Agriculture By the Numbers

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USDA Reports Signal Higher Cattle Prices

By Tim Petry, Extension Livestock Economist

On July 23, the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS) released the semi-annual July "Cattle" inventory report, and on Aug. 20, NASS released the August "Cattle on Feed" report.

The current and past reports are available online at

"Cattle" — https://usda.library.cornell.edu/concern/publications/h702q636h and

"Cattle on Feed" — https://usda.library.cornell.edu/concern/publications/m326m174z.

The July "Cattle" inventory report is important because it gives a midyear indication of possible changes to look forward to in cattle numbers, beef production and potential market price impact. The July report is less detailed and only provides total U.S. cattle inventory numbers. The January "Cattle" report provides a more detailed state-by-state breakdown, which allows regional comparisons and weather-related changes to be documented.

Most beef cattle market observers expected the July "Cattle" report to show cyclically lower beef cow inventory numbers, compared with last year, and that was the case.

The NASS reported the July 1 U.S. beef cow herd at 31.4 million head, down 2% from last year's 32.05 million. The current inventory is down 3.1% from the 2018 cyclical peak of 32.4 million head.

Drought in the northern Plains and Western states is causing forced beef cow liquidation. And increased beef cow slaughter in the first half of 2021 likely will cause lower beef cow numbers next year.

Furthermore, the July 1 number of heifers of more than 500 pounds kept for beef cow replacement, at 4.3 million head, was down 2.3% year over year.

Of course, weather-related forage and grazing conditions are always a wild card. On Aug. 23, the NASS reported U.S. pasture and range conditions at 43% in the poor to very poor category.

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And the USDA estimates that 33% of the U.S. cattle inventory is in areas experiencing some level of drought. If drought conditions linger or worsen, forced liquidation likely will continue.

The July "Cattle" report also gives the first estimate by the NASS of the 2021 calf crop. The calf crop (includes beef and dairy calves), at 35.1 million head, is down fractionally from last year, but down 3.3% from the 2018 cyclical peak of 36.3 million head.

The COVID-19 pandemic, with reduced slaughter capacity, caused a backlog of cattle in feedlots that has negatively impacted cattle prices, especially fed cattle. The August "Cattle on Feed" report showed continued improvement in feedlot inventories.

The number of cattle on feed on Aug. 1, at 11.07 million head, was down 2% from last year. That was the lowest number of cattle on feed for August since 2017.

In spite of drought conditions, feedlot placements in July, at 1.7 million head, were down more than 8%. Fewer placements likely came from cyclically declining calf crops and high corn prices. Higher corn prices and cost of gain mean feedlots prefer to purchase heavier weight feeder cattle, so incentives exist to graze feeder cattle.

Placements weighting less than 700 pounds were down 15% from last year, while 900- to 999-pound placements increased 5%.

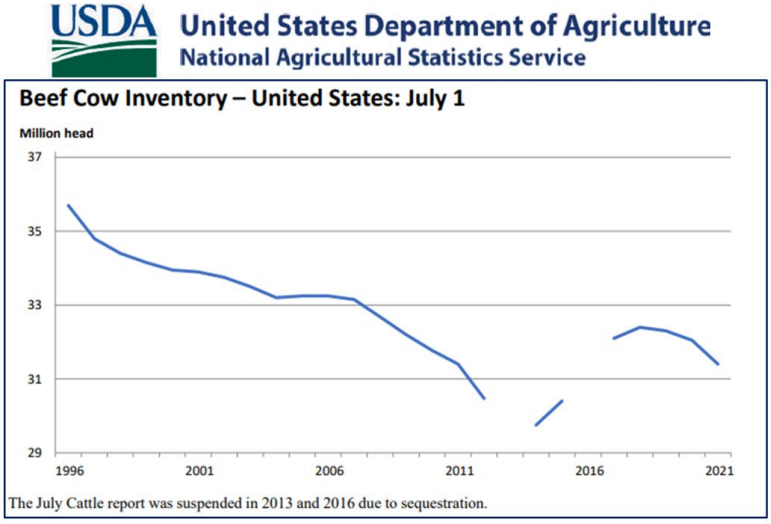
Severe drought is causing forced sales of feeder cattle from pastures and ranges, especially heifers originally kept for replacements. Continued and expanding drought in forage-deficit areas could cause more placements into feedlots.

