

2023 Nevada Agricultural Outlook



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in cooperation with

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Introduction

By their nature, economic outlook projections are based on market, weather, and geopolitical factors that are assumed to revert to “normal” following periods of disruption. As such, the year 2023 has shaped up to be a pivotal year that moved away from disruption back towards normalcy and the future is expected to shape up favorably. While volatility and uncertainty remain, current-year trends reflect a shift back towards average trends in many agricultural markets and indeed, the overall economy. However, the shifts remain tenuous and uncertainty facing the agricultural, and indeed, general economy persists. While COVID-19 is no longer the threat or disruption it was two years ago, the reverberation from prior years has not played out completely yet. Despite trends towards normalcy, current and future events will greatly impact global, national, and Nevada agriculture.

Prices, availability, and trade of agriculture products are driven by both direct supply and demand of the products themselves as well as the inputs vital to their production. These direct market impacts are influenced by non-market factors such as weather and geopolitics which can shock markets and drive outsized impacts disrupting agricultural production and threaten domestic consumer markets and international trade. While the overall global agricultural outlook is improved from the past two years, the robustness is nascent. Similar expectations largely hold for Nevada agriculture in the short to medium term, particularly given easing of extended drought and many supply chain shortages. Nevertheless, those factors remain risks.

Global and national economies have been impacted and even disrupted by a variety of forces. There remains an economic hangover that is prolonging the period of high interest rates while inflation easing is not complete. The global economic picture is further clouded by wars, particularly the Ukraine-Russia and Israel-Hamas conflicts. While petroleum supplies are directly impacted by the former, the geopolitical alignments tied to the latter also have the potential to alter global energy supplies and distribution. Related are changes in environmental policy of many developed nations, including the U.S., that are forcing changes in energy markets before those markets can adjust on their own.

Expectations for agricultural markets are influenced by these factors, both short term and long term. Assumptions regarding these factors are key to shaping this outlook. Of course, we recognize that future developments may move us from prior assumptions, but we do not know when or where. This outlook therefore serves as a baseline against which we can compare unforeseen developments.

In the medium to long term, price stability is expected, and price levels will be adequate to induce the necessary food and fiber production for an increasing global population. After this year, grain and oilseed prices are projected to exhibit little upward movement over the outlook period, giving a sense of stability to agricultural markets.

Currently livestock prices, especially for cattle, continue to be impacted by low inventories, and that market strength is expected to persist into 2025, when cattle inventories are expected to bottom out. The high milk prices of 2022 have eased substantially, and stability of milk prices is

expected over the projection period. Wool prices are low and not expected to exhibit substantial strengthening in the medium term as weak demand persists in export markets, and competition from other exporters remains strong, especially in the Pacific Basin.

Given standard assumptions for economic baselines, normal temperature and precipitation patterns are expected after this year, suggesting healthy crop supplies will exist, supporting medium-term projections of moderate, stable prices, and a further dampening of feed costs. While deviations from normal weather will continue to have short-term impacts on markets, in the long term, weather is expected to be approximately “normal.” This outlook, therefore, is shaped by supply-side issues in the short term, but primarily by demand-side developments in the long term.

The global and U.S. economies are returning to pre-pandemic growth rates after above-normal expansion in 2021 and 2022, following the pandemic-induced recession. After the accelerated recovery period, developed and most emerging nations are returning to long-term GDP growth similar to pre-pandemic levels, while average annual growth for developing nations is expected to exceed pre-pandemic levels.

Both China and India are expected to experience slowing growth in the long term as their economies mature. Population trends influence economic growth as well with China in a pattern of negative population growth and India surpassing China in 2023 as the World’s most populous country. On average, only developing countries report population growth above replacement annually. However, and despite population growth, a few developing economies are exhibiting sub-par economic expansion. Argentina and Venezuela are among those nations that are experiencing economic woes. Though lesser than humanitarian concerns, much uncertainty exists about expected economic growth in countries afflicted with war. Most other developing nations are growing at expected long-term rates. Increasing global trade protectionism and geopolitical disruption adds risk to the pace of economic growth.

The return to healthy, stable growth will support demand. That will limit downward movement of prices and allow agricultural producers to maintain returns necessary for production to keep pace with global consumption. Most of the increase in production will come from yield growth, as returns are not expected to be adequate to induce substantial expansion of crop area in most regions with the exception of major South American exporting countries. Consumption is expected to slightly outpace population growth for most commodities as income expansion, especially in emerging and some developing regions, spurs improvements in standards of living and diets.

The short term holds promise for some Nevada producers, but challenges for others. Major Nevada products, such as cattle, dairy, sheep and wool, and hay depend largely on markets beyond state borders, limiting the amount of control the Nevada producers can impose on costs and revenues for their output. Within our borders, climatic conditions directly impact the ability of ranchers and farmers to produce. In 2023, the widespread drought that limited water availability for cow-calf operations, dairy, sheep and wool, and hay producers was alleviated, with forecasts for another robust water year again in 2024 given El Niño predictions. Together

these four sectors comprise more than 90% of agriculture revenues in Nevada. Other agriculture products have also seen reduced risk because of this year's improved weather and lower fire danger.

Agriculture in Nevada faces a mixed price outlook in the short term, but stability will emerge in the medium term. Feeder steer operations are the largest of the agricultural industries in Nevada and feeder steer prices are expected to remain high into 2025, well above the prices at top of the cycle in 2015. Ranchers may expect to face cyclical declines in prices for several years after that time.

Milk prices have declined substantially in 2023 from last year's highs and are expected to slide further in 2024. Overall, average prices are expected to stabilize in the next several years somewhat above pre-pandemic levels. As such, profitability is expected to be sufficient to gradually continue the herd expansion that began this year. As such, milk production in the north part of the state may supply more milk to the whole milk powder processing plant. Improved water availability expectations may allow greater hay acreage as prices turn lower and are expected to slide into 2024, then stabilize after that time.

What was previously a bright spot in the livestock and dairy sector, sheep and wool, is being weakened by low global wool prices. Although recovering from the low point reached in 2022, global wool prices remain more than 10% below pre-pandemic levels, and nearly 25% off the peak of 2019 and 2020. In addition, weekly volatility persists in global wool markets. Nevada producer prices move closely with Australian wool prices.

In this outlook Nevada cattle producers expect improvements in profitability, but not record levels, particularly when adjusting for inflation. Dairy producers can expect a generally healthy financial situation in the next five years, similar to 2015 through 2020. Sheep and wool production expectations are for improving returns and profits as feed costs retreat and sheep and lamb prices improve. For hay producers, the improved price environment has enabled producers to expect profitability during the next five years, but rising costs can erode net returns, but not eliminate them. Overall, the outlook expects moderate net income in the Nevada agricultural sector.

The risks to this outlook come from several sources. Weather, domestic and global economic growth with accompanying changes in foreign exchange rates, domestic and global agricultural and trade policies, including tariffs, geopolitical developments, and technology all have the potential to impact agriculture and positively or negatively alter the outlook. High fuel costs are likely to be a persistent drag on this outlook.

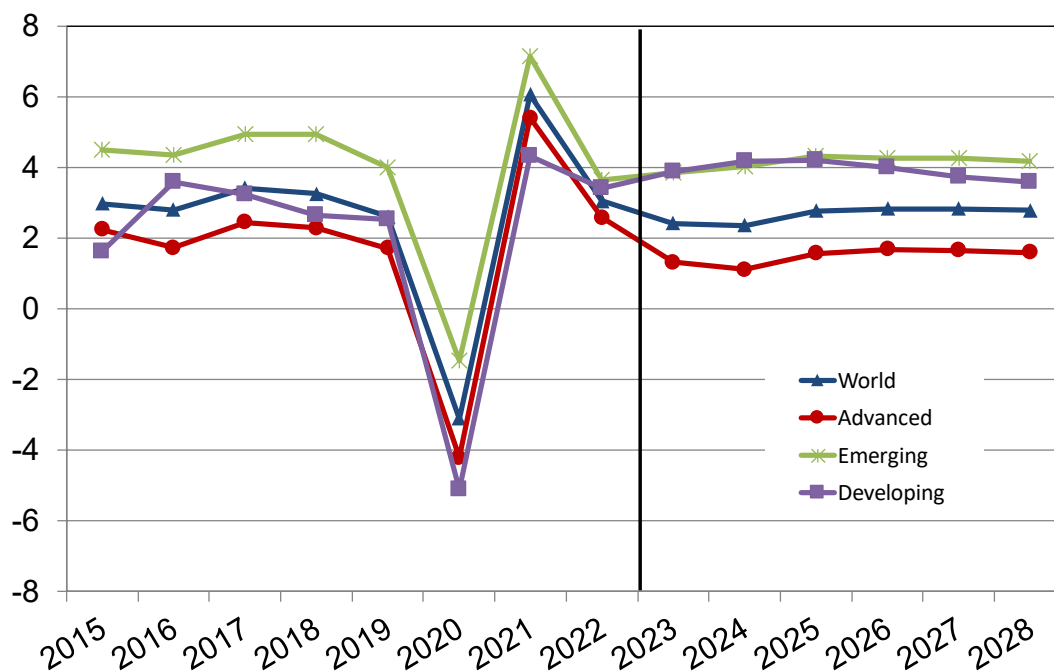
Weather can disrupt both crop and livestock production. Normal weather, following the recovery from the recent prolonged severe drought, is assumed here because the frequency, location, and severity of weather events are unknown. Shocks to feed supplies in a number of locations around the world will also impact U.S. and Nevada crop and livestock prices and therefore those markets. The failure of the domestic and global economies to perform as assumed in this outlook could result in weaker demand. A stronger international economy would improve the outlook.

The Economy

The global economy overall is slowing slightly in 2023, continuing the adjustment to long-term expected growth rates following the substantial uptick in expansion in 2021 following the pandemic. Pre-pandemic growth is expected throughout the projection period (Figure 1). Developed nations are expected to return to long-term GDP growth rates, average annual growth for developing nations is expected to exceed previous long-term rates, and emerging nations are expected to resume growth rates experienced prior to 2020. Geopolitical disruption lends uncertainty to continued economic growth. Appendix Table 1 presents an overview of economic assumptions utilized in the outlook.

Figure 1. Long-Term Expected Growth Returns

Real GDP, % change



Source: S&P Global

The growth rate in emerging and developed economies is expected to remain relatively steady in the medium term. However, growth is expected to gradually erode in developing economies for several years due to trade barriers, geopolitical disruption, and national debt and financial issues. Nevertheless, developing country economic growth is expected to outpace pre-pandemic rates throughout the outlook.

U.S. GDP growth rate fell to 2.1% in 2022, more in line with long-term rate. However, it is expected to slide to below 2% in 2023 and 1.2% in 2024, recovering somewhat over the projection period, but remaining below long-term rates. Canada and Mexico GDP 2022 growth rate fell to 3.4% and 3.0% respectively. Similar to the U.S., both slid further in 2023 and are expected to continue downward in 2024, before adjusting upward after that year. Canada is expected to average below 2% annually from 2025 through 2028 and expectations for annual growth rates in Mexico will average 2.5% over the same period.

GDP growth in Western Europe has been anemic in 2023, with little improvement expected in 2024. GDP growth in most European countries will expect to exhibit weakness, less than pre-pandemic levels throughout the projection period. Post-pandemic expansion has been dismal in Japan and is barely above 1% this year. Economic expansion there is expected to remain near or below 1.0% through the outlook period.

China was one of the only countries that reported a positive annual GDP growth rate in 2020 and benefitted from the global economic acceleration following that year, reaching more than 5% in 2023. Though leading the group of emerging countries, both China and India are expected to moderate growth throughout the projection period as their economies mature.

Oil prices have adjusted downward in 2023 from the spike the previous year, but remain high by historical standards. They are expected to remain stable in 2024, then increase as the global economy expands and excess productive capacity is absorbed in the medium term. Middle Eastern and North African oil exporters are expected to experience slowing economic growth in the next few years but expand at rates greater than the global average. There is significant risk to the economies in parts of this region due to war in that political instability.

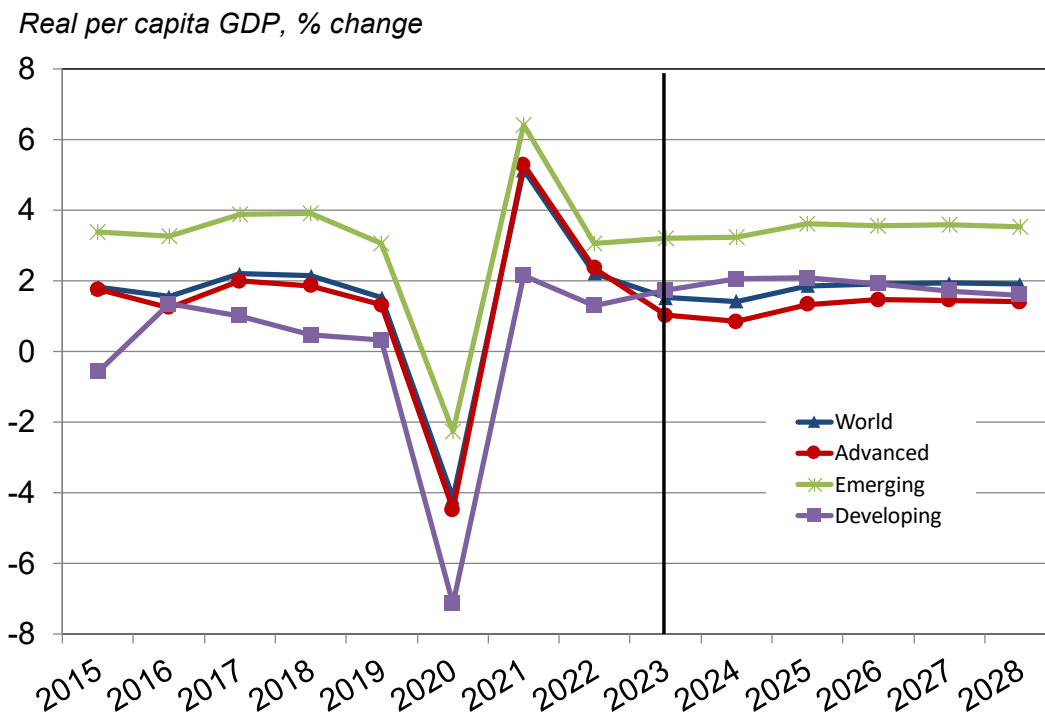
The slowing in population growth rates will persist in all global regions in the long term. Annual global population expansion will fall below 0.9% within the next five years, although growth rates in individual nations will vary considerably.

Developing and emerging economies are projected to exhibit significant slowing in population growth. Even given economic and geopolitical issues, developing nations overall will still have the highest growth rates, near 2%. Developed nations will continue to experience population growth declines, with Western Europe barely showing any population increase.

Emerging nations will experience somewhat slower than the global average population growth. Most notably, in 2023 India surpassed China in total population numbers and is expected to continue to outpace China in year-over-year growth. Though below 1%, India's population growth is expected to remain positive through the projection period while China is expected to experience negative population growth. With high income growth, emerging nations in general will enjoy robust per capita income increases (Figure 2), increasing purchasing power.

Despite high total GDP growth in developing countries, rapid increases in population dilute per capita income expansion to around the global average and constrain improvements in standards of living. Food and feed demand will increase primarily as a result of population growth in many of the poorest nations until income thresholds are reached that enable improved diets and increased demand for consumer goods.

