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USDA United States Department of Agriculture

 **USDA's 96th Annual** **Agricultural Outlook Forum**
The Innovation Imperative: *Shaping the Future of Agriculture*

February 20-21, 2020 • Crystal Gateway Marriott Hotel, Arlington, Virginia

Dairy Outlook

Friday, February 21, 2020

www.usda.gov/oc/forum

Situation and Outlook for the U.S. Dairy Industry

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A Perspective on the Dairy Situation in 2019

The simple-average all-milk price in 2019 was \$18.60 per hundredweight (cwt), an increase from \$16.27 per cwt in 2018. Slow milk production growth and relatively strong domestic use contributed to a higher average all-milk price than for 2018, but lower net exports dampened the increase.

Milk Production

Milk production in 2019 was 218.3 billion pounds, only 0.3 percent above 2018. This compares with a 1.6 percent annual compound average growth rate since 2004. The average herd size for the 2019 was 9.332 million head, 67,000 less than 2018. Average milk per cow in 2019 was 23,396 pounds, an increase from 2018 of 247 pounds, or about 1.1 percent.

Milk cows trended downward throughout 2018 and most of 2019, starting at 9.438 million head in January 2018 and reaching a low point of 9.317 million head in August of 2019. The decline of milk cow numbers in 2018 and the first 8 months of 2019 was the result of relatively low milk prices compared to input prices. The milk feed ratio averaged 2.05 in 2018, with its lowest point of 1.9 in April and May of that year.

In the first half of 2019, the milk-feed ratio averaged 2.09, a little higher than the 2018 annual average. The milk-feed ratio then began to expand in the second half of 2019, reaching 2.61 in November before declining to 2.55 in December. Milk production usually responds to changes in milk and feed prices with a lag of several months. The milking herd expanded in the last 4 months of 2019, reaching 9.399 million head in November and maintaining that level in December.

In 2019, average daily milk per cow was about 64.1 pounds per day,¹ an increase of 0.7 pounds per day from 2018. This compares with a long-term marginal year-over-year average growth rate of 0.8 pounds per cow per day since 1990. For the past 3 years, growth in milk per cow has been slightly below trend. Relatively low milk prices in recent years have likely contributed to below-trend growth in yields.

¹ The average milk per cow as reported by USDA, National Agricultural Statistics Service, includes dry cows.

Total Commercial Use

To understand the 2019 dairy situation, it is useful to examine domestic use and commercial exports of dairy products in tandem. Domestic use plus commercial exports equals total commercial use.

Growth in domestic use was relatively strong in 2019. On a milk-fat milk-equivalent basis,² it was 215.1 billion pounds, 3.0 billion higher than 2018, or an increase of 1.4 percent. Domestic use on a skim-solids milk-equivalent basis was 181.8 billion pounds, 3.3 billion pounds higher than 2018, or an increase of 1.9 percent. A strong economy contributed to the relatively strong domestic demand for dairy products. Real disposable personal income (adjusted for inflation using chained 2012 dollars) increased by 3.0 percent from 2018 to 2019. Domestic use increased for cheese, butter, nonfat dry milk and skim milk powder (NDM&SMP), dry whey, whey protein concentrate (WPC), and lactose. Based on available data for the first 11 months of 2019, fluid milk continued its long-term decline.

Exports weakened significantly in 2019. Exports were 9.1 billion pounds on a milk-fat basis, 1.3 billion less than 2018. On a skim-solids basis, exports were 41.6 billion pounds in 2019, 3.1 billion less than 2018. Exports of most dairy products declined in 2019, including butter, NDM&SMP, dry whey, WPC, and lactose. Tariffs imposed by Mexico, Canada, and China during the year contributed to the aggregate decline in exports. The spread of African Swine Fever, especially in China, also likely played a part in the decline. Exports of cheese were an exception, with an increase of 21 million pounds.