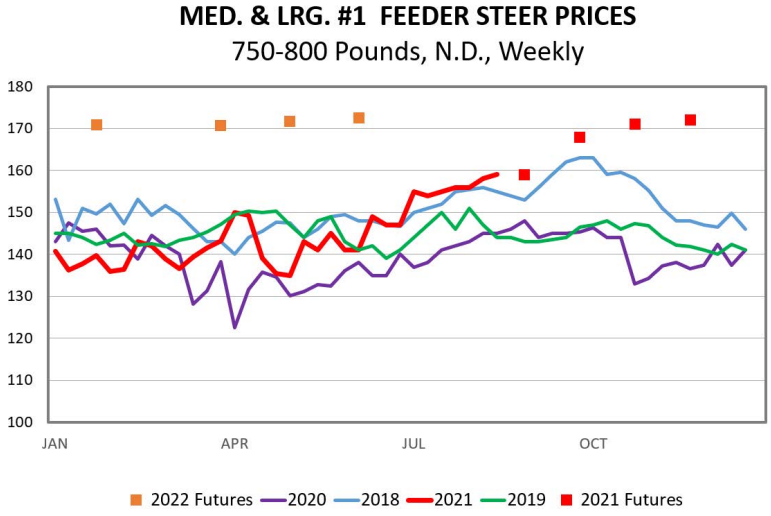
Fed steer and heifer marketings in July, at 1.9 million head, were down 4.5% from last year.

The number of cattle on feed more than 120 days was down 4.5 % from last year's pandemic-inflated levels.

The report confirmed that the industry is finally reducing the backlog of cattle in feedlots.

Also important is that with cyclically declining beef cow numbers and calf crops, feedlot inventories should continue to decline and support fed cattle prices.





The bottom line for prices of all market classes of cattle, from a supply standpoint, is the cyclically smaller beef cow herd and calf crops will be supportive to prices for the next several years. Declining supplies, along with strong domestic beef demand and record high beef exports, have resulted in current cattle prices being higher than in the last several years.

Feeder cattle prices are being supported by early 2022 live (fed) cattle futures prices trading from $139 to $142, compared with current cash fed cattle prices at $126.

Feeder cattle futures prices for October and November 2021 and into 2022 are trading from $170 to $172. If they actually happen, that would be the highest cash market prices since 2015.

Fertilizer Prices Reach 8-Year High Heading Into Fall 2021

By Bryon Parman, Extension Agricultural Finance Specialist

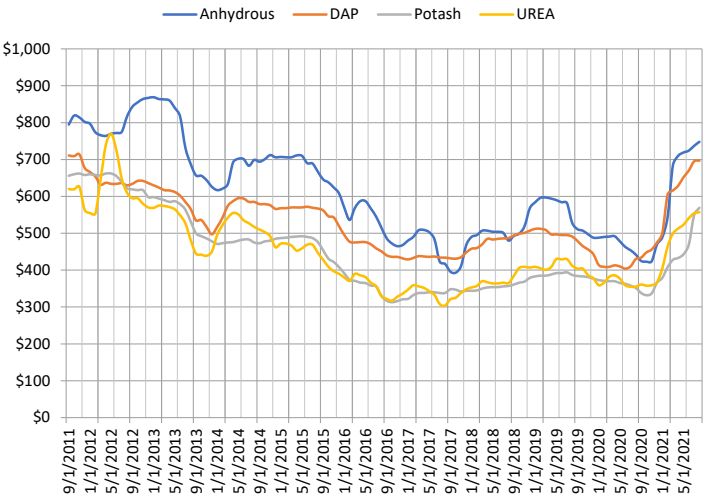
Prices for key crop nutrients are the highest they have been since 2013 as summer begins to give way to fall in 2021.