Figure 2. Per Person, Developing Regions Catch Up



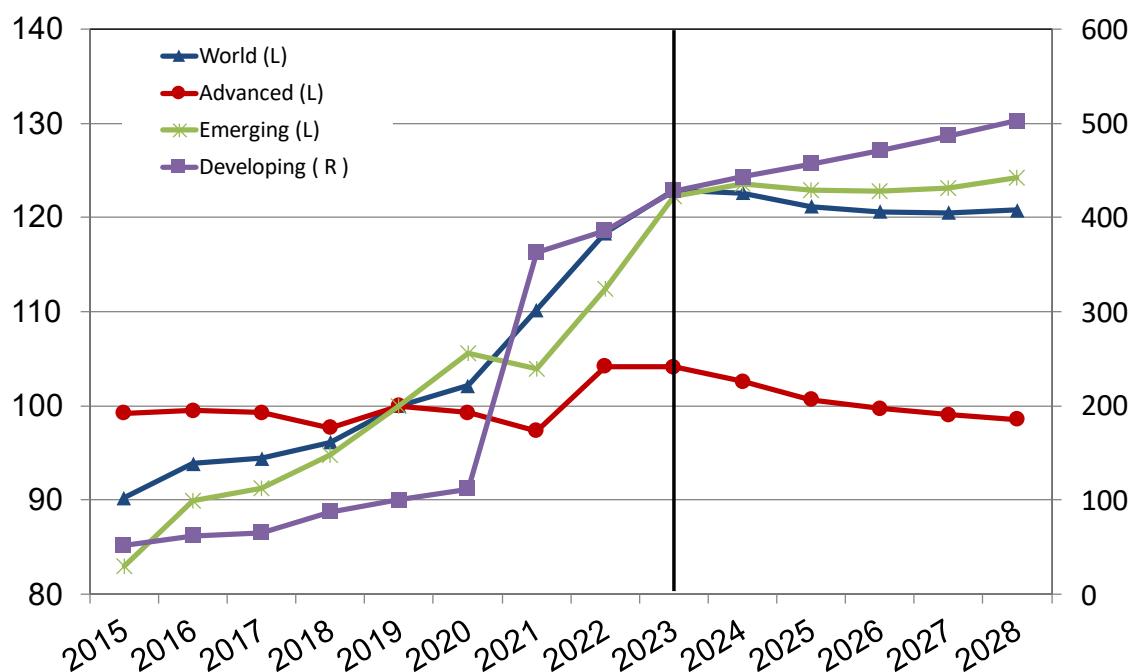
Source: S&P Global

Despite seemingly strong growth rates, some of the poorest nations have incomes below the estimated 2023 developing nation average of \$2,100, and those populations often live on subsistence agriculture, without much ability to purchase additional food.

Economic impacts related to the COVID-19 pandemic and the associated fiscal response resulted in the value of the U.S. dollar strengthening relative to a global basket of currencies in recent years (Figure 3). In 2024, the dollar is expected to begin a weakening trend against advanced economies' currencies. After slight weakening against emerging market currencies, stability with this group of nations is anticipated.

Figure 3. Developing Currencies Hit Hard in Recession

Exchange rate index, 2019=100



Source: S&P Global

The current strength of the dollar contributes to increased U.S. imports and reduces its exports as U.S. goods become more expensive abroad, thus contributing to imbalanced U.S. trade.

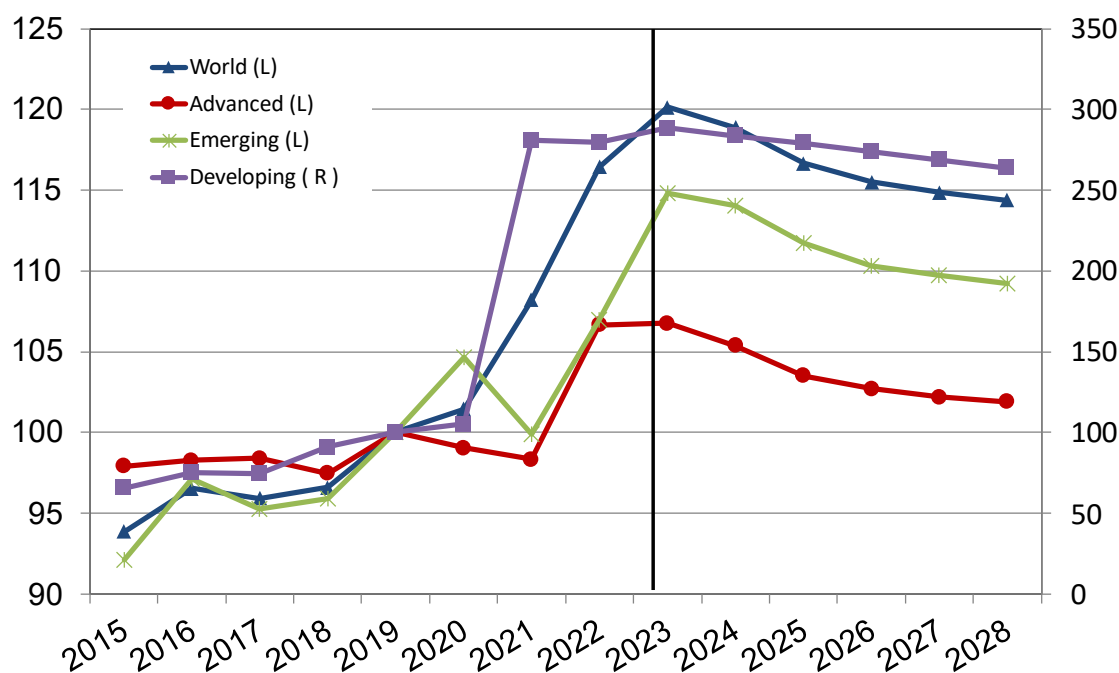
After weakening in 2022 and 2023, the Japanese yen is expected to gain strength against the dollar throughout the projection period, as is the Chinese yuan. The euro weakened against the dollar in 2022, as did the British pound, but strengthened thus far in 2023. Both are projected to continue strengthening over the medium term. The Russian ruble weakened sharply against the dollar in 2022 and is doing so again this year but is projected to stabilize in coming years. This assumption requires an end to the Russia-Ukraine war and a return of stability in this region. This assumption is one of the least certain of this outlook. Overall, developing country currencies are expected to weaken relative to the dollar. Local currencies in Africa and Latin America are expected to depreciate broadly across both regions.

Steep and rapid weakening of currency causes reduced ability to purchase goods in the short and medium terms. However, longer-term effects of such depreciation are mitigated by adjustment in the relative price levels of imports in relation to the exporting country. As such, longer-term real purchasing power of many of our trading partners is expected to increase, regaining some of the strength lost in 2022. As such, U.S. goods are expected to slightly increase competitiveness in world markets (Figure 4).

Real exchange rates in emerging countries are expected to appreciate in the next few years, led by the stabilization and eventual strengthening of the Chinese yuan. Currencies in developed countries are also expected to weaken over the projection period. Developing nations' currencies are expected to slightly fall in the long term, albeit at a slow rate, recovering little from the severe weakening experienced in 2021.

Figure 4. Developing Countries Face Global Challenges

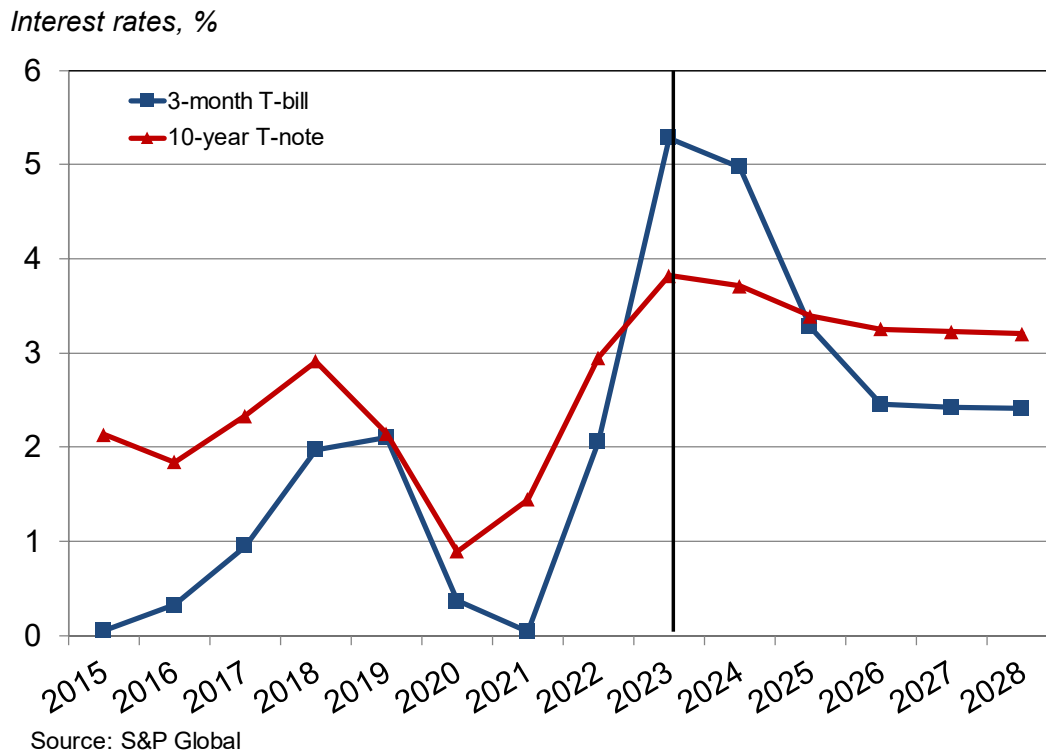
Real exchange rate index, 2019=100



Source: S&P Global

Since high inflation emerged during the pandemic, the Fed reacted with a number of hikes in interest rates that have continued into 2023. Though there has been ongoing rhetoric about easing rates, nothing has materialized and any eventual rate easing is expected to initially proceed slowly. Expectations for relaxing rates beginning in 2024 are part of this outlook, though neither long-term nor short-term rates are likely to return to 2020 and earlier terms. Short-term interest rates are expected to drop significantly into 2026, then stabilize. Whereas longer-term rates are expected to fall at a slower pace, but again, will stabilize at the end of the period (Figure 5). The Fed's goal is to eventually keep inflation in check and relax rates to promote lending standards that will support the mortgage market and other consumer and business borrowing. In the meantime, rates for annual short-term loans for producers are expected to remain unfavorable.

Figure 5. Higher Interest Rates Raise Borrowing Costs

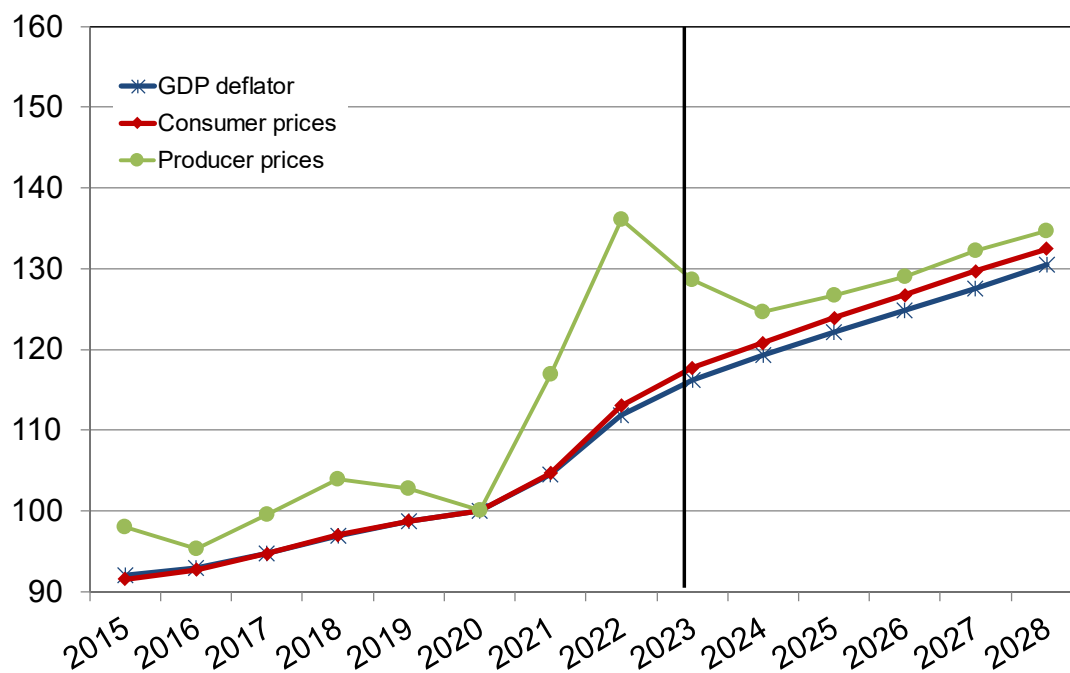


Higher short-term interest rates for annual operating expenses increase the costs of borrowing. Similarly, given high longer-term interest rates producers with capital and equipment needs will also face higher borrowing costs than in the past few years and longer-term lending rates will be less encouraging for expansion or establishment of new enterprises.

Supply shortages associated with the pandemic boosted prices of a wide variety of commodities and manufactured goods. This price inflation persisted downstream from producer goods to consumer markets (Figure 6). Although the rate of inflation has slowed to a more normal pace, the level of prices remains elevated. Slowing consumer inflation does not translate into retrenching of price levels. However, producer prices are more affected by volatile commodity markets and short-term price fluctuations can sometimes result in short-term receding price levels for raw materials and even intermediate products.

Figure 6. Easing Inflation, Steady Price Growth Expected

Price indices, 2020=100

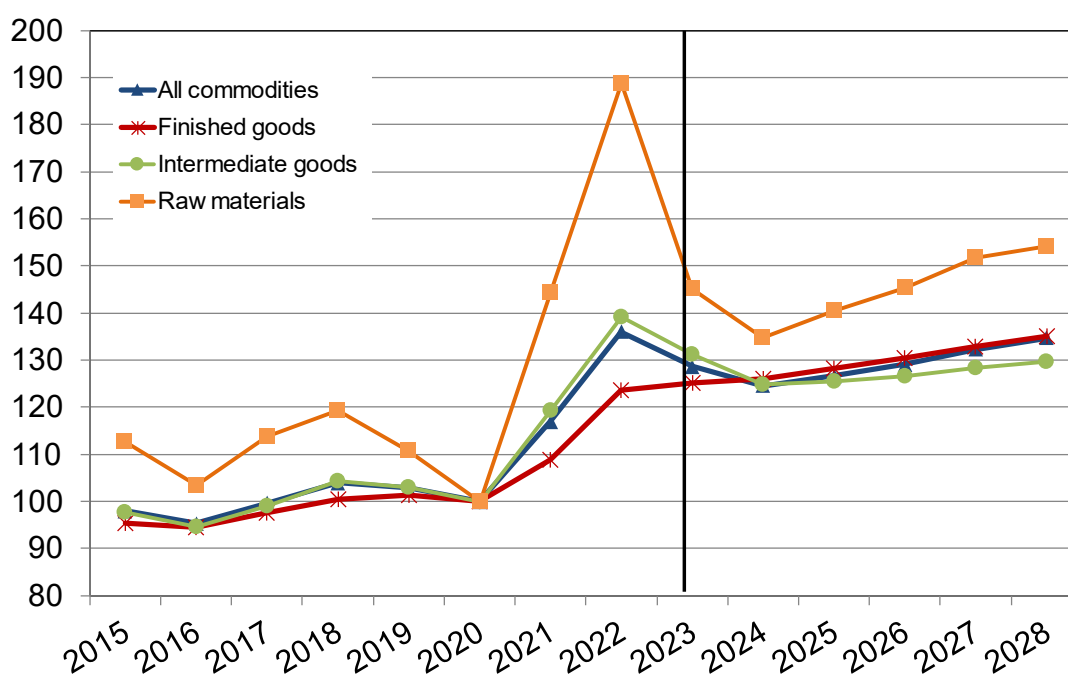


Source: S&P Global

Such has been the case in 2023, with expectations of more declines in some raw material and intermediate producer goods in 2024 (Figure 7). The impetus for these price declines has been falling energy and agricultural commodity prices, especially for major crops. While producer prices for raw materials and intermediate goods have receded somewhat, those for finished goods have not. In the medium to long term, such price declines are not expected to persist, and all producer goods and consumer prices are expected to rise, albeit at a slower pace than in 2022.