For milk in all products, the increase in domestic use was greater than the decrease in exports. On a milk-fat basis, total commercial use was 224.2 billion pounds, 1.7 billion higher than 2018. On a skim-solids basis, it was 223.4 billion pounds, 0.2 billion pounds higher than 2018. For cheese, total commercial use increased as both domestic use and exports both increased. For butter, NDM&SMP, and lactose, the increase in domestic use was greater than the decrease in exports, resulting in an increase in total commercial use. For dry whey and WPC, the decrease in exports was greater than the increase in domestic use, resulting in a decrease in total commercial use.

Exports and Tariffs Added by Mexico, Canada, and China

New tariffs on U.S. dairy products by a number of major trading partners were imposed in the summer of 2018 and continued in 2019. On June 5, 2018, Mexico imposed tariffs on many U.S. products, including tariffs of 10 to 15 percent on most types of cheeses. The tariffs were in response to U.S. tariffs on steel and aluminum. On July 5, 2018, the tariffs were applied at the rate of 20 to 25 percent, depending on the product. On July 1, 2018, Canada imposed a 10-percent surtax on yogurt, also in response to U.S. tariffs on steel and aluminum. These tariffs by Mexico and Canada continued until May 2019, when they were lifted in response to the United States' agreement to end the tariffs on steel and aluminum.

² USDA uses two measures of milk equivalence: one based on the milk-fat content and the other based on the skim-solids content of the milk used to produce the various products. For more information, see <https://www.ers.usda.gov/data-products/dairy-data/documentation/>

On June 6, 2018, China imposed tariffs on a wide range of products, including 25 percentage points on most dairy products, in response to U.S. tariffs on various goods imported from China. Tariffs for some dairy products were increased further in June and September 2019.

Another factor contributing to the decline in U.S. exports of dairy products has been the spread of African Swine Fever (ASF) across China and some other countries. The first cases of ASF in China were reported in August 2018, and the disease had spread to every province by mid-2019. In October 2019, Chinese Government statistics showed a decline in swine inventory of more than 40 percent from a year earlier. Whey products and lactose, which are often used as animal feed, make up a large part of U.S. dairy exports to China. As the swine inventory declined, demand for these products also declined.

On September 17, 2019, some products were exempted from the tariffs that China had previously imposed. The exclusions are effective through September 16, 2020. The only dairy product receiving the exemption was modified whey for animal use with lactose content of 76-88 percent. Whey permeate meets this criteria. The Chinese Government likely lifted the additional tariff on this product to help its swine industry rebuild its herd.

Examination of the U.S. export data reveals that tariffs added by these major trading partners have negatively affected U.S. exports. From January 2017 through June 2018, U.S. cheese exports to Mexico averaged 18.4 million pounds per month. During the period when the tariffs were applied, cheese exports averaged 16.2 million pounds per month. After tariffs were lifted, they averaged 17.9 million pounds per month, not quite as high as before the tariff period.

U.S. export data show that the additional tariffs by China have had impacts on U.S. dairy exports. As an example, from January 2017 through June 2018, U.S. dry whey exports to China averaged 17.6 million pounds per month. China's tariff rate on dry whey from the United States during that period was a 2-percent Most Favored Nation (MFN) rate.³ Since China added the additional tariff rate of 25 percentage points (for a total tariff rate 27 percent), U.S. exports of dry whey have averaged only 8.0 million pounds per month. In addition to the high tariff rate, ASF likely accounts for some of the decline in U.S. dry whey exports to China.

Imports and Additional Tariffs on EU Dairy Products

Dairy imports increased from 2018 to 2019. On a milk-fat basis, dairy imports totaled 7.0 billion pounds, 0.7 billion higher than 2018. On a skim-solids basis, dairy imports totaled 5.8 billion pounds, 0.3 billion higher than 2018. Notably, butter imports increased from 78.8 million pounds in 2018 to 84.5 million pounds in 2019. Most butter imports have been from Ireland.

