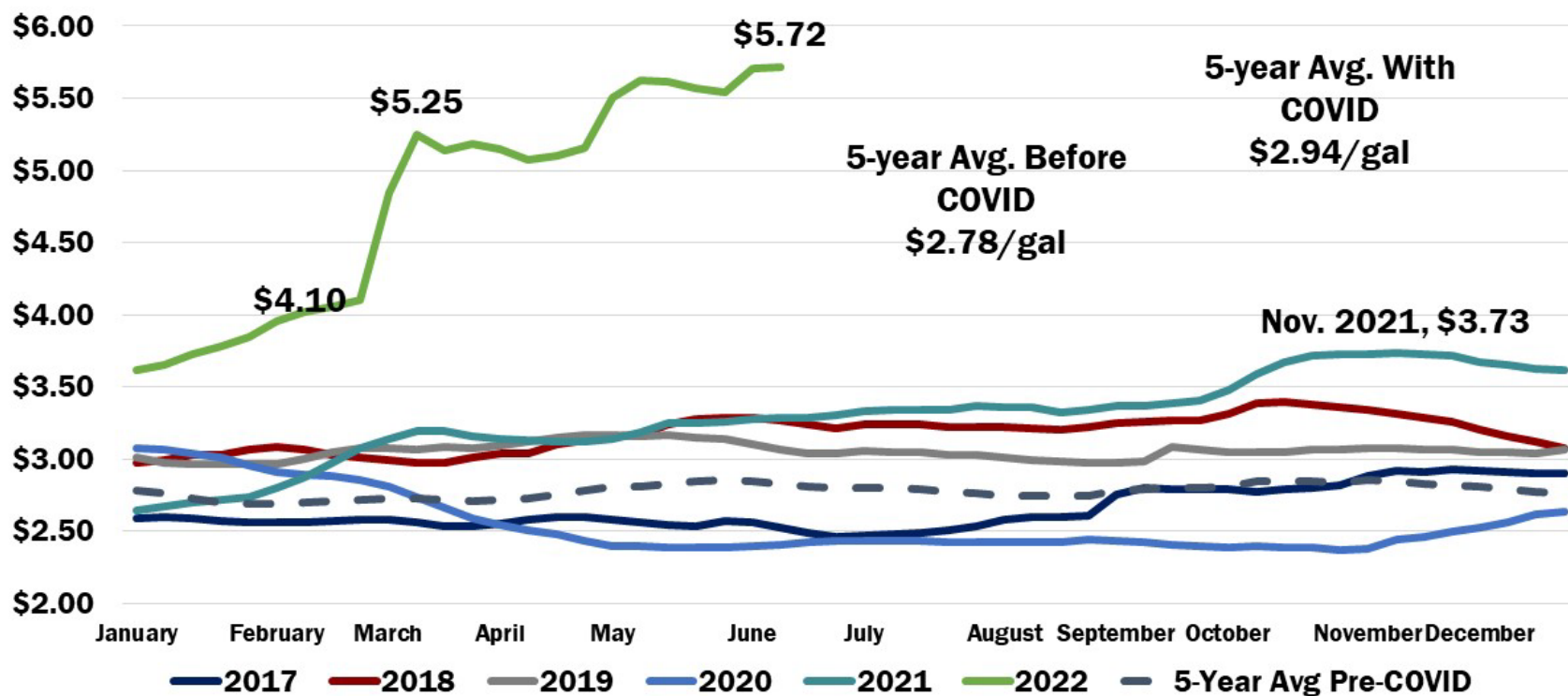


Source: Wall Street Journal

www.Hertz.ag

Russia/Ukraine Conflict Impact on Fuel Prices

Diesel Prices Hit Record Highs and Keep Climbing



AMERICAN FARM BUREAU FEDERATION®

www.fb.org

Source: U.S. Energy Information Administration,
Farm Bureau Calculations

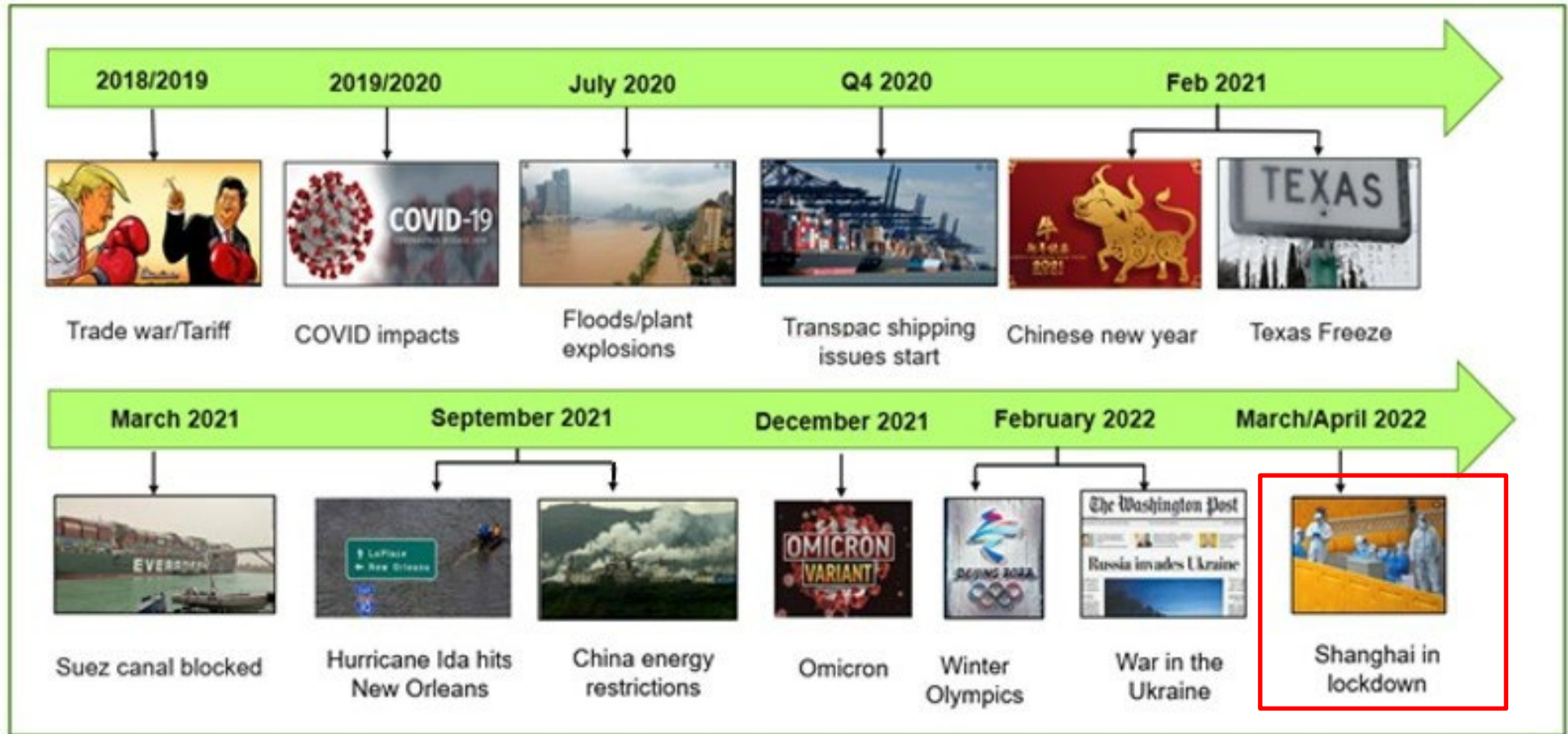


Source: American Farm Bureau Federation

www.Hertz.ag



Supply Chain Issues in Agriculture



Source: Nutrien Ag Solutions

www.Hertz.ag



Shanghai in Lockdown

- March 2022: Shanghai, China placed in strict lockdown due to COVID outbreaks
- Impacts:
 - Increased shipping congestion in the Port of Shanghai
 - Trucking services limited
 - Factory shutdowns
- Lockdowns eased in June
 - Some restrictions remain
 - Emergency testing resumed July 5



Shanghai Port Congestion



Ships waiting outside Shanghai and Ningbo ports in mid-April 2022 amid delays caused by COVID lockdowns