Figure 7. Finished Goods Prices Expect Steady Rise

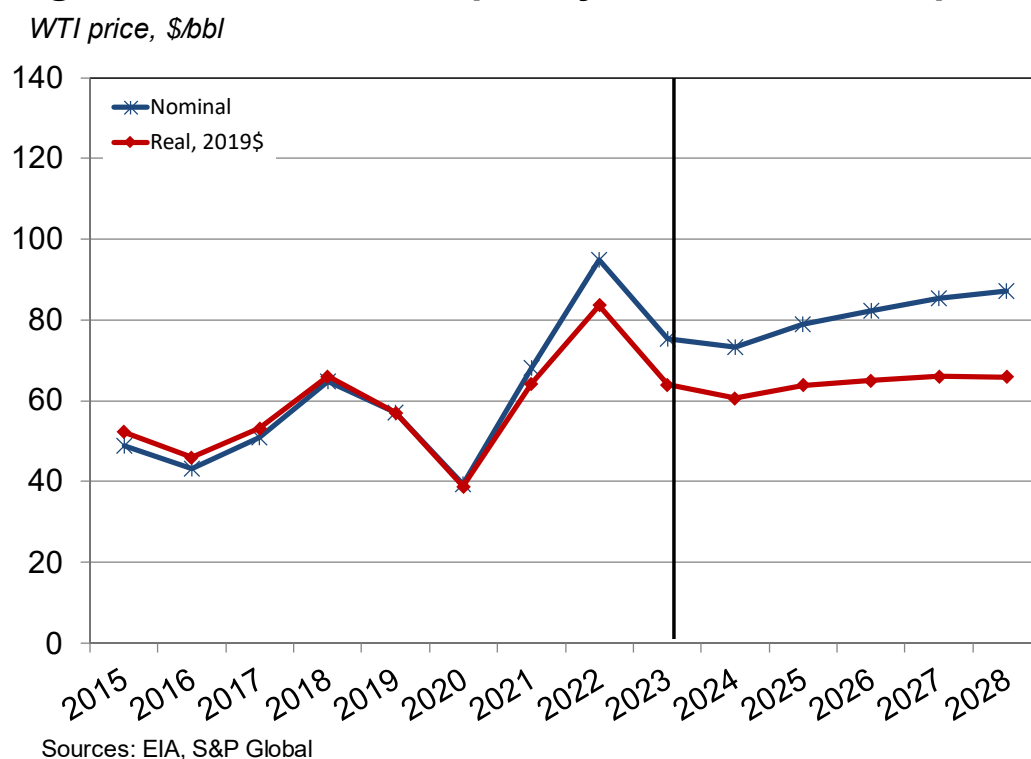
Price indices, 2020=100



Source: S&P Global

Geopolitical developments and production decreases by major oil exporters resulted in sharply higher petroleum prices in 2022. Additionally, some of the production capacity that went offline following the 2020 petroleum price drop took several months to come back online. As a result, average West Texas Intermediate spot prices in 2022 skyrocketed to more than \$100 per barrel in some months. As production capacity improved, prices receded in 2023 and are expected to continue to fall in 2024 (Figure 8). After this time, prices are expected to move steadily upward as demand stemming from global economic growth creates increasing energy requirements. The ongoing war in Ukraine and related embargoes of Russian oil and gas by various countries including the U.S. will contribute to supply constraints and upward price pressure. Nevertheless, prices are expected to increase rather slowly in inflation-adjusted terms and remain below real prices in 2022.

Figure 8. Moderate Temporary Price Retreat Expected



Oil price outlooks always have substantial risk around them, and while the medium-term prices are expected to grow modestly, uncertainty in the outer years of the projection period persists. While supplies are currently improving, growing demand will absorb them, and new production technologies could require higher prices to offset higher production costs. On the other hand, adoption of more efficient gas vehicles and electric vehicles may limit the rate of oil price increases.

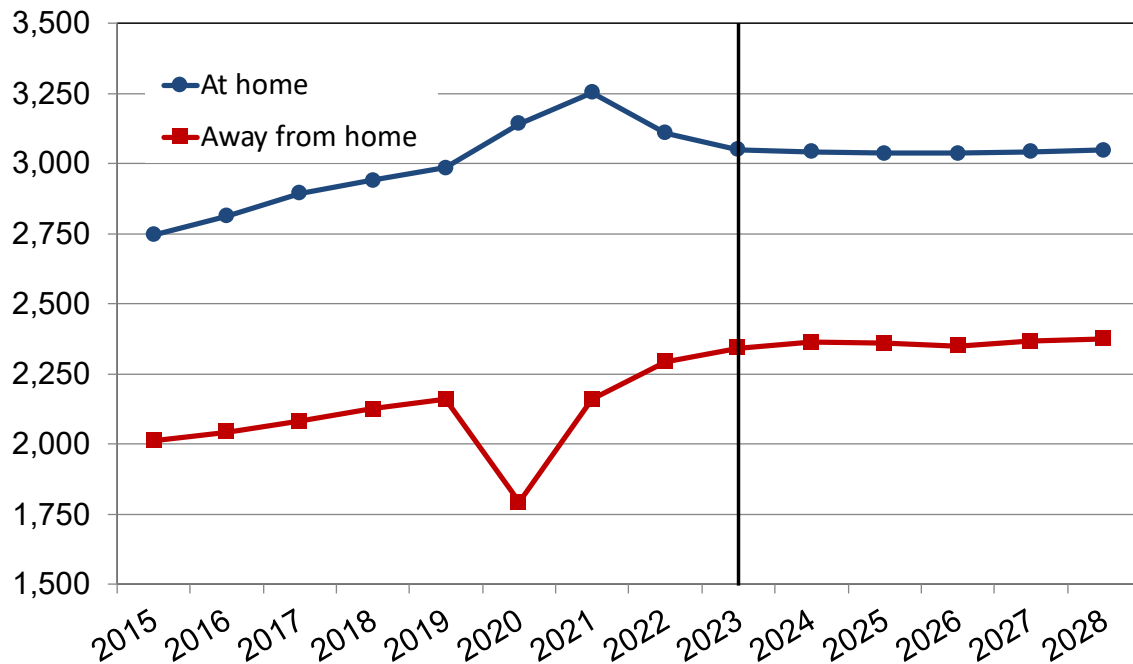
Factors including the steady global economic growth, continuing war and geopolitical unrest in Russia-Ukraine and the Middle East will add upward potential to petroleum prices. On the other hand, excess production capacity resulting from recent exploration and development, and sizeable reserves existing in various production regions around the world could result into downward, or at least mitigating forces to petroleum markets. Volatility will remain a fact of life in petroleum markets.

As petroleum product prices have been moving up, fuel prices also gained substantially in 2022. Although there has been some relief from high fuel prices, thus far the relief has been limited and unevenly realized across different regions of the U.S. Higher fuel prices will impact agriculture by adding to production and transportation costs. Moreover, high fuel prices not only make it more expensive for agriculture producers to operate machinery, but also push up costs for purchased agricultural inputs.

As jobs and income lost during the pandemic recovered, food consumption patterns returned to normal. Real per capita expenditures for food away from home gained in the past three years (Figure 9). Partly offsetting this increase has been a simultaneous decline in food purchases for at-home consumption. Like the change in food away from home, at-home expenditures returned to normal levels. Not only has there been a shift in where meals are eaten, but also what is being consumed. Restaurant meals are higher priced, so changes in where meals are eaten do not necessarily result in a corresponding change in the amount of food consumed. Further, many trips to the restaurant result in consumption of higher-quality cuts of meat and premium products not generally consumed at home. Nevertheless, the large decrease in food expenditures in 2020 has been completely reversed as consumers now have incomes to eat out more often.

Figure 9. Food Consumption Patterns Expected to Normalize

Real per capita food expenditures, \$2019



Sources: BEA, S&P Global

Another important factor adding to recovery in food being consumed away from home is the decline in unemployment as workers regain jobs and have less time to prepare meals at home. However, a significant number of people still work from home resulting in lunches still being consumed at home. Finally, the decline in distance learning in schools has boosted school lunch programs. Furthermore, more school districts are providing all students with breakfast and lunch at school. Most periods with observed increase in per capita food expenditures also coincided with an increase in the real price of food, as has been the case in the past two years. As such, consumers pay more for the same basket of food even in inflation-adjusted terms. The long-term expectation is that food spending will increase primarily with modest food price inflation and population growth and food expenditures are expected to consistently surpass pre-pandemic peaks.

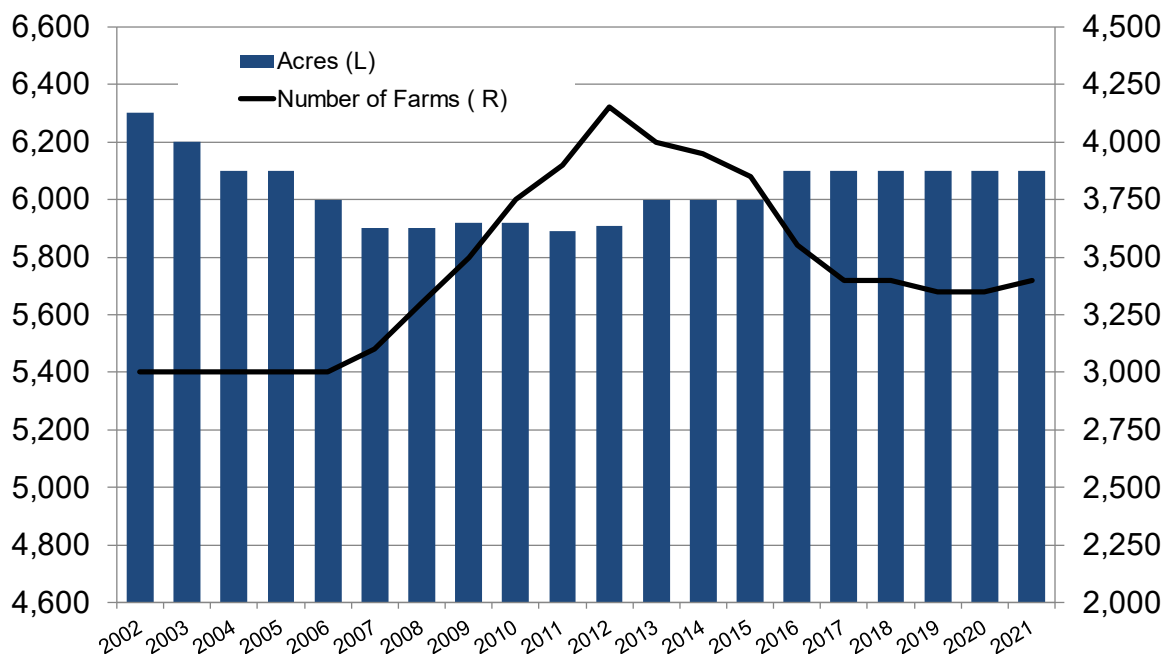
The Outlook

The contribution of agriculture to the general economy is quite low both on a statewide level and national level (Appendix Table 2). Nationally, production agriculture contributed roughly 1% to GDP in 2021, while for Nevada that percentage was reported around 0.2% in the same year¹. There are other major industries in Nevada that contribute the greatest percentage to GDP, gaming and associated food and accommodations, and mining. However, in the smaller rural counties, agriculture contributes far more than the national and state averages to county-level GDP. As such, agriculture is an important economic and cultural focus, and is vital for the sustainability of Nevada's rural communities. The percentages presented in the table reflect direct production agriculture only, and do not reflect upstream or downstream industries that rely on or support agriculture production such as inputs, marketing, processing, and transportation.

Land in crop production has stabilized in the past decade, as has the number of farms (Figure 10). By far, the crop with the most acreage is hay production, including both alfalfa and grass hay. According to the 2017 Census of Agriculture, the latest Census available, 265 farms, comprising 22% of Nevada crop acreage were on tribal lands.

Figure 10. Farm Numbers and Acreage Are Consistent

Nevada alfalfa, \$/harvested acre



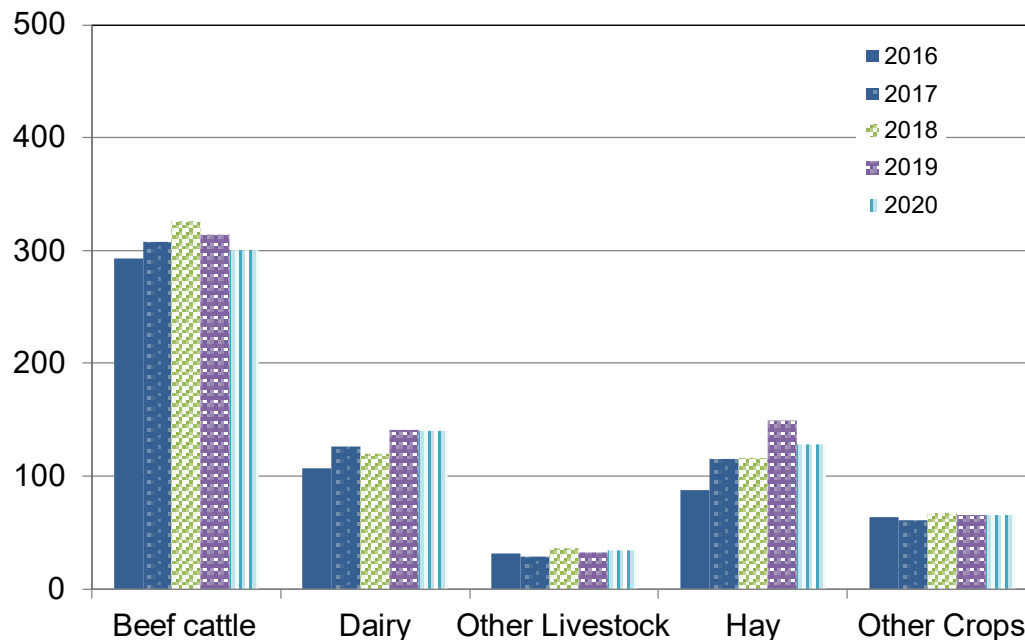
Sources: USDA, NASS

¹ As context, California accounts for the largest share of gross U.S. farm receipts at approximately 11% in 2021, yet the agriculture sector in California accounted for only about 2.5% of state GDP (USDA, BEA).

Nevada agriculture revolves around livestock, especially beef cattle production. In most years more than 40% of state agriculture gross receipts stem from beef cattle. Dairy production also accounts for a large proportion of the value of agriculture. While hay is the largest crop, it is directly related to cattle, dairy, and sheep production. As such, livestock, especially cattle production, dominates the state's agricultural sector (Figure 11).

Figure 11. Cattle Dominate Nevada Agriculture

Cash receipts, \$ mil



Sources: USDA, NASS

The long-term Nevada agricultural outlook is expected to return to a more normal path than that of the past two years, experiencing stabilization following the impacts of the pandemic and ensuing high inflation. This view is supported by the 2023 trends that return production and prices to historical patterns, setting the stage for less expected volatility in coming years.

Cattle prices have strengthened cyclically, as expected, and are expected to remain relatively high for the next few years as inventories build sufficiently to allow increased marketing of cattle.