As of Aug. 1, 2021, the monthly average price for anhydrous ammonia had reached $748 per ton, while diammonium phosphate (DAP), potash and urea had reached $697, $569 and $557 per ton, respectively, free on board (FOB) at the ports in New Orleans, La. DTN, meanwhile, reports that the average retail price of anhydrous was $846 per ton, with DAP approaching $800 per ton, potash at $716 per ton and urea costing $615 per ton.

Not since 2013 have anhydrous ammonia or urea prices been this high, and we have to look back to 2011 to see equivalent nominal prices for potash or DAP. As recently as October 2020, the FOB New Orleans (NOLA) price for anhydrous ammonia was $423 per ton, with DAP at $448 per ton, potash costing $332 per ton and urea at $358 per ton.

Compared with the Aug. 1, 2021, prices, the Oct. 1, 2020, prices are 43.5% higher for anhydrous, 35.7% higher for DAP, 41.7% higher for potash and 35.7% higher for urea. Figure 1 shows the monthly FOB NOLA price for the selected fertilizers going back 10 years.

Figure 1: Monthly price per ton FOB NOLA for selected fertilizers.



At the retail level, the difference from a year ago is even more dramatic. DTN's Russ Quinn reports that "... potash is 56% higher, urea is 57% more expensive, UAN32 is 60% higher, anhydrous is 62% more expensive, UAN28 65% higher, DAP is 67% more expensive ... ."[1]

Some of the price increases are obviously due to the rise in commodity prices because retailers expect producers in 2022 will be planting more acres of nutrient-consuming crops such as corn, wheat and soybeans. However, some considerable supply side concerns exist as well, including previous chemical plant shutdowns and import issues related and unrelated to the COVID-19 pandemic.

Such a dramatic rise in nutrient costs, if they persist, will have a considerable financial impact on the costs of production in North Dakota and other states growing similar crops. For instance, fertilizer makes up approximately 25% of the total production costs of spring wheat in North Dakota and 20% of the total production cost of corn.

Canola and sunflowers are also large consumers of fertilizer, with fertilizer being nearly 20% of the total production costs for canola and 10% for sunflowers. With respect to corn alone, a 50% increase in the cost of fertilizer could increase the cost per acre to grow corn by $50, compared with the same prices last fall.

The cost of fertilizer is certainly something to watch as 2021 closes out and we move into 2022. Many farmers utilize the cyclical nature of fertilizer prices to reduce costs, taking advantage of the fact that prices tend to be the lowest in the fall and rise as farmers begin buying in anticipation of spring planting. However, given current prices, locking in purchases of fertilizers may be hard for famers, knowing that prices may come down in the coming months.

If higher fertilizer costs persist, they certainly will have an impact on cropping decisions. Crops that use considerably less nitrogen, such as pulse crops (soybeans, dry beans, peas, etc.) could look attractive, compared with wheat, corn or canola, which use relatively larger quantities.

That is especially the case for corn, which requires large amounts of currently high-priced fertilizer despite its relatively high price per bushel. To help with these decisions, North Dakota State University Extension provides the Crop Compare Tool, which can be found online at www.ndsu.edu/agriculture/ag-hub/ag-topics/crop-production/tools/crop-compare.

[1] Russ Quinn of DTN. "Retail Potash, MAP Prices Climb as Other Fertilizers Stall." Aug. 11, 2021. Online at www.dtnpf.com/agriculture/web/ag/crops/article/2021/08/11/retail-potash-map-prices-climb-stall.

Renewable Diesel

By David Ripplinger, Extension Bioproducts/Bioenergy Economist

Demand for biofuels resulting from California low-carbon transportation fuel policy has significantly impacted agriculture. We have no better case of this than renewable diesel and bio-based oils, fats and grease.