Image Source: Nutrien Ag Solutions

www.Hertz.ag



Travel Density in Major Chinese Cities



2022 Shanghai lockdown was severe, but not as severe as 2020

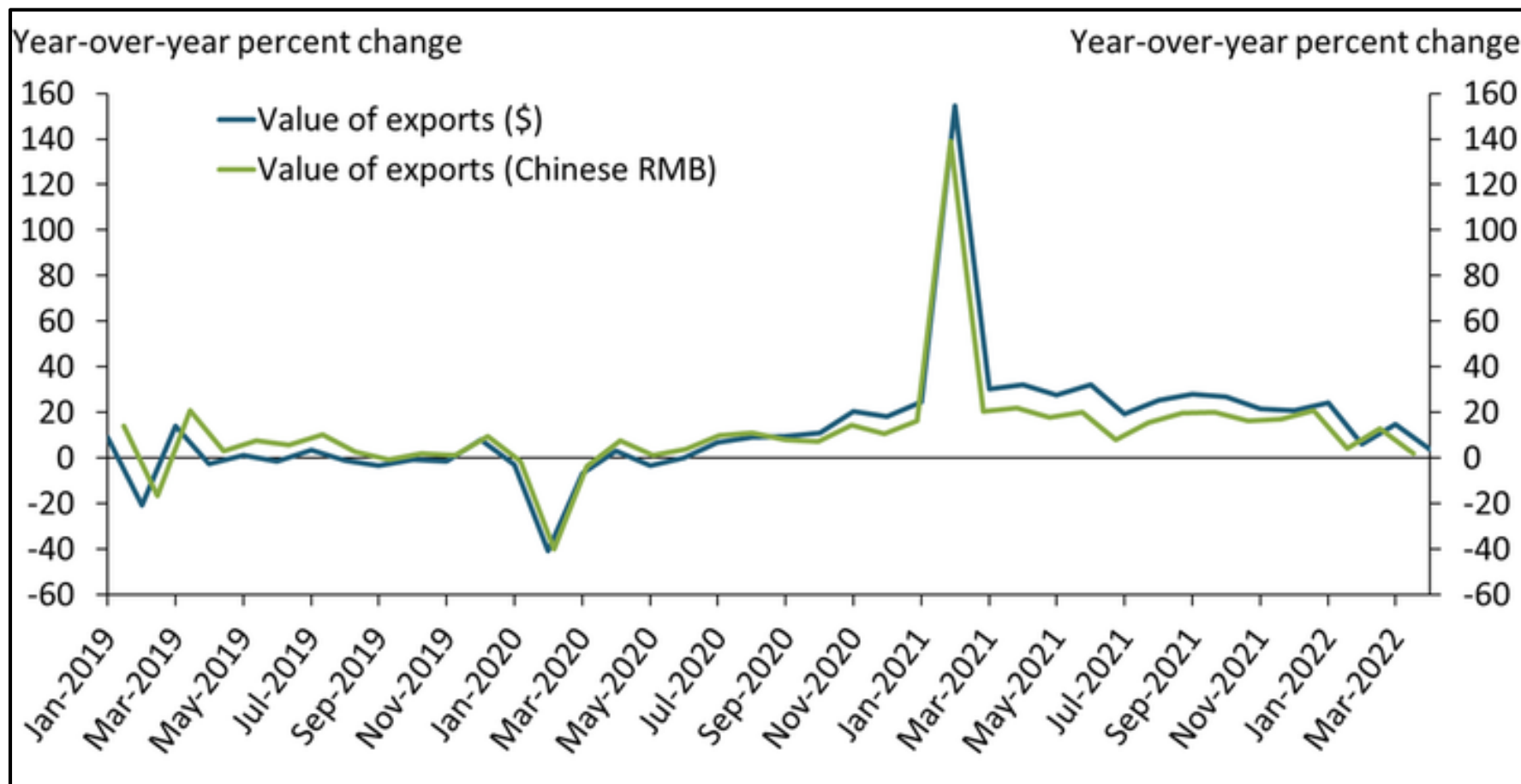


Source: Federal Reserve Bank of Kansas City

www.Hertz.ag



Export Growth Declines in China



Source: Federal Reserve Bank of Kansas City

www.Hertz.ag



What's Ahead?

- Continued “long-tail” consequences of severe disruptions to supply chain
- Fallout of Russia/Ukraine War
 - Lasting impact on grain & energy supplies
- Domestic trucking shortages
- 2023 U.S. Crop Input Availability
 - Pricing expected to remain elevated
 - Seed, chem, fertilizer all expected to be in supply
- Increased investment in domestic fertilizer production
- Hopefully, a supply chain that can adapt quickly to future “black swans”





www.Hertz.ag

- Farmland For Sale
- Auctions and Auction Results
- Ag Links
- Request Weekly Farmland Email

FOLLOW US

@HertzAgLand



www.Hertz.ag