Milk prices, although improved from pandemic lows, are well below the 2022 spike. With international wool prices remaining low and volatile globally, the sheep and wool industry realized softer profits last year but is experiencing modest improvement in 2023 with similar expectations in subsequent years. However, the support for the sheep and wool industry is likely to be from improved prices for sheep and lambs rather than wool, as fiber prices are expected to

remain weak due to softer international demand. Nevertheless, that industry is expected to remain moderately profitable throughout the outlook.

Hay producers are expected to see profits erode from the high levels of last year but remain profitable. However, profits are expected to contract toward the end of this projection. The next few years are expected to see lower hay prices but still higher than the five years preceding the pandemic.

It is generally expected that the state's livestock and crop producers will be able to maintain production in most sectors. In reality there will likely be periods when gross receipts far exceed costs in a year, and there will be periods when profitability is lacking.

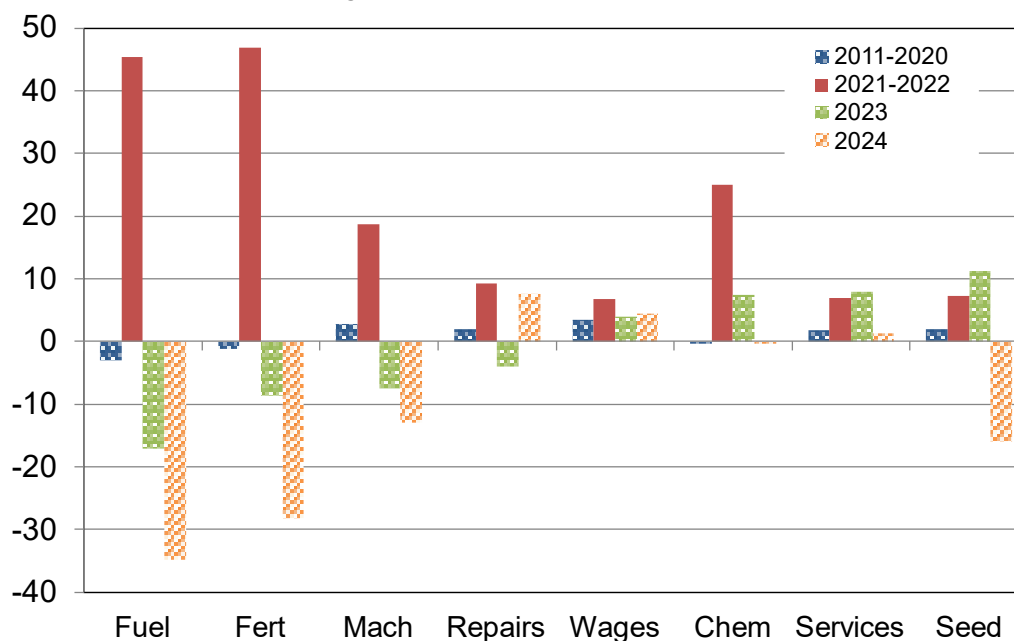
Production Costs

The costs producers face for the means of agricultural production underpin the outlook as much as the demand for commodities. In the long term, producers must be able to recover their costs plus make a profit to continue to expand production to meet growing global demand. This outlook reflects expectations of producers' abilities to maintain margins above costs in the long term. While producers must also be able to recover fixed costs in the long run, annual production decisions are made on whether variable, or operating, costs can at least be covered. Indices of major cost categories are presented in Appendix Table 3.

There are several cost categories utilized in developing the enterprise budgets underlying operating cost estimates and projections in the outlook. Major categories for crops include seed, agricultural chemicals, fuels and energy, machinery, labor, repairs, and services. Livestock enterprises are faced with feed, feeder animals, veterinary, equipment, fuels, trucking, and labor, among the major cost categories. Not all cost categories move together over time, with some exhibiting faster rates of inflation and greater volatility (Figure 12).

Figure 12. Prices Are Still Adjusting

Costs, annualized % change



Sources: USDA, BLS, S&P Global, NAES

In the period from 2021 to 2022, raw material-based costs, especially those for fuel and fertilizer, increased relatively faster than any other major category. Now that costs are easing, those inputs have experienced the greatest downward adjustments, with additional declines expected in 2024. This is typical for commodity-based products. Chemical prices also exhibited substantial increases in 2023 with smaller hikes expected next year. Despite boosts to minimum wage rates in most states and at the federal level, overall wage increases remain relatively benign, although slightly higher than the long-term historical average. As the economy solidifies, average wage increases are expected to tick up a bit next year. Fuel is the most volatile category, with high prices adding significantly to producers' costs in the past two years.

It is anticipated that those high fuel prices will ease substantially next year, but this assumption carries perhaps the most uncertainty of any in the outlook. The higher fuel costs have been exacerbated by pipeline closures resulting from policy and production decisions. Over the outlook, not all cost categories are expected to behave as in the previous decade. Fuel price increases are expected to persist over the outlook period, but at a more modest rate. Because fertilizer, particularly nitrogen fertilizer, is dependent on natural gas, that cost category will reflect rising fuel input costs.

With continued economic expansion expected, wages will accelerate in the medium term. Items such as services will reflect changes in wages as labor makes up a substantial portion of the costs of these items. As no sharp acceleration or deceleration of the economy is expected, and therefore the job market is driving the wage rate projections, service costs will also follow a relatively smooth upward path that suggests controlled inflation. Overall cost categories are expected to increase by around 2% to 3% per year.

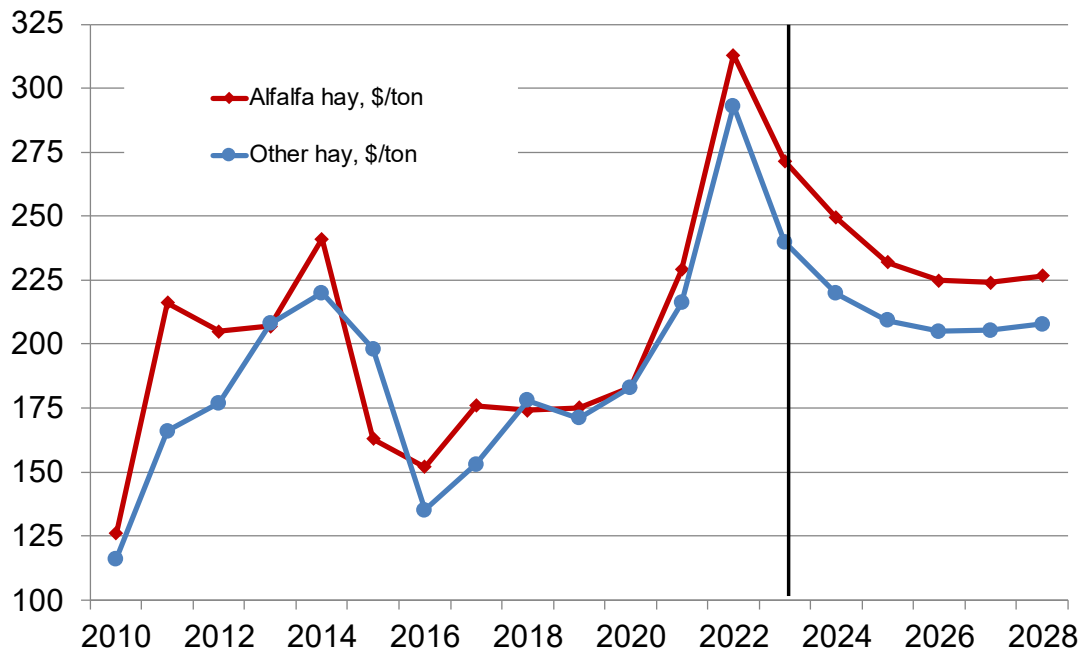
The volatility in fuel prices and potential for sharp price increases mean that this category embodies significant risk for producers. However, fuel costs are generally not among the largest agricultural input cost categories. For livestock, feed costs generally account for the largest category. For crops, it is usually fertilizers and other agricultural chemicals.

Hay

Alfalfa and other hay prices shot up in 2022 (Figure 13). Nevada hay production was constrained last year due to lower yields primarily related to severe water shortages and in line with spikes in other feed costs. The drought was relieved in 2023 and indications are that hay production recovered and will continue to be adequate.

Figure 13. Hay Prices Expect Retreat

Nevada hay and forage prices

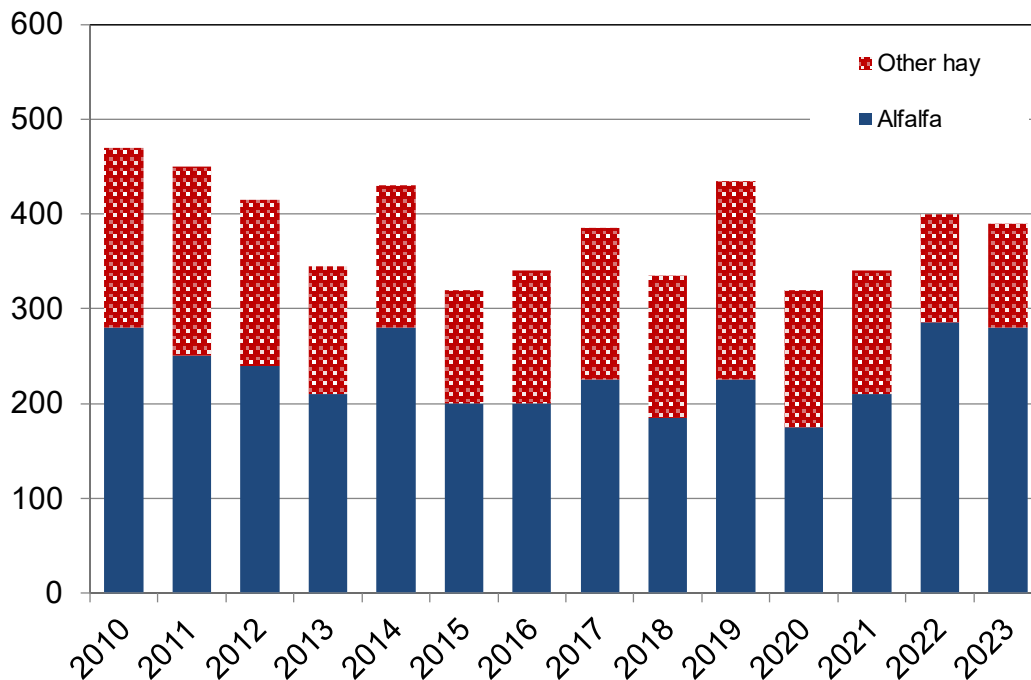


Sources: USDA, NAES

Early in 2023 when the hay harvested acreage intentions were announced, there was an expectation of harvested acreage in Nevada similar to that of a year ago. October reports indicate that it fell slightly from 2022 but was still well above the low acreage of 2020 and 2021 (Figure 14). Because of this, Nevada hay production has recovered and prices are likely to ease further in the next few years.

Figure 14. Hay Acreage Stable in 2023

Nevada hay acreage, ths



Source: USDA

Reported alfalfa yields show little movement over time because virtually all Nevada production is irrigated which mitigates the impacts of variable precipitation. However, the cut to water allocations in the past few years did result in lower average yield reductions, but those lower yields have been alleviated in 2023. It should be mentioned that Nevada hay producers' intentions as reported by USDA in March rarely reflect what actually is harvested in the state that year.

There is continued downward potential for hay prices expected into 2024 with improved production and lower prices for other feeds. Alfalfa prices are expected to stabilize at lower levels after next year for the remainder of the outlook. Prices for other hay varieties are projected to drop back to a more typical relationship with alfalfa with the assumption of normal precipitation in the future. This is another of the major uncertainties surrounding this outlook.

The price outlook for important Nevada commodities is presented in Appendix Table 4. Because of the sharp inflation of recent years, the prices are reported in both current and inflation-adjusted terms.

In the longer term, production recovery will be affected by the ability of producers to establish new stands that were damaged by the lack of water during the recent protracted drought. There is some local substitution into corn silage acreage in recent years, especially in dairy regions. However, this increase in silage acreage is quite small compared to the overall hay area and feed requirements and is occurring only on a localized basis.

A significant portion of Nevada's hay is shipped westward to supply California dairy and cattle production and for providing high quality hay to the horse racing industry. California hay acreage is only about half of what it was 15 years ago. In addition, Nevada high-quality alfalfa cubes are shipped to Asian markets such as Japan. This has tightened the regional market for high-quality alfalfa hay and will be a contributing factor to the potential for higher prices for hay in the next several years.

Additionally, though some dairy herd liquidation occurred as a result of COVID-induced decline in dairy product demand, dairy herd expansion returned in 2023. The Dairy Farmers of America whole milk powder plant in Fallon and expected dairy herd increase will gradually put upward pressure on regional hay and other feed demand, supporting local prices and providing the opportunity for eventual greater production. As always, water will be a crucial factor in the ability of hay producers to increase output.

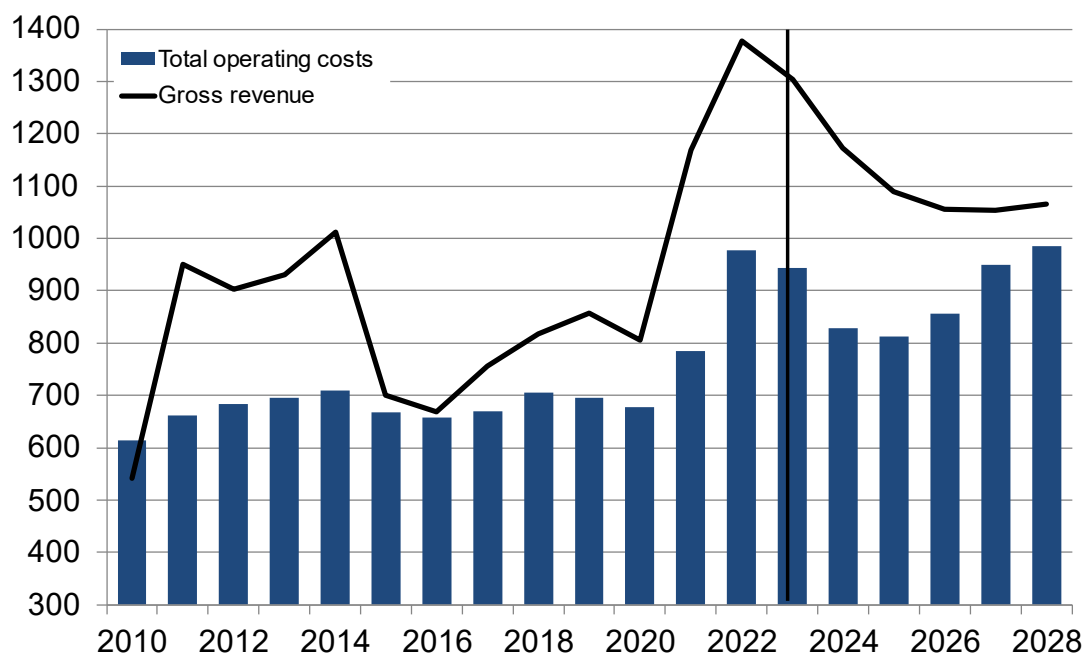
Nevada cow-calf producers are partly insulated from rising feed costs because of limited volatility in federal grazing fees. However, the need to purchase seasonal and supplemental feed exposes them to fluctuations in feed costs and cattlemen that utilize private grazing lands are subject to more variation in costs from contract to contract. With the improved precipitation in the winter of 2022 and into 2023, and expectations for another wet winter this year, conditions that previously deteriorated are expected to see improved forage quality and quantity. The range will likely take several years to recover, leaving lingering although diminishing effects on grazing.

Despite lower yields and creeping costs, per acre profits were healthy in 2022 and again in 2023 (Figure 15). If adequate water is available in the next few years, per-acre profits are expected to remain favorable although gradually shrink as prices stabilize while costs increase modestly. Nevertheless, hay profitability is expected to be solid over the next five years. However, because of much lower acreage harvested, total revenues for producers are below those of the past.

