

Food and Agribusiness Market Update

Industry Consulting Team | Q4 2022

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When's it gonna rain?

One of my favorite movies is *Leap of Faith* starring Steve Martin. He plays the role of Jonas Nightingale, a dubious traveling faith healer preacher with a high-tech revival show whose bus breaks down in the fictional town of Rustwater, Kansas. While waiting for a replacement part he decides to hold a revival meeting. Rustwater is an agricultural community suffering from a terrible drought, and they desperately need rain to save their crops. A man from the audience asks the question, "When's it gonna rain?" Jonas responds with a litany of the problems people are facing each day. He then says the famous line, "So when you say to me Jonas, when's it gonna rain, all I can say is when's it gonna stop?!"

I picked this exchange because it mirrors two things we have been dealing with lately. The lack of rain in certain regions of the globe and the looming question of when are things going to get better. We are emerging from COVID to a world that is in turmoil. Consumers are hoping for relief from elevated food prices. When are prices going to come down significantly? That's a tough question to answer as there are unprecedented crises with no immediate resolution in sight.

Everyone is dealing with inflation, including farmers. A myth around higher food prices is that farmers must be profiting. That is not true. Farmers have very little control over the price they are paid for their commodities, or the price paid by the consumer. Price is mostly driven by how much supply is in the market and the demand of those products. When input prices are high, farmers must make very calculated risk decisions around their plantings. Since farmers have little influence on price paid for their commodities, they are very vulnerable to higher input cost. The largest of these are chemicals and fertilizer, representing on average 18% of farm production expenditures. Depending on the crop, that number can be as high as 30%. If a farmer or rancher is raising livestock, feed is nearly 16% of the production cost. Other large expenditures are land rent, seeds, seed tech fees, labor and machinery costs.

We long ago abandoned backyard gardens and eating only locally grown. Now the food market is global, the regions from which we fill our plates are stretched far and wide. What happens in Europe, or in any other region, has an effect not only on prices but ripples through food stocks around the world. Food inflation since 2020 has not been driven by traditional economic forces such as lack of supply. Rather, drivers include a disruption in the workforce and supply chain, coupled with a return to cooking at home brought on by the COVID lockdowns. We are still dealing with some of those issues, while additional factors keep food prices elevated as we look ahead to 2023. These factors include global drought, the war in Ukraine, and Russian control of natural gas going into Europe.

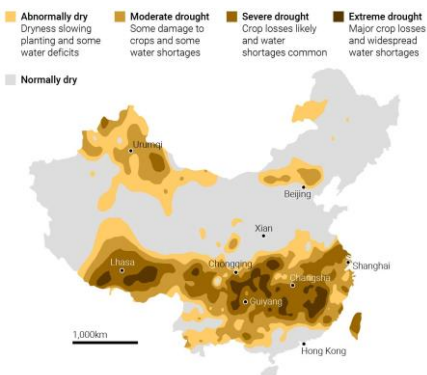
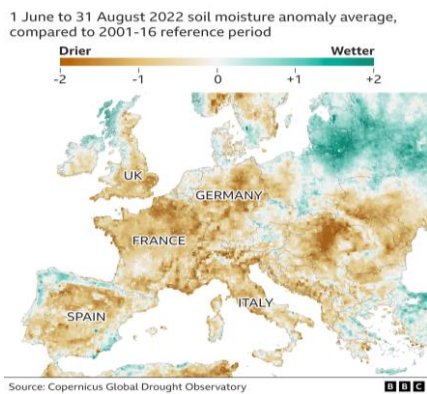
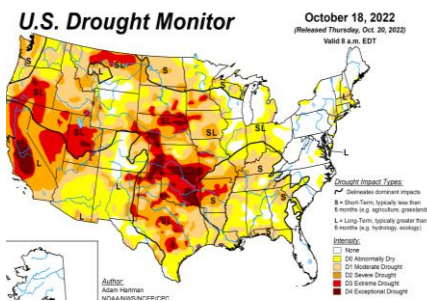
Extreme Droughts Contribute to Food Inflation

Exacerbated by a lingering La Nina cycle, the Midwest, Southwest and Western United States are suffering from what might be the worst drought ever recorded. The cold in the Pacific has pushed the wave-like jet stream flow across the United States causing dry weather. Usually, a La Nina cycle lasts less than a year. However, this one has lasted nearly two years. The results have been devastating to the cotton crop, where the loss is expected to reach 28% according to USDA forecasts. The drought has resulted in older cattle being brought to market because the fields were dry and cattle could not graze. In addition, the price of corn and hay were high, so feeding cattle proved costly. Because the pandemic caused a run on everything at the grocery store, beef prices increased. Between the cost of feed, water issues and high beef prices, the ranchers chose to sell their older cattle. This influx of beef caused prices to pull back. For the next couple of years, this event will impact the cost of beef as the herd will need to be built back, which will keep supplies tight.