A Federal Register notice of October 9, 2019, stated that the Office of the United States Trade Representative (USTR) had determined that the European Union (EU) failed to implement WTO

³ An explanation of Most Favored Nation (MFN) tariffs is provided on the World Bank website: "In current usage, MFN tariffs are what countries promise to impose on imports from other members of the WTO, unless the country is part of a preferential trade agreement (such as a free trade area or customs union). This means that, in practice, MFN rates are the highest (most restrictive) that WTO members charge one another."

Dispute Settlement Body regulations concerning certain subsidies to the EU large civil aircraft industry. As a result the United States began applying tariffs of 25 percent on certain goods from the EU beginning October 18, including many dairy products. These tariffs are in addition to MFN tariffs already in place.

The U.S. tariffs applied these additional tariffs to a complex list of dairy products, including cheese, butter, butterfat products, WPC, yogurt, and fermented products. Not all products within these categories have been assessed the additional tariffs, and the tariffs do not apply uniformly to all countries within the EU. For example, some apply only to imports from Germany, Spain, and the United Kingdom.

The EU is the largest supplier of dairy products to the United States. In 2018, the products that would have been subject to the additional tariffs accounted for the following shares of all U.S. imports by value for each category: 42.3 percent of cheese, 82.8 percent of butter, 2.8 percent of butterfat products, 6.7 percent of WPC, and 1.2 percent of yogurt/fermented milk.

It appears that the tariffs have had an impact on imports of dairy products from the EU. For the first 10 months of 2019, butter imports from the EU averaged 7.0 million pounds. However, after tariffs were applied, U.S. imports of butter from the EU were only 3.4 million pounds in November and 2.1 million pounds in December.

Dairy product inventories

Most dairy stocks declined in 2019 as total commercial use exceeded total supply. Dairy ending stocks for 2019 totaled 13.6 billion pounds on a milk-fat basis, down 0.2 billion from the end of 2018. On a skim-solids basis, 2019 ending stocks totaled 10.2 billion pounds, 0.5 billion lower than the end of 2018.

January 2019 ending stocks for cheese stocks were 1.370 billion pounds, 90 million pounds higher than January 2018. Cheese stocks followed a downward trend through 2019. At the end of 2019, they were 1.316 billion pounds, 29 million below the end of 2018. Butter ending stocks in 2019 were below 2018 for the first half of the year but above 2018 for the second half of the year. At the end of 2019, butter stocks totaled 190 million pounds, 11 million pounds higher than at the end of 2018. For the first six months of 2019, nonfat dry milk (NDM) stocks were sometimes above but other times below the same months of the previous year. In the second half of 2019, NDM stocks were substantially below 2018, ending the year at 248 million pounds, 28 million pounds lower than 2018.

In addition to domestic stocks, the U.S. dairy industry is also impacted by stocks abroad. In order to support prices, the EU sometimes purchases dairy products and holds the products in storage as intervention stocks. At the end of January 2018, EU intervention stocks of SMP totaled 832 million pounds. Throughout 2018 and the early part of 2019, the EU sold the intervention stocks in the open market. By the end of February 2019, they had been depleted to a trivial quantity, and they were completely gone by June. With EU intervention stocks of SMP no longer overhanging the market, global prices for NDM&SMP rose. In January 2019, European and Oceania export prices for SMP were \$0.964 and \$1.112 per pound respectively, and the U.S.

domestic price for NDM was \$0.951. In December 2019, European and Oceania export prices for SMP were \$1.087 and \$1.196 per pound, respectively, and the U.S. domestic price for NDM was \$1.216.

Prices

Most dairy product prices reported in the USDA *National Dairy Products Sales Report* in 2019 were higher on average than they were in 2018. The butter price was an exception. For the first half of 2019, the butter price averaged \$2.284 per pound, more than 4 cents higher than the same period in 2018. The price decreased each month in the second half of the year, ending at \$1.984 in December with a second-half average of \$2.203 per pound, 7.1 cents lower than the second half of 2018. The year-over-year increase in butter stocks (brought about by an increase in production and imports and a decrease in exports) contributed to the decline. For 2019, the butter price averaged \$2.243 per pound, a decline from \$2.257 in 2018.