One factor helping to mitigate the impact on profits will be lower operating costs for hay producers, primarily from lower fuel costs expected through 2024. For hay, the largest cost categories are machinery, fuel, and irrigation, with wages also accounting for considerable cost. Hay is more exposed to fuel costs than most other crops. Hay is also water-intensive, finding growing competition for this scarce natural resource a major risk factor. Expectations are that steadily rising costs will begin to erode profitability again in the last part of the projection period. Net returns for major Nevada agricultural commodities are shown in Appendix Table 5. Again, the values are presented in both current and inflation-adjusted terms to make comparison with recent price levels easier.

Figure 15. Even With Creeping Costs Hay Profitability Expected

Nevada alfalfa, \$/harvested acre



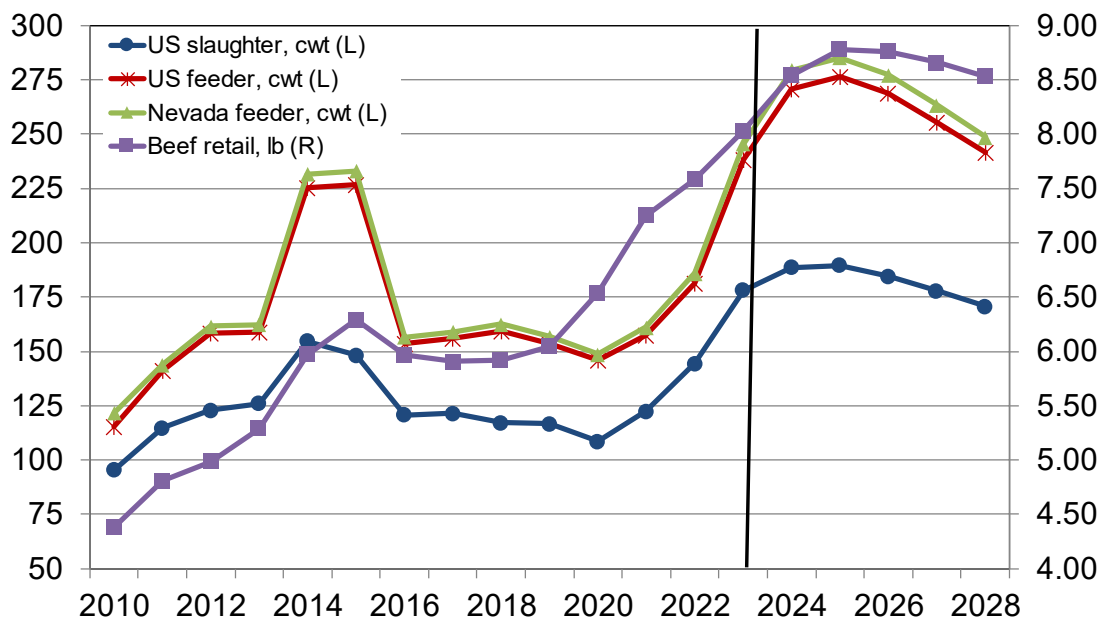
Sources: USDA, NAES

Cattle

U.S. and Nevada ranchers saw cattle prices begin rising in 2021, moving cyclically higher in the last two years (Figure 16) when they faced pressure from lower inventories and lingering supply chain disruptions in the meat processing sector. Until inventories build back to recent year averages, the number of head put on feed will remain constrained and feeder steer prices will continue to trend higher. As herd building slows as expected and more cattle are marketed, prices will soften cyclically after 2025.

Figure 16. Current Cattle Prices Reflect Lower Inventories

Cattle prices, \$

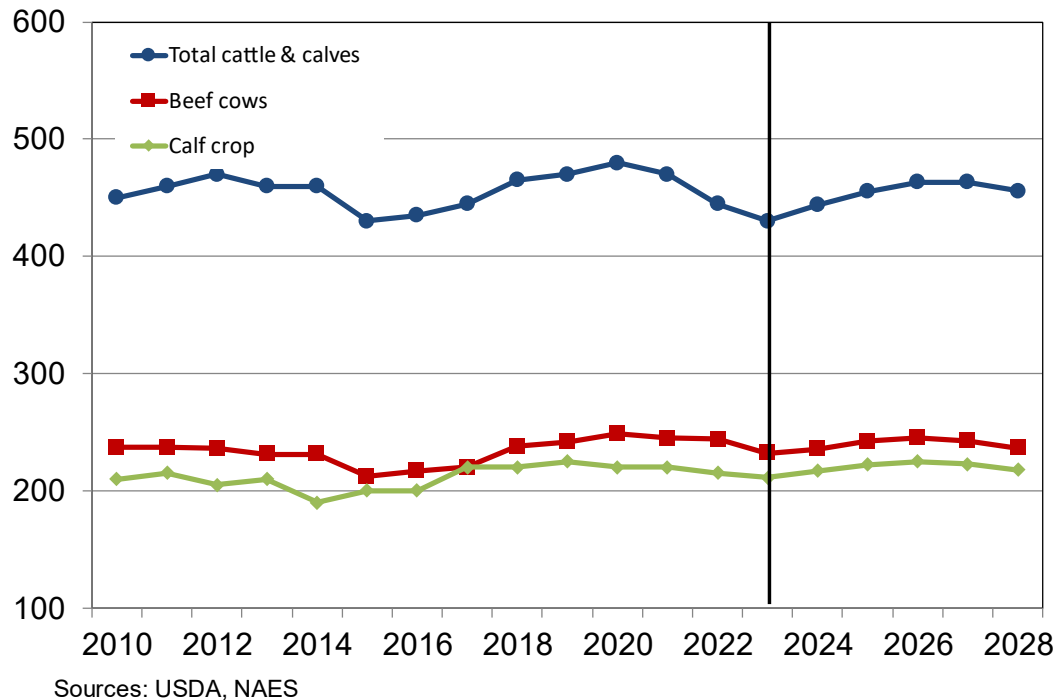


Sources: USDA, FAPRI-MU, NAES

Nevada cattle inventories fell cyclically beginning in 2021 with the expectation that 2023 will be the nadir (Figure 17). With low returns in 2023 expected on high costs, only a modest increase in Nevada cattle numbers is expected given prices still reflect pandemic impacts before peaking again in 2026. However, it is not expected that the cyclically high inventories in the outer projection years will exceed the last peak of 2020.

Figure 17. Cattle Cycle Expects Trend Reversal in 2024

Nevada cattle, 1,000 head

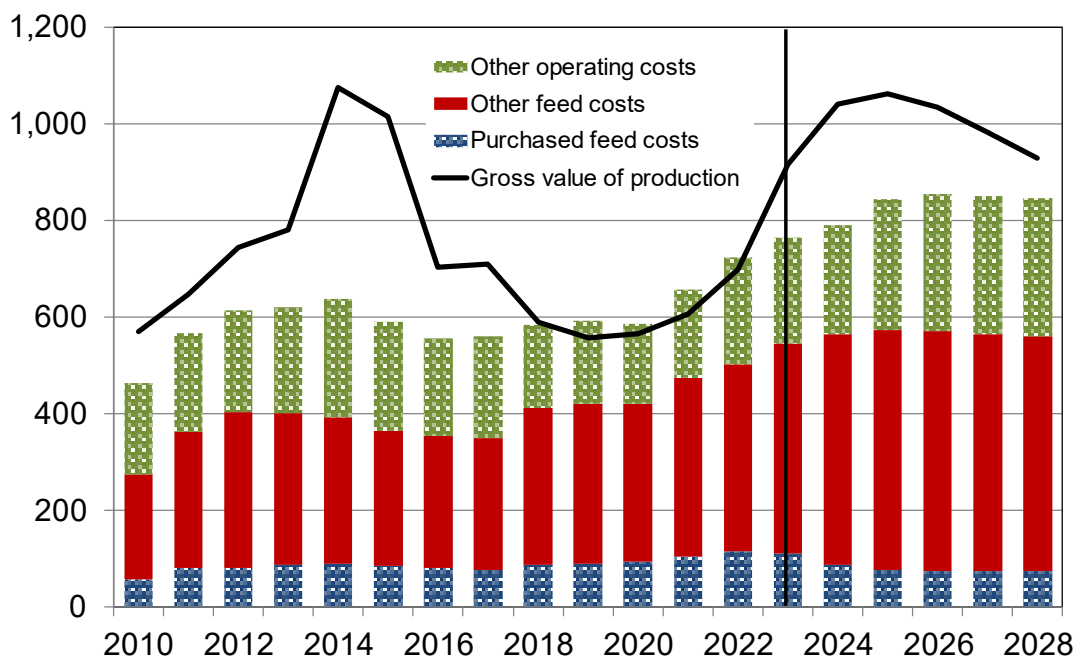


While non-feed costs are assumed to increase at a steady rate over the next five years - driven in part by fuel costs - feed costs are expected to show slower rates of increase. In addition, many western herds graze federal lands where fees are expected to remain at long-term historical rates, adding further stability to feed costs during the projection period. The feed cost advantage of public grazing is likely to improve if far western rangelands recover following the recent drought. One area of risk for western public grazing is the increase in fire incidence and severity that has occurred in recent years, affecting areas available for grazing, if only on a temporary basis. It takes several years for perennial grasses to re-establish and produce adequate forage after wildfire impacts.

As cattle prices move higher and feed costs stabilize, returns will improve and cow-calf profitability is expected for several years, before declining with lower cyclical prices (Figure 18). As herd expansion proceeds as expected over the next few years, it will conflict with the desire to sell cattle at improved prices, and inventories will rise only slowly until they reach levels where supplies and demand can equilibrate without price rationing. After this time, prices are expected to fall cyclically. Because of the high proportion of cow-calf operations in the west, the region will be heavily impacted by the cyclical nature of the impacts on demand for calves and feeders.

Figure 18. Expectations for Easing Costs, Profit Return

Basin & Range cow-calf, \$/bred cow

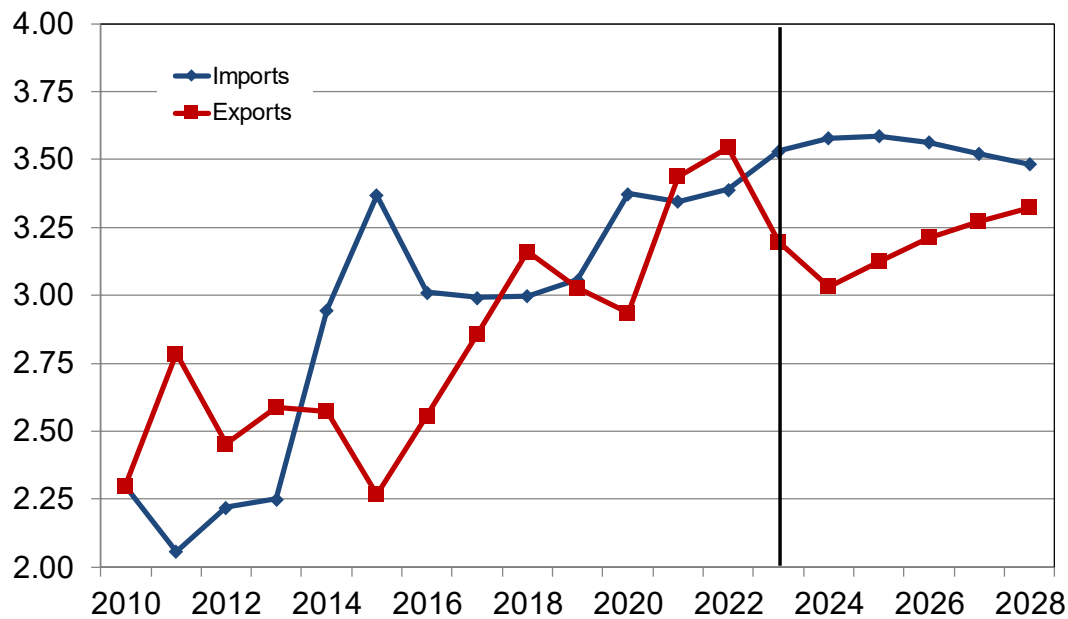


Sources: USDA, NAES

The combination of higher domestic beef prices and a stronger dollar hurt U.S. beef competitiveness on international markets and the trade balance reversed this year as exports dropped sharply and imports increased (Figure 19).

Figure 19. U.S. Competitiveness Expected to Soften

Beef trade, bil lb

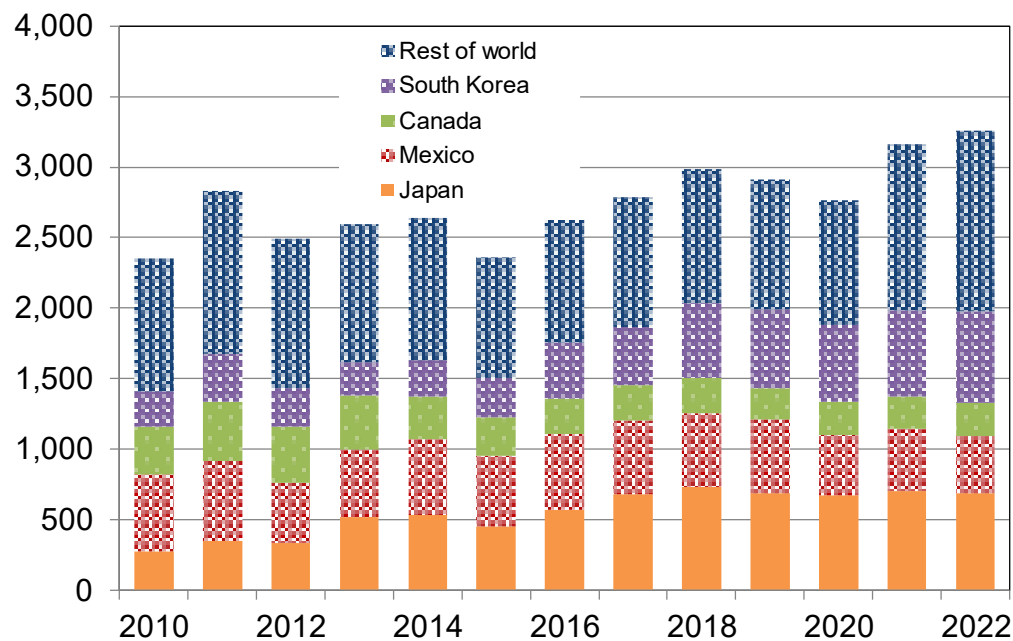


Sources: USDA, FAPRI -MU

Several beef importers limited trade in 2020 because of health concerns surrounding imported goods, however purchases of U.S. beef increased in the past two years. In particular, South Korea relaxed restrictions and increased imports. Japan remained steady but Mexico and Canada imported less American beef in the past few years (Figure 20).