USDA reports that only 54% of the corn crop is at good to excellent quality. Corn production is vital as it is primarily used for livestock feed and ethanol. It's also further processed into food, starches, corn oil and sweeteners. Furthermore, the soybean crop has suffered a similar fate as it is grown in the same geography and is often a rotation crop. The corn and soybean harvest will come in below typical yields, delaying what should have been a restocking year for global supplies. To make matters worse, the Mississippi River is at record lows, limiting barge traffic shipments of agricultural products. Chuck Magro, chief executive at Corteva, said at a recent investor presentation, "The current market expectation is that global grain and oilseeds markets need two consecutive normal crop years to stabilize global supplies."

Similar issues are happening in Europe and China. Europe is suffering through a drought that some scientists estimate has not been seen in 500 years. Italian rice farmers in the Po River Valley could lose nearly half their crop. Like the Po River, the Danube, Rhine, and Rhine are lower than anytime in recorded history. These are lifelines for agriculture, transport and hydroelectric energy. Barges that move everything from coal to agricultural products struggle to navigate these shallow rivers or must reduce their cargo loads to a point that it is not economical to operate. The eastern provinces of China are experiencing severe drought as well. This will likely reduce rice and peanut yields. Many of our ag chemicals used in fungicides, pesticides and herbicides are produced in China. In many regions, the manufacturing districts use hydroelectric power. The plants' power supply has been hampered by the low lake and river levels. This, coupled with strict COVID restrictions, could cause disruption in the production of those crop protection chemicals.

US, Europe & China Drought Maps



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Table 1

Three Year Wheat Prices

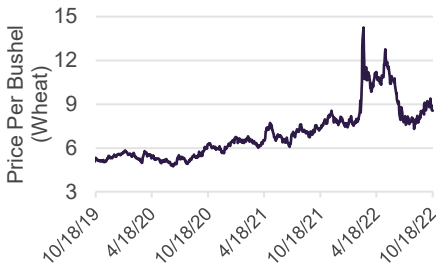


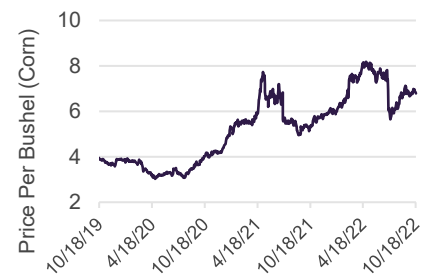
Table 2

Three Year Soybean Prices



Table 3

Three Year Corn Prices



Russia-Ukraine War

Together, Ukraine and Russia account for nearly 30% of the global export of wheat and around 65% of sunflower seeds. McKinsey estimates that 19 million to 34 million tons of export production could disappear from the market this year. Furthermore, the estimate for 2023 is expected to range from 10 million to 43 million tons. Not only will this impact the caloric intake of 60 to 150 million people, but this will also affect the price of the commodities. Currently there is a UN agreement allowing the export of Ukrainian crops out of the Black Sea. Shippers are working to move as much as possible before the deal expires, but they are being held up by a lack of functional ports and ongoing inspections. Egypt relies on Ukraine and Russia for 60% of its imports. Egypt in turn processes these commodities and exports them to Eastern Africa.

Fertilizer is the most important input for farmers. The main components of fertilizer are nitrogen, phosphorus and potassium. Nitrogen is produced using natural gas. Phosphorus and potassium are mined. Canada, Russia and Belarus are major supply regions for potash. Canada is the world's largest producer and exporter of potash. The U.S. imports most of its potash from Canada. The U.S. produces most of its own nitrogen and phosphorus. There was some damage by Hurricane Ian to our phosphorus facilities in Florida, but overall, I don't anticipate much disruption in US production. The war in Ukraine has led to a two-fold increase in the cost of potash. While Russia is still shipping potash, logistically moving these products out of Russia and Belarus is not without challenges. Putin's latest inflammatory speeches only create more pause for shipping companies and underwriters engaged in moving those products and insuring the cargo and vessels. I do expect exports to continue as Putin has a lot of leverage holding Ukrainian grains hostage in order to have his fertilizer and food exports sustained.