The cheese price increased through most of 2019, from \$1.387 per pound in January to \$2.172 per pound in November, before falling to \$2.051 in December. Cheese stocks declined through the year as total commercial use increased. For 2019 the cheese price averaged \$1.759 per pound, an increase from \$1.538 per pound in 2018.

The NDM price increased through 2019 as exports rose, stock levels declined, and international prices rose. In January 2019, the NDM price was \$0.951 per pound. It rose to \$1.216 in December 2019. The annual average NDM price 2019 was \$1.042 per pound, an increase from \$0.795 in 2018.

Back in 2018, the dry whey price rose through the year, from \$0.276 per pound in January to \$0.469 in December. By contrast, in 2019 the dry whey price declined through most of the year, from 0.481 per pound in January to a low point of \$0.307 in November before rising to \$0.329 in December. Weak exports of whey products due to tariffs and African Swine Fever in China contributed to export weakness. The whey price in 2019 averaged \$0.380 per pound, an increase from \$0.342 in 2018.

With 2019 cheese and whey prices both higher on average than 2018, the Class III milk price averaged \$16.96 per cwt, an increase from \$14.61 in 2018. With the higher NDM price more than offsetting the lower butter price, the Class IV price for 2019 was \$16.30 per cwt, an increase from \$14.23 in 2018. The all-milk price in 2019 averaged \$18.60 per cwt, an increase from \$16.27 in 2018.

Federal Government assistance to the dairy industry in 2019 and 2020

The Dairy Margin Coverage program (DMC), administered by USDA Farm Service Agency, offers protection to dairy producers when the difference between the all-milk price and the average feed price (the margin) falls below a certain dollar amount selected by the producer. In 2019, about 82 percent of dairy operations participated in DMC. Estimated indemnity payments totaled \$312 million. At the time of sign-up for the 2020 program in late 2019, it appeared that 2020 margins for dairy operations would be higher than they were in 2019. Only about 43

percent of dairy operations enrolled in the 2020 program.

The Dairy Revenue Protection program (Dairy-RP), administered by USDA Risk Management Agency (RMA), is designed to insure against unexpected declines in the quarterly revenue from milk sales relative to a guaranteed coverage level. In 2019 total premiums for the program were \$95.1 million, including Government subsidies of \$41.8 million. Indemnity payments were \$5.7 million. For 2020, as of February 17, total premiums were \$110.2 million, with Government subsidies of \$48.0 million.

Another program administered by RMA is the Livestock Gross Margin for Dairy Cattle program (LGM-Dairy). The program provides protection when feed costs rise or milk prices drop and can be tailored to any size farm. In 2019, total premiums were \$2.1 million, including Government subsidies of \$0.8 million. Indemnities paid were \$2.3 million. For 2020, as of February 17, total premiums were \$1.9 million, including Government subsidies of \$0.8 million.

Through the Food Purchase and Distribution Program (FPDP), administered by USDA Agricultural Marketing Service, USDA buys food products produced on American farms through approved vendors. In 2019 USDA awarded \$78 million in contracts for product purchases for the Trade Mitigation Program. The target for 2020 is \$68 million. Funds for the purchases are provided through USDA's Commodity Credit Corporation (CCC). Purchases through the program show up as CCC donations in the USDA *World Agricultural Supply and Demand Estimates* report (WASDE). In 2019, CCC donations totaled 0.2 billion pounds on a milk-fat basis and 0.2 billion on a skim-solids basis. In 2020, CCC donations are expected to total 0.3 billion pounds on a milk-fat basis and 0.1 billion on a skim-solids basis.

Agriculture Secretary Sonny Perdue announced on May 23, 2019, that USDA would provide aid totaling \$14.5 billion in direct Market Facilitation Payments (MFP) for 2019 to assist producers impacted by tariffs and non-tariff barriers. Dairy producers were included in the aid package, with direct payments being made at rates per cwt on production history as calculated for DMC. Payments were made in 3 tranches, with the last tranche in February of this year.