Figure 20. U.S. Beef Exports Temporarily Improved

U.S. beef exports, mil lb



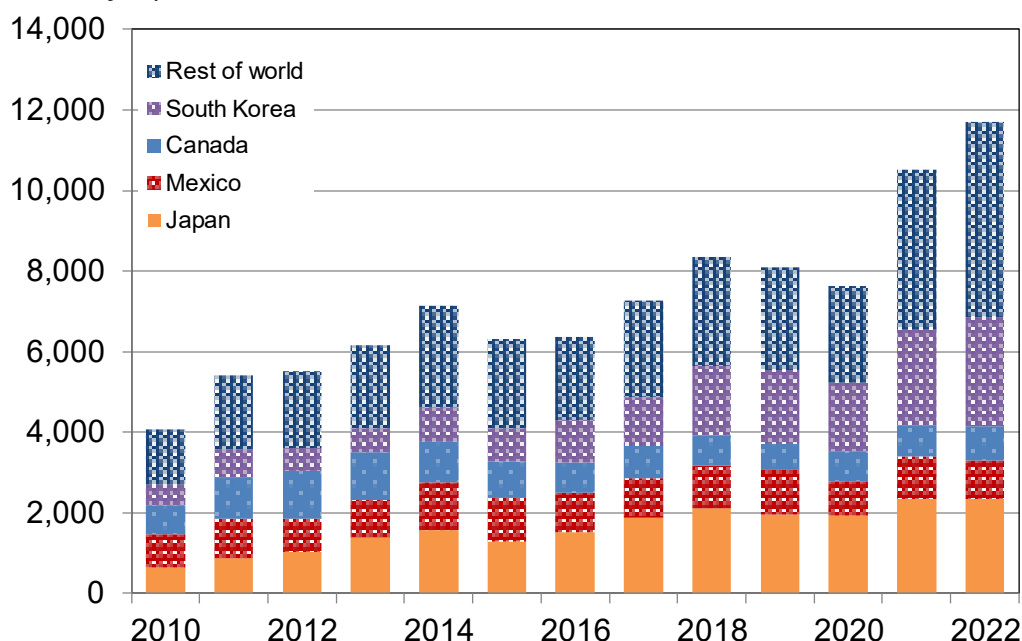
Sources: USDA, FAS: Global Agricultural Trade System

As beef prices rise and the dollar maintains strength in the medium term, U.S. beef will see a deterioration in its competitive position on world markets. However, as the dollar eventually loses strength against other currencies, U.S. exports are expected to retain some competitiveness. In general, the beef trade imbalance is expected to persist over the next five years.

The temporarily improved beef export volume in 2021 and 2022 contributed to significantly higher export value (Figure 21). In coming years, growth in the global economy, and rising populations and affluence in other nations, especially those with limited productive capabilities, provide an opportunity for expanding global meat, including beef demand and trade. However, high U.S. beef prices and expectations of a slowly weakening U.S. dollar will somewhat constrain U.S. exports and therefore export values.

Figure 21. Nominal Trade Values Rise With Prices

U.S. beef exports, \$mil



Sources: USDA, FAS: Global Agricultural Trade System

Increasing affluence has also been the dominant driver of rising commodity imports by China. However, U.S. beef is on the commodity list that could be subject to tariffs in response to those imposed by the U.S. While there is inconsistent enforcement of those trade restrictions by China, it is possible that beef trade with that country could be curtailed at times. What the current administration decides on permanent trade developments with China leaves a level of uncertainty about Chinese beef trade with the U.S.

Many developing nations are also seeing incomes reach thresholds that typically indicate more demand for higher-quality diets, and beef producers will benefit. Particularly, developing nations with a constrained land base, many of them Asian nations with rapid income growth, will turn to global markets to acquire agricultural products they have limited capacity to produce domestically.

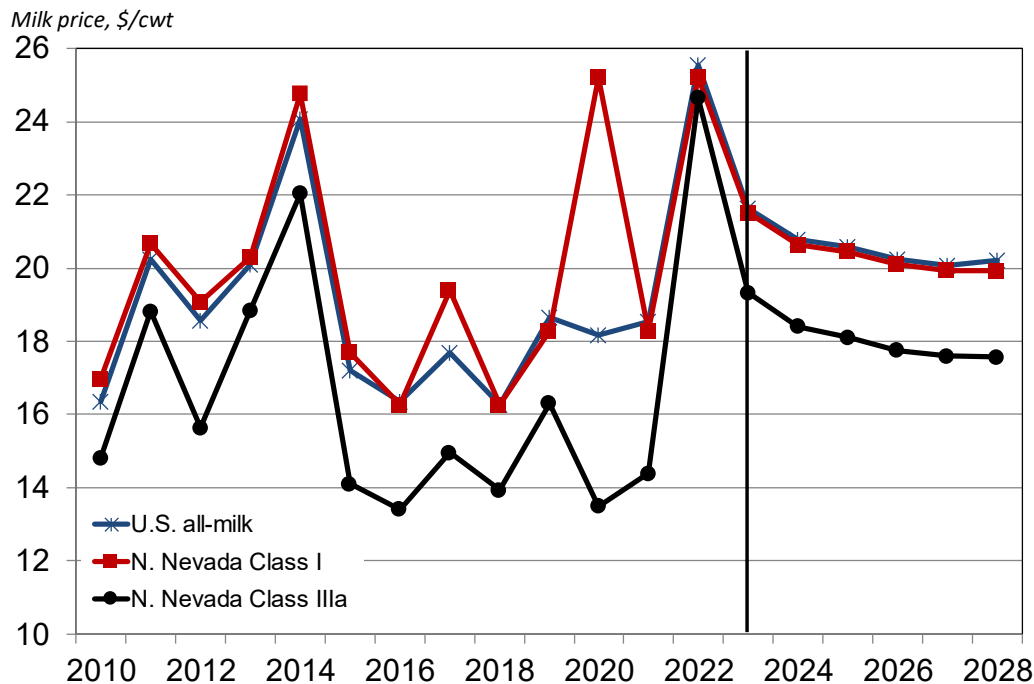
As the dollar eventually gives up some of its recent strength as expected, higher U.S. export volumes will expand, helping to boost export values. Export quantities are projected to increase from the lower level occurring in 2023 and expected to persist in 2024 throughout the outlook, and gradual strengthening of prices will boost export values. Japan, Mexico, and South Korea are expected to maintain their positions as top international markets for U.S. beef.

Dairy

Milk prices have been volatile over the past several years, especially in Nevada. The smaller state dairy herd in 2020 through 2022 resulting from liquidation stemming from lingering effects of the pandemic set the stage for the sharp drop in milk production last year. Furthermore, the substantially higher feed costs last year led to lower production per cow.

As students returned to classrooms, school breakfast and lunch programs boosted fluid milk consumption by students. The reopening of restaurants and recovery in occupancy rates for those remaining open further boosted the consumption of items such as cheeses and butter, which are consumed at a higher rate with premium dining. All classes of milk shot up in 2022 and all-milk prices topped the previous record of 2014 (Figure 22). Dairy herds in many parts of the country, including Nevada, remained smaller and feed rations were altered to reduce output per cow for some periods. Particularly, manufacturing grades experienced volatility and reduced levels. While they are not expected to fall to pre-pandemic levels, prices are expected to gradually weaken in the medium to long term to levels similar to averages prior to 2014.

Figure 22. Milk Prices Expected to Stabilize

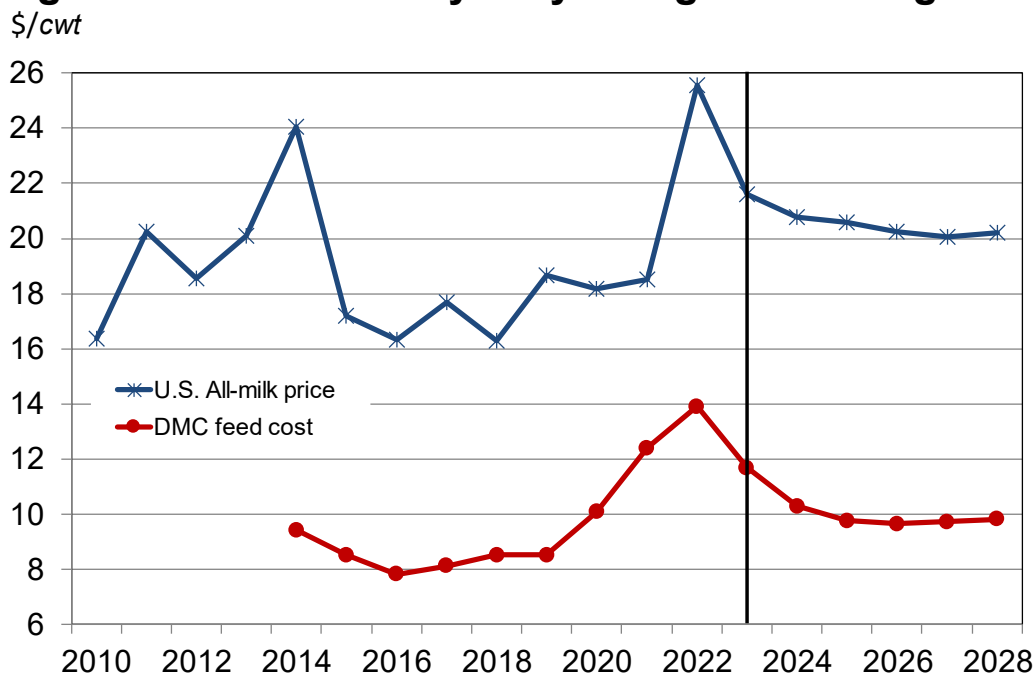


Sources: Nevada Dairy Commission, USDA, FAPRI-MU, NAES

Even as prices stabilize in 2023, dairy producers are feeling the squeeze from still high feed costs, including corn and soybean meal, but also hay and other feedstuffs. In the emerging era, however, non-feed costs are also proving a burden to dairy producers, especially fuel costs that are expected to gradually fall, but not to levels seen prior to last year. Nevertheless, costs are

expected to fall somewhat beginning in 2024 to levels that will permit a recovery in profitability. With decent margins, the Dairy Margin Coverage (DMC) will come into play only at higher premium levels and only during brief periods to help dairy producers maintain margins. The DMC establishes a margin floor and reduces the volatility in margins. During periods when the DMC is triggered, government purchases of dairy products will occur under the Dairy Product Donation Program as a means of temporarily supporting prices sufficiently to bring margins back above the threshold that triggers payments. Because margins are targeted instead of prices, milk prices are expected to stabilize similar to feed costs projected in this baseline (Figure 23).

Figure 23. DMC Will Pay Only at Higher Coverage Rates



Sources: USDA, FAPRI -MU

The basic margin protection level was increased from \$4 to \$5 per hundredweight at no cost to the producer in the February 2018 spending bill. The annual \$100 administrative fee has been waived for underserved farmers, which include veterans, socially disadvantaged, minorities, and women. Tier 1 coverage applies to the first five million pounds of historical base production. However, higher margins (up to \$9.50 per hundredweight) can be obtained for a premium to be paid by the dairy farmer. The margin is calculated monthly instead of using the previous two-month average that was under the previous Margin Protection Program (MPP). In combination with the higher margin this shorter time frame provides more potential for payments as margins will now be required to drop below the threshold for a shorter period of time in order to trigger payments.

For coverage above the basic \$5 per hundredweight margin, the premiums are significantly higher for Tier 2 coverage, that is, annual base production above five million pounds. This feature makes the legislation geared more toward small dairy producers rather than large operations such as those found in the west. However, the restriction of selecting DMC coverage or Livestock Gross Margin (LGM) insurance has been removed, improving the safety net for larger producers. While milk prices are expected to be high enough and feed component prices low enough not to consistently trigger payments at the \$5 margin, it is probable that some payments will be made at higher levels of margin coverage in the baseline.

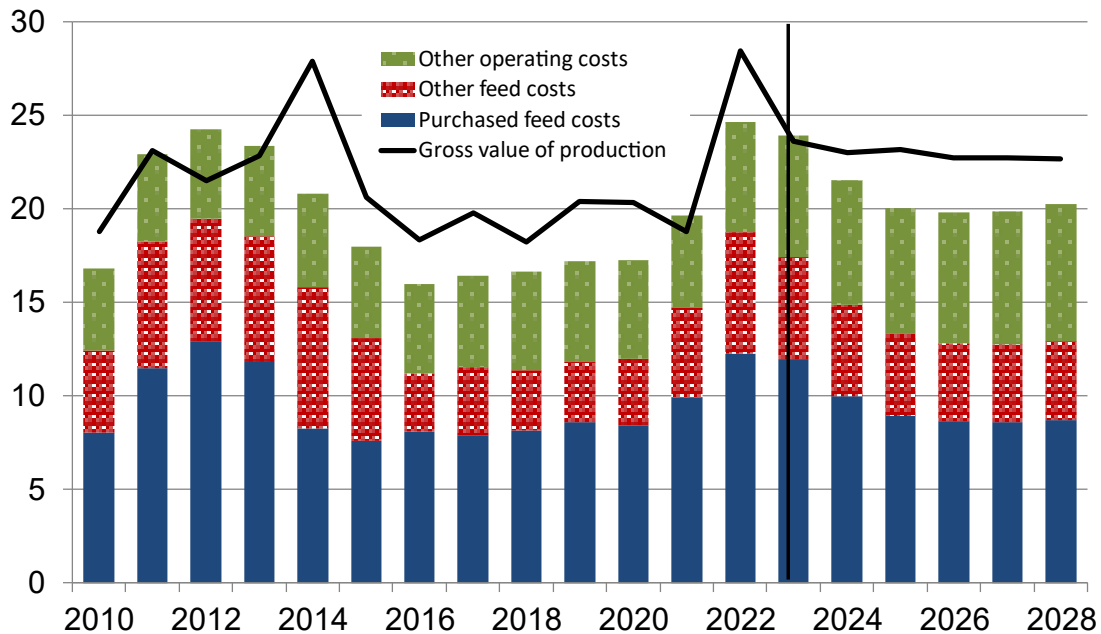
The DMC (MPP) was conceived and implemented in an environment when feed costs were extremely high. If that environment persisted, the program would pay substantially more to dairy producers. However, with expected moderate feed costs over the next five years, the program will be only periodically triggered, especially at lower margins. On the flip side, if feed costs were to jump dramatically and margins become substantially reduced, the program would become very expensive to operate.

It should be noted that Nevada dairy rations are different than the standard rations used in many grain and oilseed producing areas, but the feed cost calculation for the DMC is based on those standard rations. As a result, the DMC margin might not reflect margins in Nevada. Another important note is that the 2018 Farm Bill was set to expire at the end of 2023 but has been extended through September 2024. Many existing programs under the bill may be renegotiated and/or legislated. This is an important area of uncertainty, especially for Nevada dairy producers.

With relaxing feed costs in coming years, dairy producers will see improved net returns compared to the past three years. However, with the stable milk prices in coming years, any uptick in costs, dairy market net returns are expected to be mediocre (Figure 24). The DMC will be required to keep some, especially smaller, dairy farmers in operation.