Rice is one of the most important cereal crops grown and is a staple food for more than 3.5 billion people. The growing of rice requires large amounts of phosphorus. Countries that produce rice will start holding on to their supplies of phosphorus. As evidence, China recently announced a ban on the export of phosphorus.

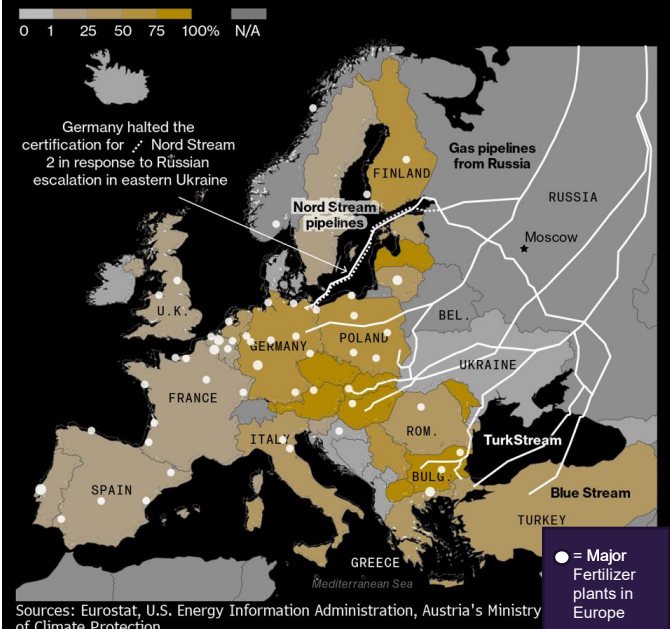
Russia and Natural Gas

Russian state-controlled companies supply Europe with nearly 40% of its natural gas. Some countries, such as Germany, prior to the invasion, relied on Russia for 55% of their supply. Natural gas is the main component in the production of nitrogen fertilizer. Russia has drastically reduced its supply of natural gas into Europe by "routine pipeline maintenance". Most recently Russia intentionally destroyed one of the two Nord Stream lines that run under the Baltic Sea.

On the right is a map Bloomberg recently published of Russian natural gas pipelines going into Europe. We overlaid that with a map of major fertilizer plants in Europe. The natural gas issue is not just impacting fertilizer. There are worries that it could destroy Europe's metal business forever. Bakeries are concerned they will not be able to produce due to soaring energy and supply costs. However, Europe's fertilizer industry has been impacted the most. Most of Europe's nitrogen fertilizer manufacturers were pulled offline in September. Yara and other manufacturers, for months, have been shipping ammonia from the U.S. to be converted in Europe, but this will not come close to filling the gap created by the shutdowns. Combined, the lost production from Europe's nitrogen plants is around 400,000t of nitrogen per month. Europe will soon be operating less than half of its installed capacity of production. Russia and China are the largest fertilizer exporters in the world. It's still uncertain how cooperative Russia will be, and we know China is holding close to its reserves. In regions that will struggle to source fertilizer, we will see lower crop yields. The World Food Program believes that, due to inflationary pressures including the fertilizer crisis, hunger will rise even further. We are witnessing the beginnings of a global food crisis.

Russian Natural Gas & Major Fertilizer Plants

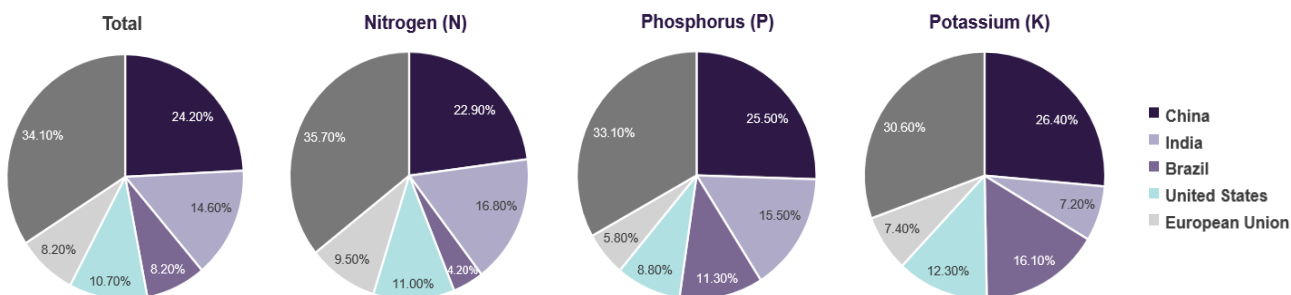
Share of natural gas imports coming from Russia, 2020