California's low-carbon fuel standard (LCFS) is a cap-and-trade system that mandates a regularly decreasing average carbon footprint for transportation fuels used in the state. The LCFS has impacted the U.S. biofuel industry in a number of ways. It has diverted relatively low-carbon biofuels to California, led to modifications and investments to reduce carbon emissions at existing biorefineries, and resulted in the commercialization and increased production of biofuels other than corn ethanol and soybean oil biodiesel, which currently make up most of the market in terms of volume.

Renewable diesel is the most recent example of new production coming online due to the LCFS. Renewable diesel is in high demand because it has an extremely small carbon footprint and is a drop-in replacement for petroleum diesel, meaning that it has no blending restrictions.

Renewable diesel should not be confused with biodiesel. While both use oils, fats or grease from plants or animals, the processes used to make them and resulting products are quite different.

Biodiesel is produced using a relatively simple, low-cost process called transesterification, which reduces viscosity and reduces undesirable characteristics such as buildup and gelling. Biodiesel meets its own specification, which serves a variety of purposes, including providing confidence when blending with petroleum-based diesel.

Renewable diesel, on the other hand, is produced by hydrotreating biomass, with the resulting product meeting the same diesel specifications as that made from petroleum. Hydrotreating is a capital-intense process used by some petroleum refineries.

From 2014 until recently, a renewable diesel plant in Louisiana that used tallow as feedstock was the sole U.S. producer of renewable diesel. However, as the price of California carbon credits rose, so did interest in low-carbon fuels and renewable diesel specifically. While the volume of diesel used in California has remained relatively constant in the last decade, renewable diesel use has grown tremendously and now exceeds one-fourth of diesel use.

The growth to date in renewable production has been supported by increased use of used cooking oil, corn oil (typically from corn ethanol refineries) and, most recently, other vegetable oil.

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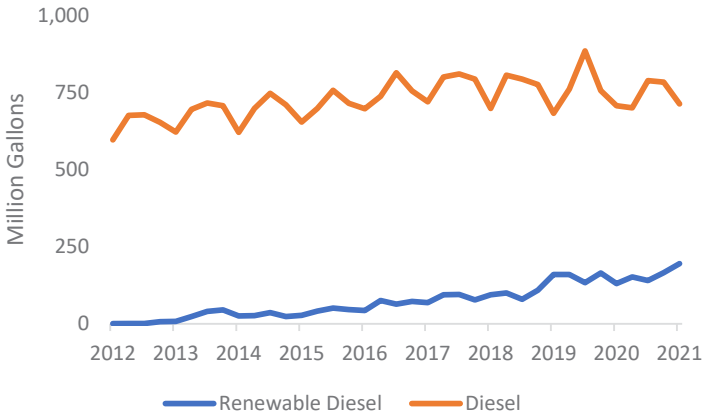
Quarterly California Diesel and Renewable Diesel Use 2012-2021



Source: California Department of Tax and Fee Administration, California Air Resources Board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Renewable Diesel – continued from page 4

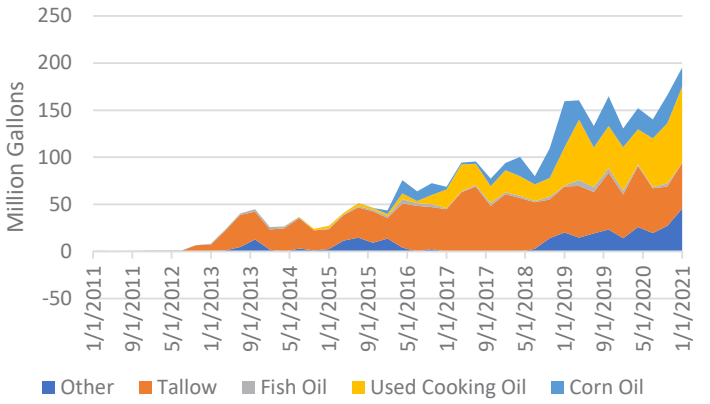
The increased demand for renewable diesel and vegetable oil is most evident in North Dakota from the conversion of the Marathon-Dickinson refinery to renewable diesel production and the recently announced off-take agreement by ADM for the soybean oil production from the to-be-constructed Spiritwood crush plant.