Figure 24. Expected Lower Feed Costs Will Boost Profits

Nevada dairy, \$/cwt of milk sold

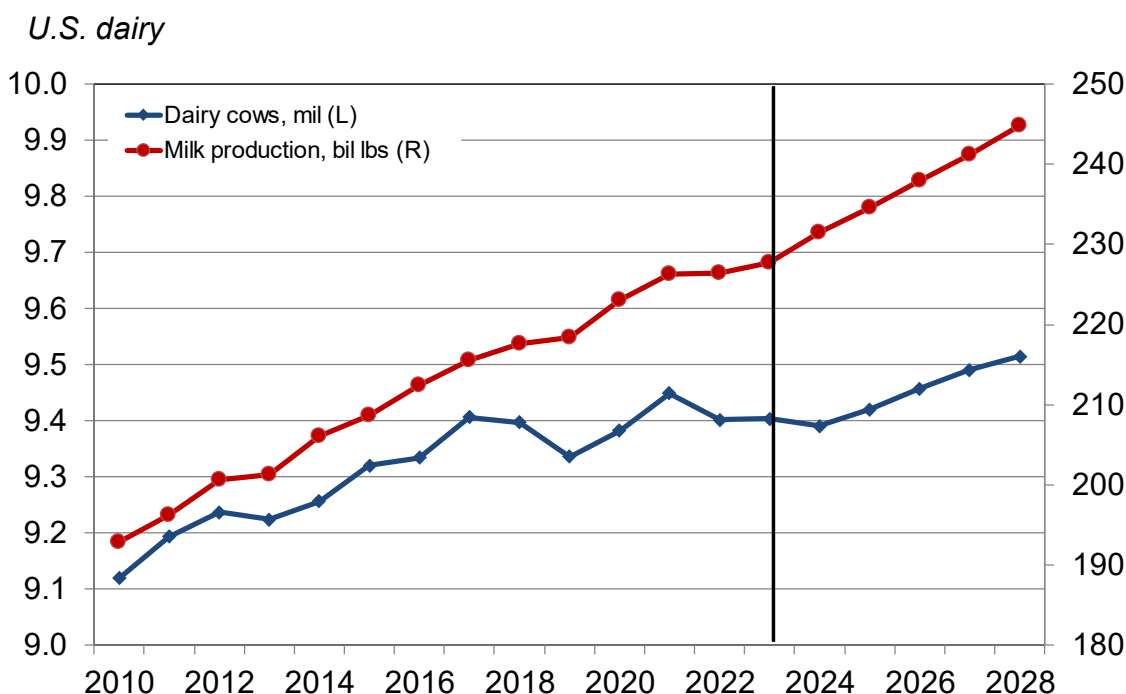


Sources: USDA, NAES

Non-feed costs are expected to increase at rates similar to overall inflation so that when total operating costs are considered, the rate of increase will not outpace the increases in dairy gross revenues. Margins are expected to be positive over the projection period. This suggests that small dairies unable to only achieve modest margins will face challenges, and larger operations are more likely to be the source of expansion. Larger dairies characteristic of Nevada have some potential to expand production to provide milk to local processors. It should be noted that the gross value of dairy production also includes sales of calves and cull cows. With healthy cattle prices expected during the next five years, the value of cattle sales for dairy producers could then support profitability in the next few years.

The lingering effects of herd liquidation during the pandemic will make it difficult to induce expansion of milk cow inventories on a national basis through 2024. Although dairy cow inventories remain in a relatively small range, milk production has increased (Figure 25). Ongoing increases in milk yield per cow will be instrumental in supplying U.S. milk requirements. Breeding, nutrition, veterinary science, and lactation cycle management are combined factors that may increase the average cow's ability to produce milk. Milk production increases will be vital to supplying domestic requirements and meeting expanding dairy product demand on international markets as well.

Figure 25. Expected Yield Increases Drive Milk Supply



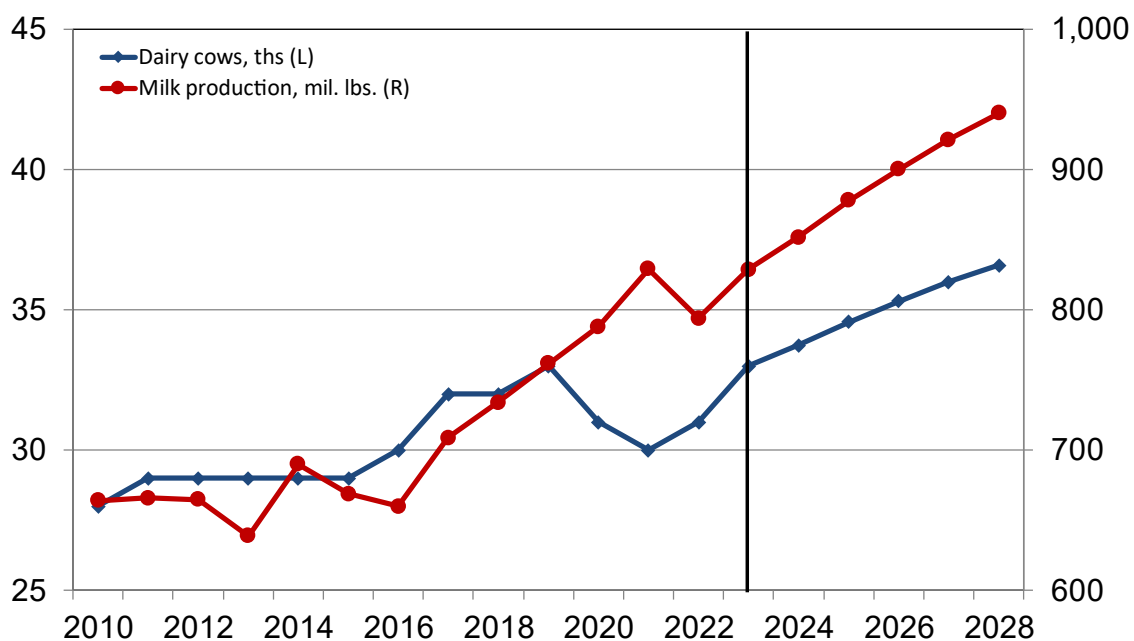
Sources: USDA, FAPRI-MU

Milk prices in Northern Nevada are influenced not only by the Nevada market for fluid milk, but also by California bottlers and by the whole milk powder plant in Fallon. Much of Northern Nevada produced milk is utilized at the plant and bought from producers at the lower Northern Nevada Class IIIa price instead of a Northern Nevada Class I price. In order to supply Class 1 milk to California bottlers, Northern Nevada producers receive a lower effective price as they must cover transportation costs to California destinations. With higher fuel prices, those costs have increased markedly in recent years. Because they now sell much of their milk to the Fallon plant, those transportation costs will be less, allowing them to sell milk at the lower Class IIIa price. The price differential is expected to be offset by no longer having to factor transportation costs to California into the local milk price.

The necessary expansion of Nevada dairy herds to meet the Fallon plant's two million pound per day capacity with locally produced milk was occurring slowly prior to the pandemic. With the disruption to dairy markets and prices in the past year, Nevada dairy cow inventories were reduced. With the recent protracted drought, the lack of water limited the ability to maintain dairy herds. The drought severely cut water availability to run and expand dairy farms, as well as to produce locally grown feeds such as hay and corn silage. With the improved precipitation in the past year, water supplies are much improved and hay production recovered. As a result, the herd expanded to 2019 inventories in 2023 and is expected to grow throughout the outlook period (Figure 26). Furthermore, economic headwinds that previously faced the dairy industry are subsiding and local producers will be able to expand, and out-of-state producers can establish new operations in Nevada. But because of expected modest milk prices and returns, such expansion will be slow.

Figure 26. Herd Size Recovery Expected

Nevada dairy



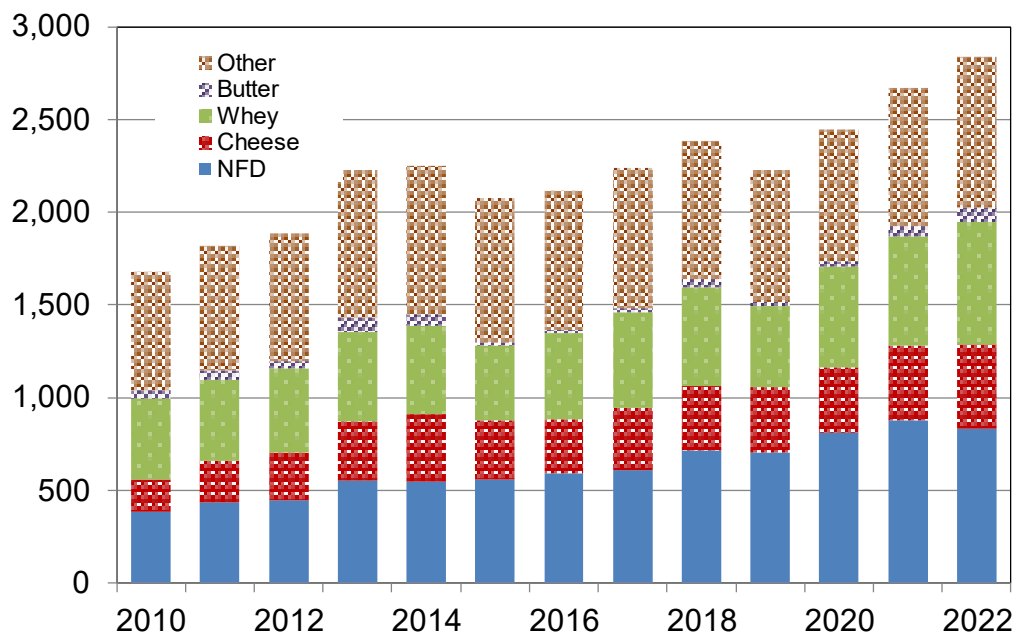
Sources: USDA, NAES

Expansion of Northern Nevada's dairy industry would markedly increase feed demand especially for locally grown hay and corn silage, providing larger local markets for those crops and supporting prices for those input crops. Recalling the recent severely limited precipitation, a major issue for expanding the state's dairy herd *and* producing feed is the ever-present need for scarce water.

Domestic consumption will provide only limited growth potential. Rapidly growing and increasingly affluent populations in developing and emerging economies, especially in Asia, are providing market opportunities for dairy products (Figure 27).

Figure 27. Dairy Export Volumes Remain Healthy

U.S. dairy exports, ths tonnes

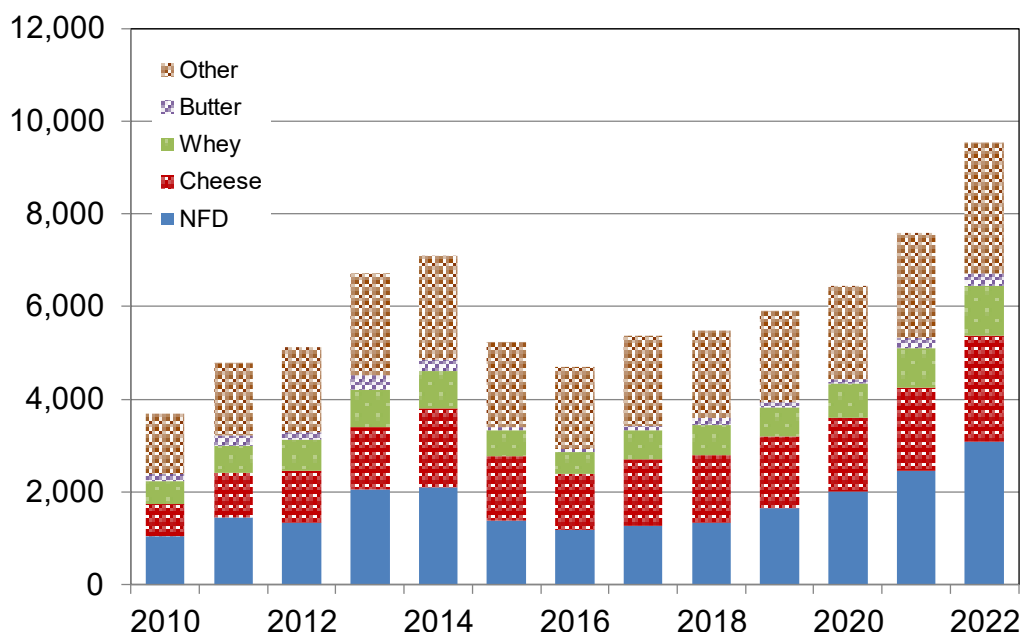


Sources: USDA, US Dairy Export Council

In recent years, milk powder and cheese purchases in overseas markets increased as rising affluence in importing countries boosted demand. However, in 2022, milk powder exports fell slightly, although other products continued to find favor with foreign buyers. Strong export volumes coupled with higher prices and a strengthening dollar in 2022 further boosted the value of those exports (Figure 28).

Figure 28. Higher Prices Boost Export Values

U.S. dairy exports, \$mil



Sources: USDA, FAS: Global Agricultural Trade System

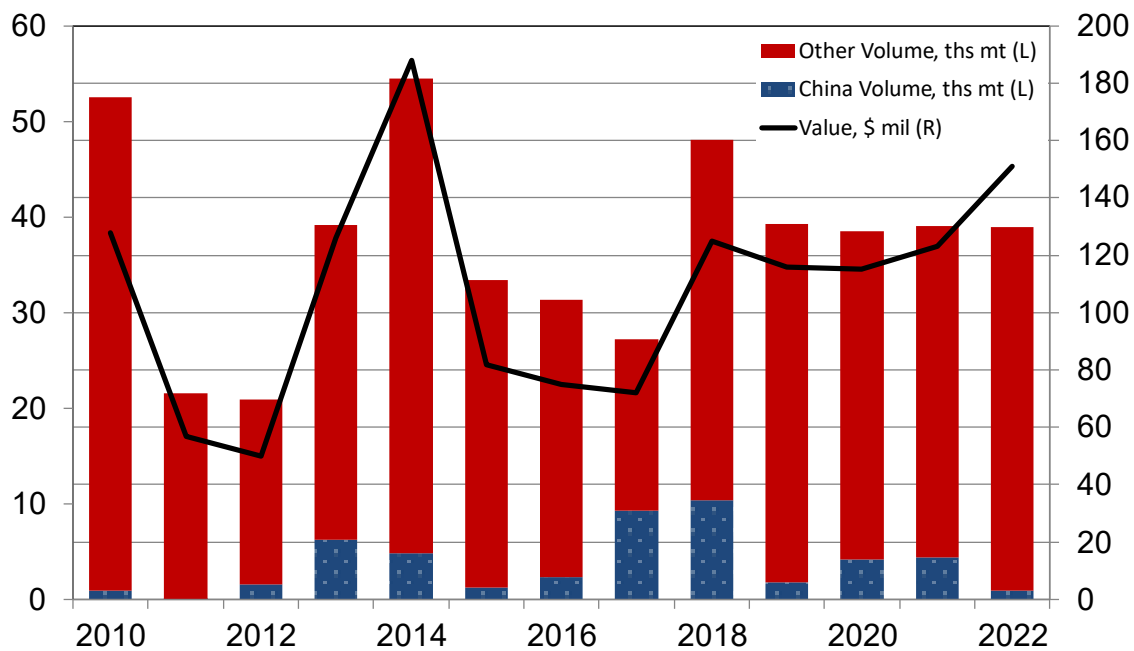
Like many other agricultural commodities, global markets for dairy products are viewed as an opportunity for expanding domestic industry. Nevertheless, U.S. dairy product market share requires competitive prices, and a strong dollar in can dampen U.S. competitiveness. With the expectation of a slightly weaker dollar in the long term the international market will remain a vital supporter of the domestic dairy industry. Competing exporters like New Zealand and Australia have favorable exchange rates and geographic location advantages to expanding Asian markets, making their products less expensive to nearby importing countries. Nevertheless, the U.S. dairy industry's growth potential is greatly enhanced by international demand. Rapidly growing Asian economies are viewed as an immense market to target for increasing dairy product exports.

The emerging world market is precisely the impetus behind the evolving dairy product industry in Nevada. China was the initial targeted market for the milk powder products of the Fallon plant, but more recently targeted marketing has expanded to other affluent international

markets. In addition, China has almost completely abandoned U.S. whole milk powder imports. Fortunately, trade with other nations has offset the loss of the Chinese market (Figure 29), dampening some of the volatility, as China has proven to be an on-again off-again market. New Zealand and Australia are dominant exporters and have been successful in capturing much of the large Chinese market, but the market is also attractive to other suppliers.