Recent developments in dairy markets

There have been some significant dairy product price changes in recent weeks. From the week ending January 4 to the week ending February 8, the butter price declined by 12.3 cents to \$1.8561 per pound. Prices for NDM and dry whey rose to \$1.2542 per pound (+1.9 cents) and \$0.3634 per pound (+3.0 cents), respectively. The price spread between 40-pound blocks and 500-pound barrels of Cheddar cheese widened, with blocks rising to \$1.9639 per pound (+7.7 cents) and barrels falling to \$1.6242 per pound (-12.7 cents).

There have been important reports concerning the dairy cow herd in recent weeks. In the recent *Cattle* report, USDA National Agricultural Statistics Service (NASS) reported a milk cow inventory of 9.335 million head on January 1. This is lower than the average milk cow inventory of 9.339 million head reported by NASS for December in the January *Milk Production* report,

implying that milk cow numbers likely declined during December.⁴ Milk replacement heifers on January 1 totaled 4.637 million head, 65 thousand fewer than January 1, 2019. The ratio of milk replacement heifers to milk cows for January 1 was 49.7 percent, the lowest percentage since January 1, 2014. For the first 5 weeks of 2020, federally-inspected commercial dairy cow slaughter, as reported by USDA Agricultural Marketing Service, totaled 325,900 head, 1.8 percent above the first five weeks of 2019.

Recent developments in trade policy

There have been some significant changes in trade policy since the start of the year. The U.S.-Japan Trade Agreement became effective January 1. The language of the deal is similar to that of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership and the EU-Japan Economic Partnership Agreement. Tariff reductions for most dairy products will be phased in over several years. The agreement immediately eliminates the 8.5 percent tariff on lactose and the 2.9 percent tariff on milk albumin.

The Phase One trade deal with China deals with mostly nontariff issues, including U.S. facility and product registrations, regulations concerning imports of certain dairy products, and geographical indicators. It includes provisions to increase imports of agricultural products but no specific value allocation by sector. It does not address additional tariffs now in place.

China announced a reduction of tariffs on certain products as of February 14. For the dairy products included in the reduction (milk and cream in liquid form; yogurt; buttermilk and curdled, fermented, or acidified milk and cream; and cheese), the reduction was 2.5 percentage points. This is a very small decrease in tariffs. Before this reduction, tariffs on these products were 38 to 50 percent.

On January 29, President Trump signed legislation to implement the U.S.-Mexico-Canada Agreement (USMCA). The agreement was ratified by Mexico in June 2019, but it has not been ratified by Canada. Zero tariffs for U.S. dairy products going to Mexico, and vice versa, would be preserved under the agreement. Canada and the United States would allow phased-in access of dairy product trade in both directions. Canada would make changes to its classified pricing system with respect to milk used to produce certain dairy ingredients. The agreement awaits ratification by Canada and thus has not been figured into USDA forecasts.

Dairy forecasts for 2020

Rising milk-feed ratios point to continued expansion of the milking herd. However, there are several indications that bring about considerable uncertainty for 2020. The January 1 milk cow inventory of 9.335 million head was lower than previously expected, January 1 milk replacement heifer numbers were relatively low, and dairy cow slaughter has been running relatively high. As a result, the forecast for milk cow numbers is 9.330 million head in the first quarter, down 7,000 from the fourth quarter of 2019. For the second through fourth quarters, the milking herd is

⁴ Note that this report was prepared before NASS released the *Milk Production* report on February 21, 2020. Historical data in this presentation do not reflect revisions in this latest *Milk Production* report, and forecasts do not take the new information into account.

forecast at 9.335 million head. The forecast for the 2020 annual average is 9.335 million head, only slightly higher than 2019.

Relatively strong growth in milk per cow is expected in 2020. Higher yields are expected to be promoted by rising milk prices and steady feed prices. With relatively high slaughter rates, lower performing cows will be culled, raising the average. Normal weather is assumed. Milk per cow is expected to average 23,785 for the year. The average of 65.0 pounds per cow per day is 0.9 pounds higher than 2018, an increase of 1.4 percent.