However, we are likely in the early stages of renewable diesel as a major biofuel, with continued growth in use in California expected, to say nothing of the impacts of low-carbon fuel policies in Oregon, Washington and Colorado and likely many other states (and countries) to come.

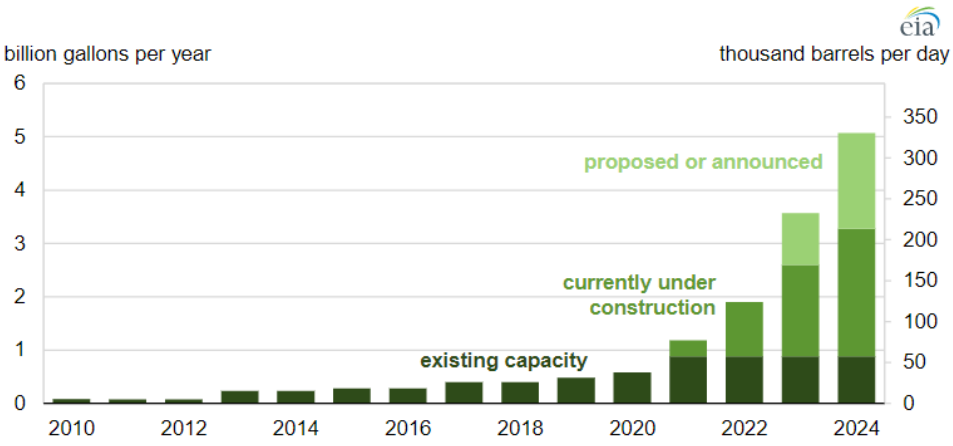
The Energy Information Administration, an agency within the U.S. Department of Energy, has tallied announced capacity growth to reach 5.1 billion gallons in 2024 from just 600 million in 2020.

A simple calculation based on the 7.5 pounds of vegetable oil to produce a gallon of renewable diesel shows just how large a market for vegetable oil, animal fats and grease this may become: from 4.5 billion pounds to 38.2 billion pounds, which would be more than about 150% of current U.S. soybean oil production.

Quarterly California Renewable Oil by Feedstock



Existing and Expected U.S. Renewable Diesel Production Capacity (2010-2024)



Source: Graph by the U.S. Energy Information Administration (EIA), based on data from company announcements in trade press.

Potential Impacts of Renewable Diesel Production on the Soybean Industry

By Frayne Olson, Extension Crop Economist/Marketing Specialist

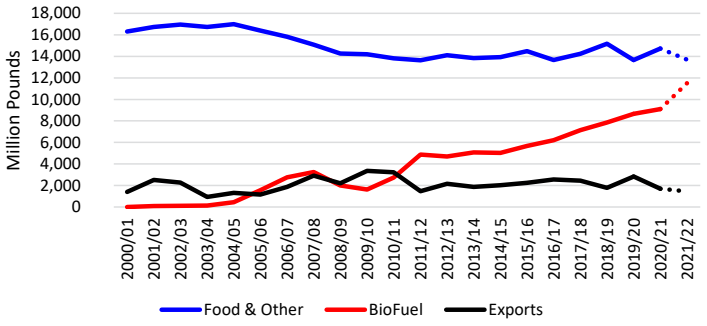
The increasing demand from renewable diesel production has potential long-term implications for the U.S. soybean industry. The scope of possible changes will be heavily influenced by the pace and scale of renewable diesel adoption, which is also very difficult to predict.