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Global Fertilizer Use



Export Restrictions

When the market faces disruption and uncertainty, countries retain their agricultural stock and fertilizer. For instance, India has put an export tax on rice. They supply approximately 40% of the world's rice. Other countries are following suit. Countries like Turkey and Argentina are implementing restrictions on export. China is prepared for such events as they have grown strategic reserve by 70% since 2008. The charts on the right are lists of countries imposing trade restrictions on food and fertilizer products.

As a result, the United Nations recently announced that 2022 is a year of "unprecedented hunger". The U.N.'s Global Crisis Response Group claims that over 60 countries are now struggling to afford food imports. Furthermore, the WTO has asked countries to halt food export restrictions.

When's it gonna stop?

Companies, producers and consumers are finding themselves in a more volatile marketplace than they are accustomed to operating in. We will not be able to look at what we did in past years and simply replicate and hope for the same success. The turmoil caused by the Russian-Ukraine war, the energy crisis in Europe and the lingering problems created by the drought will not cure themselves overnight. I believe there has been a seismic shift that could last years. Ag inputs and food sources that have historically been somewhat stable and predictable have been knocked off balance.

Nevertheless, there is hope. A few countries have the resources to solve this problem, and no one is better positioned to do so than the United States. We have abundant resources, fertilizer, distribution and the greatest agricultural land on the planet. We are energy independent, technologically superior, and have extremely efficient and productive farms. We can and will do more to secure food for those around the world. If this war draws out, it is possible that shifts in production and demand for U.S. food products could increase over the next several years along with foreign investment in our food and agricultural assets.

Food Export Restrictions

Category	Countries	Products	Start Date	End Date
Export Bans	Argentina	Beef meat	01/01/2022	12/31/23
	India	Broken rice	09/08/2022	12/31/22
		Sugar	06/01/2022	10/31/22
		Wheat	05/13/2022	12/31/22
	Kazakhstan	Wheat flour, semolina, maida	08/25/2022	12/31/22
	Russia	Sugar	05/23/2022	11/24/22
Export Licensing	Turkey	Rapeseed	04/01/2022	02/01/23
		Beef meat, sheep meat, goat meat	03/19/2022	12/31/22
		Cooking oils	03/04/2022	12/31/22
Export Taxes	Argentina	Red Lentils and beans	01/27/2022	12/31/22
	India	Beef meat	01/01/2022	12/31/23
	Turkey	Wheat flour	07/12/2022	12/31/22
		Grains, oilseeds, cooking oil	03/04/2022	12/31/22
Export Taxes	Russia	Poultry meat, eggs, vegetables, fruits	01/27/2022	12/31/22
		Soybean oil, soybean meal	03/19/2022	12/31/22
		Rice	09/09/2022	12/31/22
		Soya beans	04/15/2022	08/31/24
Export Taxes	Russia	Sunflower oil, sunflower meal	04/15/2022	12/31/22
		Wheat, barley, corn	04/13/2022	12/31/22

Fertilizer Export Restrictions

Category	Countries	Products	Start Date	End Date
Current Export Ban	China	Phosphate rock	09/28/2021	12/31/22
	Ukraine	Nitrogenous fertilizers (inc. compound), phosphatic fertilizer, potassic	03/12/2022	12/31/22
Export Licensing	China	Fertilizers	09/24/2021	12/31/22
	Russia	Nitrogenous fertilizers (inc. compound)	11/03/2021	12/31/22
Export Taxes	Viet Nam	Mineral fertilizers	05/06/2022	12/31/22

Sources: *Leap of Faith* (1992), Bloomberg, USDA, Wall Street Journal, McKinsey, Argus, CNBC, BBC, US Drought Monitor, South China Morning Post



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