With the combination of slightly higher cow numbers and higher yield per cow, the forecast for milk production is 222.0 billion pounds. At 606.6 pounds per day, the rate of growth in daily milk production is 1.4 percent, the same as the annual compound average growth rate for the past 10 years.

Domestic commercial use in 2020 is expected to grow as economic growth is expected to continue. On a milk-fat basis, domestic use is forecast at 217.9 billion pounds, an increase of 1.3 percent. On a skim-solids basis, 2020 domestic commercial use is forecast at 182.7 billion pounds, only 0.5 percent higher than 2019, following an unusually strong increase of 1.9 percent in 2019.

Commercial exports are expected to rise in 2020. On a milk-fat basis, exports are forecast at 9.4 billion pounds, 0.3 billion higher than 2019. On a skim-solids basis, exports are forecast at 43.6 billion pounds, 2.0 billion higher than 2019. There are several reasons why exports are expected to increase in 2020 compared to 2019:

- Currently, U.S. prices are competitive with international prices.
- Strong NDM&SMP exports of recent months are expected to continue.
- There are no longer tariffs on U.S. cheese exports to Mexico.
- Additional tariffs from China are assumed to continue, but U.S. exporters will likely find alternative markets for their products, partially offsetting the loss.
- Exports of whey permeate to China may increase since additional tariffs for that product have been exempted through September 16, 2020.

Dairy imports are expected to fall in 2020. On a milk-fat basis, imports are forecast at 6.3 billion pounds, 0.7 billion lower than 2019. On a skim-solids basis, imports are forecast at 5.5 billion pounds, 0.3 billion lower than 2019. The additional 25-percent tariffs on many dairy products imported from the EU are expected to dampen import demand. Also, U.S. domestic prices are currently competitive with international prices for a number of imported products.

Ending stocks for 2020 on a milk-fat basis are forecast at 13.4 billion pounds, 0.2 billion lower than 2019, as growth in total use is expected to more than offset growth in total supply. On a skim-solids basis, 2020 ending stocks are forecast at 10.3 billion pounds, 0.1 billion higher than 2019, as relatively slow growth in total use is expected to be slower than growth in total supply.

Average 2020 prices for butter and dry whey are expected to be lower than 2019 while the average prices for cheese and NDM are expected to be higher than 2019. The butter price

forecast for 2020 is \$1.910 per pound, compared to \$2.243 in 2019. The butter price has been declining in recent months, and more milk fat may be plentiful as NDM&SMP production increases in response to higher expected prices. The cheese price is forecast to be \$1.790 per pound in 2020, compared to \$1.759 in 2019. Cheese prices have fallen recently, but they are expected to rise as stocks have been relatively low, domestic demand is expected to grow, and commercial exports are expected to be higher than the previous year (in part due to removal of tariffs by Mexico). The NDM price is forecast at \$1.255 per pound in 2020, compared to \$1.042 in 2019. Relatively strong NDM exports are expected, and the U.S. price is currently competitive in global markets. The dry whey price is forecast at \$0.345 per pound in 2020, compared to \$0.380 in 2019. Export demand is expected to be weak as additional tariffs from China are assumed to continue and hog inventories are low.

The Class III milk forecast for 2020 is \$16.95 per cwt, about the same as 2019, as the year-over-year increase in the cheese price forecast is offset by the lower dry whey price forecast. The Class IV price forecast is \$16.70 per cwt, as the expected increase in the NDM price more than offsets the expected decrease in the butter price. The all-milk price for 2020 is \$18.85 per cwt, an increase of \$0.25 from 2019.

Factors on the Horizon

There are several important factors that could impact directions of supply, demand, and prices for U.S. dairy markets:

- Coronavirus: At this time, impacts are uncertain.
- Trade negotiations with China.
- Ratification, implementation, and timing of USMCA.