Historically, approximately 60% of the gross value from soybean crushing comes from the sale of soybean meal, with about 40% coming from the sale of the crude soybean oil. Today, the gross value of production is about equally divided between soybean oil and meal. The expansion of biodiesel, and now the introduction of renewable diesel, has contributed to the increased soybean oil prices and shifting revenue streams for crushing.

Figure 1 shows the annual use of soybean oil for the past 20 years and projected values for the 2021-22 marketing year. During this time period, soybean oil exports, as well as food and other uses, has remained relatively stable, while the use for biodiesel has nearly doubled from 2011 to 2021.

The August U.S. Department of Agriculture (USDA) World Agricultural Supply and Demand Estimates (WASDE) is forecasting a 26% increase in soybean oil being used for biodiesel from the 2020-21 to 2021-22 marketing year. What is unclear is how much of this projected increase is due to renewable diesel production versus growth in blended biodiesel, but soybean oil prices are responding and increasing the profitability of soybean crushing.

Figure 1: Annual U.S. soybean oil usage by category.



USDA Oil Crops Yearbook and Aug.12, 2021, World Agricultrual Supply and Demand Estimates

As David Ripplinger noted in his article, the policy-driven growth in renewable diesel is projected to expand dramatically during the next several years. Here are four interconnected questions surrounding this potenial expansion: 1) Can the U.S. soybean crushing industry keep pace with a growth in the renewable diesel refining, either through expansion of existing crushing facilities or construction of new plants? 2) How many additional soybean acres can the U.S. add to supply an increase in crushing demand? 3) Can other vegetable oils be used as alternative refining feedstock? and 4) How high will U.S. vegetable oil prices increase before imported vegetable oils from international suppliers become a more profitable alternative?

Expanding industry-level oilseed crushing capacity is a very complex process. Historically, the first level of increased processing capacity has come from expanding existing facilities, rather than building new plants.

The main advantages for facility expansion are lower capital requirements per unit of output and a well-established supply chain for inbound ingredients and outbound products. The advantages of new construction are more flexibility for site location, potentially creating logistics advantages, and the ability to incorporate the most current processing technology. Every oilseed processing company will approach expansion differently and an expectation is that the new demand base can justify the capital expendatures.

Increasing soybean crushing margins usually leads to higher farm-level soybean prices, which signal a need for increased production. Figure 2 shows the historical planted acreage for corn, soybeans, wheat, cotton and sorghum. These five crops represent the the largest annual planted acreage for U.S. crops.

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Potential Impacts of Renewable Diesel Production on the Soybean Industry — continued from page 6

While increasing prices can lead to inceased planted acreage, competition exists among crops for annual plantings. The historical high for soybean plantings was reached in 2017 at 90.1 million acres, versus 2021 planted acreage, at 87.5 million acres. This suggests that the U.S. has the capacity to increase soybean plantings approximately 2.5 million through changes in relative market prices.

However, expanding beyond approximately 90 million soybean acres may be more difficult because of competion for acres from other crops. In addion, the amount of land enrolled in the Conservation Reserve Program likely will not decrease in the next several years to allow more soybeans to be planted.

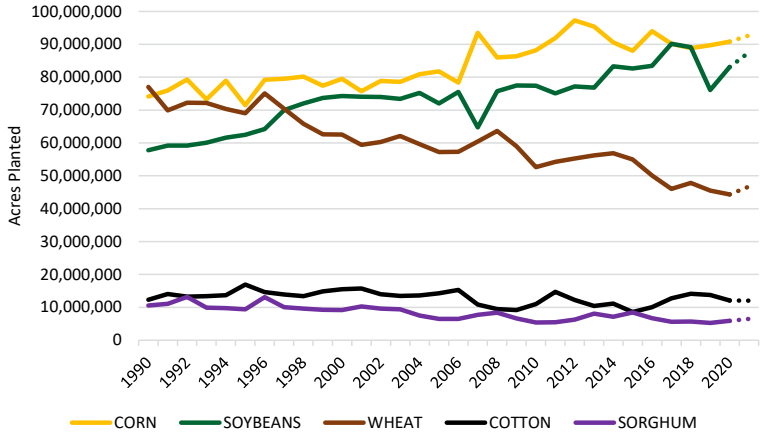
Figure 3 shows the annual producton of U.S. oilseeds by type. Soybean oil represents the largest source of vegetable oil for renewable diesel refining, at 25.2 billion pounds in the 2020-21 marketing year. Corn oil production is a distant second, at 5.9 billion pounds in 2020-21. While other vegetable oils may be viable alternatives for soybean oil in renewable diesel refining, soybean oil provides the largest potential supply and likely will be the preferred vegetable oil.

Figure 4 shows the annual global oilseed exports by oilseed type. Global oilseed exports are being used as a proxy for the availablity of alternive oilseeds from the world market that might be used as an alternative source for renewable diesel production. Based upon these USDA estimates, palm oil has the largest volume of global oilseed trade, with the volume traded increasing through time. This suggests that imported palm oil may become a viable alternative for renewable diesel production if domestic soybean oil supplies are inadequate and/or become more expensive than imported palm oil.

Once again, what is unclear is whether the relative prices and alternative supply chain systems will allow renewable diesel refineries to utilize different vegetable oils from the world markets. What also is too early to tell is how quickly and easily these refinerys could switch feedstock sources and what adjustments will be required to maintain refining efficiencies.

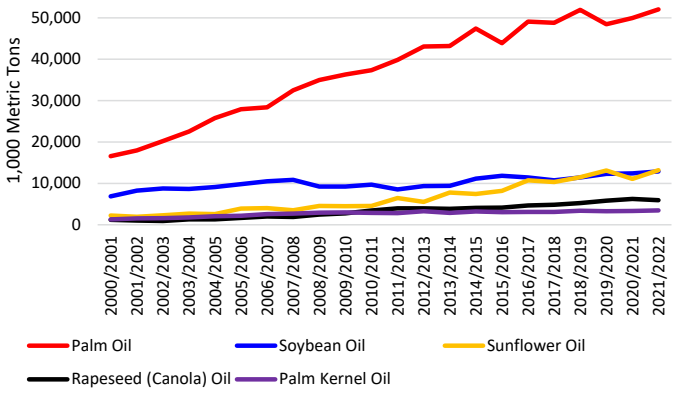
While the current outlook for renewable diesel is encouraging, the potential impacts on the U.S. soybean industry are unknown. However, we have indicators that can be used to gauge the expansion of the renewable diesel sector; these include soybean oil prices and estimated crushing margins, expanding U.S. soybean acreage, expansion of the soybean crushing industry and possible importation of allternative vegetable oils.

Figure 2: Annual U.S. planed acreage for major crops.



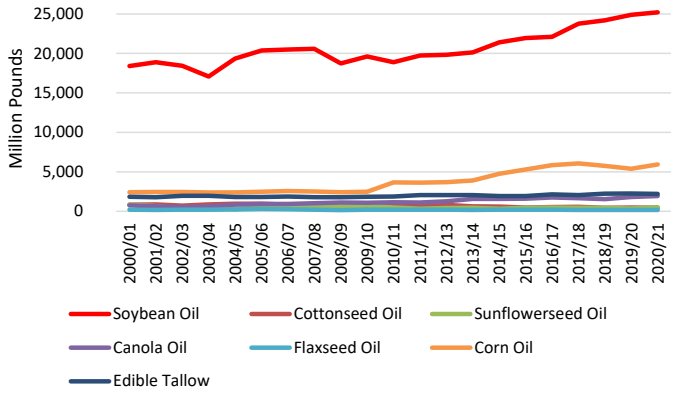
USDA-Quick Stats Custom Query and June 30, 2021, Acreage Report

Figure 3: U.S. annual vegetable oil production.



USDA Oil Crops Yearbook

Figure 4: Annual global oilseed exports by oilseed.



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