Figure 29. China Disappears as Dairy Export Market

U.S. dry whole milk and cream exports



Sources: USDA, FAS: Global Agricultural Trade System

Sheep and Wool

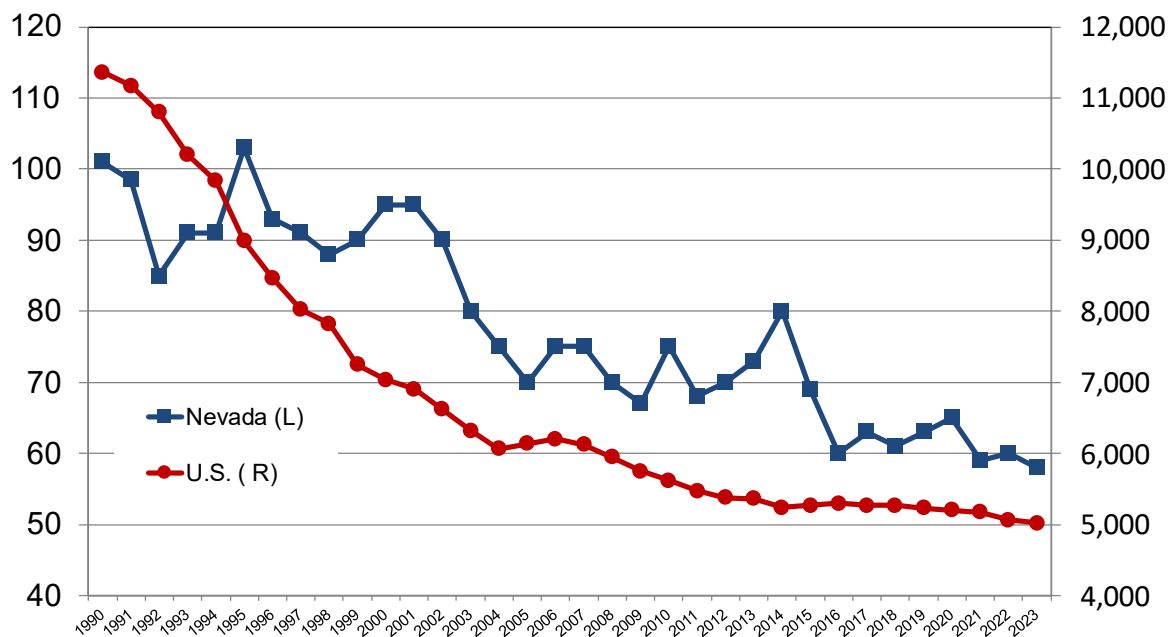
The sheep and wool industry historically were supported by several government programs, but most of those programs, such as the National Wool Act of 1954, were eliminated over time. As a result, severe adjustment took place in this industry. There were several programs since 2000 such as the Lamb Meat Adjustment Assistance Program, the Ewe Lamb Replacement and Retention Program, and reinstitution of federal support for wool and mohair under the Farm Security and Rural Investment Act of 2002. However, the lamb meat and ewe lamb programs were temporary. Much of the support has disappeared, leaving the marketing loan program for wool the primary support mechanism. There is a Livestock Risk Protection program from the RMA.

Under the 2014 farm bill the Sheep Production and Marketing Grant Program was introduced to strengthen and enhance the production and marketing of sheep and sheep products in the United States. That program has been retained under the current farm bill. It also authorized the Livestock Indemnity Program to assist with disasters that kill sheep and lambs and provides for cost-share of sheep killed by federally re-introduced or regulated predators including avian predators. Even with these programs, there is little support for the sheep and wool industry.

U.S. sheep producers have continually reduced the national flock size to reflect flagging demand to maintain prices and margins. In the period since 1990, national sheep inventories have fallen around 55%, and in Nevada they have been reduced more than 40% (Figure 30). The effects on sheep and wool markets stemming from COVID, and the deterioration of forage conditions in the Great Basin accompanying the most recent drought contributed to the estimated 7,000 head reduction in the Nevada flock from 2020 to 2023. Some of the reduction in the Nevada flock was a 20,000 head, or 25%, drop from 2014 to 2016 that was never reversed, partly related to declining forage availability with the previous drought. Despite improvement in range and pasture conditions with improved precipitation, it is not anticipated that there will be a recovery in sheep inventories.

Figure 30. Sheep Flock Long -Term Decline Continues

Sheep inventory, ths head



Source: USDA

The U.S. is not a dominant player in the global sheep and wool markets. As a result, developments in major sheep producing regions have a more pronounced impact on U.S. producers than for other commodities such as alfalfa, and U.S. producers have struggled to maintain competitiveness. Nevertheless, this also provides opportunities for windfalls for domestic producers as they can also benefit from adverse conditions, or demand increases elsewhere that force global wool and sheep meat prices higher. However, these windfalls are very short-term in nature.

The relatively small share Nevada sheep and wool producers contribute to national and global output leaves them subject to prices largely determined elsewhere. This position of price-takers has limited the competitiveness of American sheep and wool producers for the past six decades and contributed to the decline in the national and state flocks.

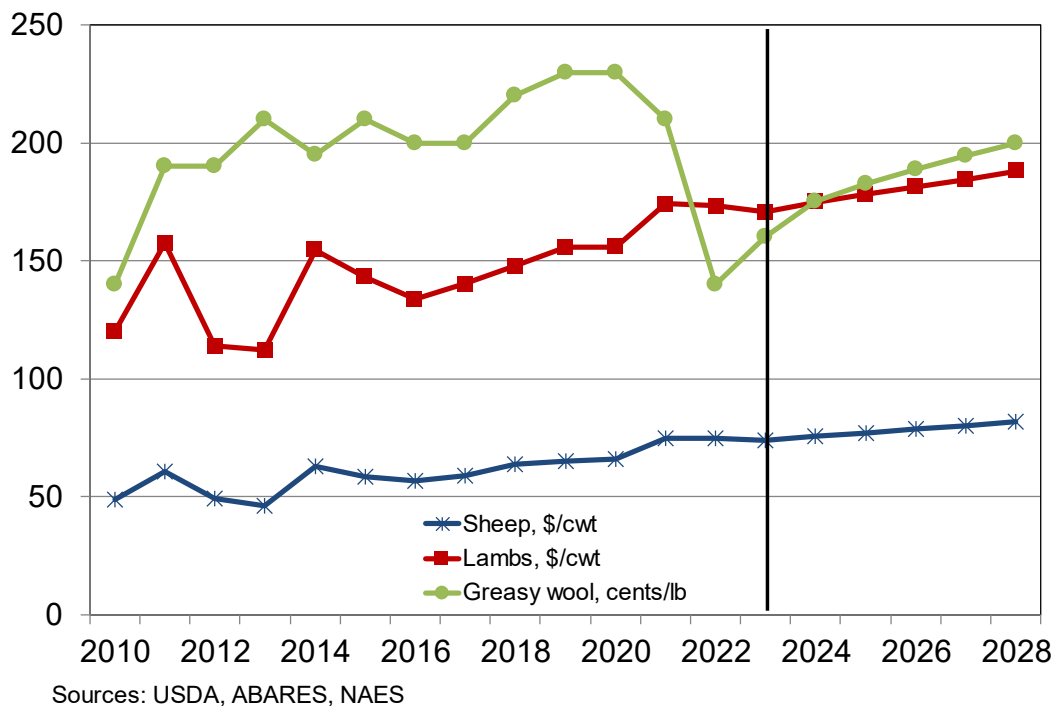
While lamb and mutton are losing ground to other meats in the developed world, consumers in developing nations are increasing consumption of these products as incomes push their propensity to consume upward and population growth adds to the demand base. As a result, global lamb and mutton trade is increasing, albeit slowly and inconsistently. However, the U.S. participation in global sheep meat markets is extremely small. As a result, U.S. lamb and sheep prices are largely determined in the domestic market.

Wool demand has generally declined over the past two decades, although it has stabilized in recent years, primarily as a result of rising demand in China, Africa, and the former Soviet Union. Upper-end products made from high quality wool have found niche markets, and supported prices for wool until 2022. In the past year, global market disruption during the pandemic induced steep price declines for wool. While those prices have made some recovery, they have not regained pre-pandemic levels, and remain well below the historic highs reached in 2019 and 2020. Wool prices have a high exposure to those determined on the Australian market, and domestic producers have little ability to influence those prices. Australian prices are sharply lower than a few years ago. The Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES) outlook does not indicate expectations of significant price recovery in the short term.

Even with the otherwise expected tepid growth in global markets that will offer some medium-term support to prices (Figure 31), the sheep and wool industry in the U.S. is expected to continue to decline in order to match supply of sheep meat to a weak demand base. However, the rate of sheep inventory decline is not expected to be as rapid as in the past three decades. In a change from wool driving industry profitability, much of the industry margins in the short to medium term are expected to come from the lamb side, which will be influenced by higher overall meat prices expected in the next few years.

Figure 31. Lower World Wool Prices Impact Nevada

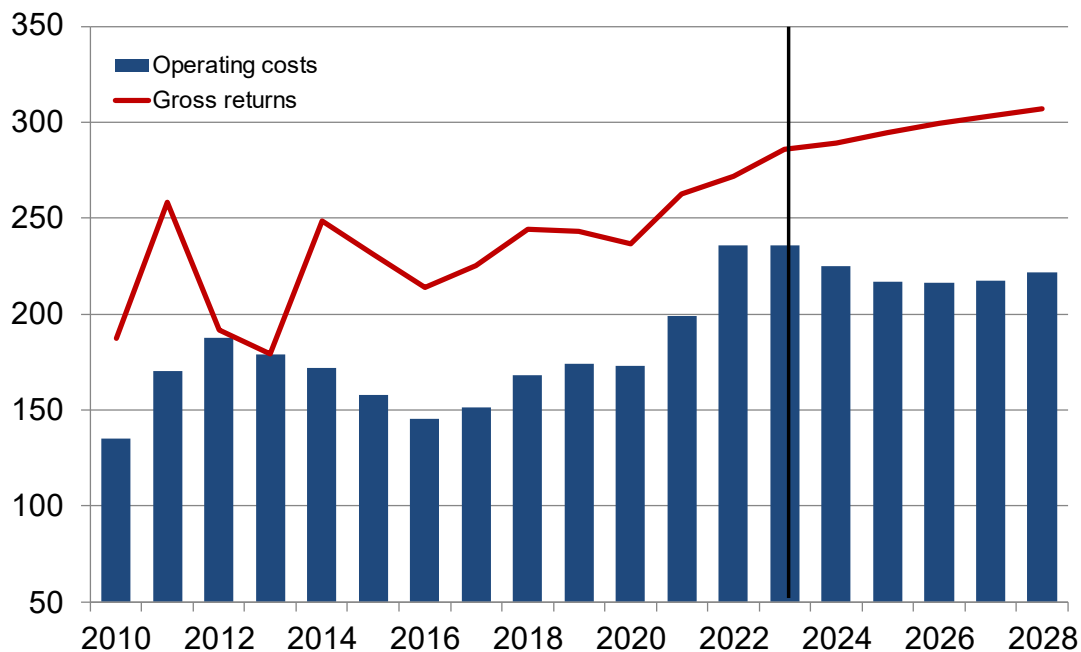
Nevada average prices



Overall costs are expected to decline from the high levels of the past two years, and upward pressure is not expected to persist throughout the baseline, primarily because feed costs are expected to fall then stabilize. Maintaining adequate returns will require sheep numbers to continue declining to rationalize supply and demand. However, with the expected continued downsizing of domestic flocks that will result in prices adequate to rationalize supply and demand, profitability per bred ewe is expected to be maintained (Figure 32).

Figure 32. But Lower Costs Support Profitability

Sheep and wool, \$/bred ewe



Sources: USDA, NAES

Because there is currently little slaughter of livestock, including sheep in Nevada, live animals must be marketed and shipped out of state. As a result, live sheep and lamb prices are somewhat lower in the state compared to national benchmark prices at San Angelo, Texas.

Shearing does take place within the state and Nevada prices hold a premium over national average prices. The presence of Merino sheep in Nevada enhances wool quality and results in higher prices locally.

Risks to the Outlook

The world we live in and our agricultural industry becomes more uncertain with each passing year. The primary risks to the outlook stem from assumptions about economic, technological, energy, geopolitical, policy, and weather factors that might be substantially different from actual developments in the future. This year, the extent of the geopolitical situation makes the future extremely unsure.

Outlook accuracy aside, the above factors present real risks for production, prices, and producers' bottom lines. For agriculture, weather is an ever-present risk. Damaging weather can take the form of several weeks, months, or even years of abnormal temperature or precipitation that can affect large areas. While global climate change is a topic that not everybody agrees on, it is undeniable that weather in the past few years is different than in the past. While the severe drought that gripped most of the west has been alleviated, it remains to be seen if adequate precipitation will remain for more than just a year or two, promoting production of water- and forage-dependent commodities in the Great Basin. Weather impacts can also come in sudden catastrophic events that tend to be more localized in nature. Since many crop safety-net programs tend to be price oriented, they generally do not come into play in such instances. However, more recent programs combine price and yield variances that address drastic declines in overall revenues. If the breadth of damage is wide enough, Congress can enact ad hoc disaster bills. With smaller emergencies, however, farmers and ranchers are often left with insurance as their only source of aid. Insurance programs have become more of a focus for policymakers and are the primary risk-mitigating tool under current farm law. Congress reduced other programs in the interest of budgetary savings and continue pushing U.S. agricultural policy toward more non-market distorting programs.

There are several factors, both domestic and foreign, that could either derail an economic expansion or accelerate it. The increasingly global economy offers substantial business and trade opportunities. It also means that political, economic, and financial troubles in a major economy can spill over into markets elsewhere. The uncertainty wars in Ukraine and Russia, and in Gaza are devastating for humanitarian concerns, but also destabilizing factors for the global economy. Issues surrounding trade with China present risks to the agricultural economy as well as the overall economy, but recently there have been attempts by the administration to alleviate some of the tensions with that country. But while such developments could dampen global growth, they are not expected to derail it. Nevertheless, high deficits and debt will force resources to be devoted to service these shortfalls in years ahead instead of being used to fuel growth.

Interest rates remain high and although the Fed has indicated that it will ease them in coming quarters, no such moves have been made as inflation, though lower than in the past few years, remains a tangible risk. High interest rates boost costs for producers. In many markets, housing demand is softening as high interest rates are leading to less affordability for many. A surer economy with lower borrowing costs will be necessary to reverse this emerging trend.

The volatility in energy markets and prices has intensified this year. There are several sources of this volatility that are particularly troublesome and both are very difficult to predict. The first is the perpetually unstable geopolitical situation in major petroleum producing regions, particularly Russia and the Middle East. The continued unrest boosts risk to global energy markets and petroleum prices. Cartels, wars, terrorism, and economic sanctions and their consequences impact the supply and price of oil. There is also the fallout on energy markets of shutting down important pipelines, and international interference in the ability of others to operate. The speculative trade in petroleum contracts often causes wild swings in prices and can exacerbate volatility.

As always, there is uncertainty surrounding the crude oil price, including the increases projected. As prices rise with economic expansion, substantial exploration and expansion of production capacity will occur. This presents a downward risk for crude oil prices in the medium to long term.

Past exploration has resulted in new production capacity that will not be absorbed overnight - crude oil inventories should generally be more than adequate in the next five years - and prices are expected to be moderate in inflation-adjusted terms. As such, recent exploration activity has dropped dramatically. While oil prices will rise with growth in the global economy, there is the potential for the market to balance at substantially different prices than in this projection, particularly in the outer years as continually increasing oil production will be necessary to meet global demand.

Farmers and ranchers will have to navigate this minefield of risks. However, the generally mediocre financial situation for agriculture in the U.S. at present magnifies that risk in the short term. As always, producers' long-term survivability will depend on making sound decisions based on the price and cost environment they are facing. This outlook lays out one estimate of what that environment will look like and provides information to weigh in the decision-making process.

Appendix Tables

Table 1. Economic Assumptions

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Real GDP growth, %										
U.S.	2.3	-2.8	5.9	2.1	1.8	1.2	1.5	1.7	1.8	1.8
World	2.6	-3.1	6.1	3.1	2.4	2.4	2.8	2.9	2.8	2.8
Inflation rate, %										
GDP deflator	1.8	1.3	4.5	7.0	3.6	2.3	2.1	2.2	2.2	2.2
Consumer prices	1.8	1.2	4.7	8.0	3.9	2.2	2.0	2.2	2.2	2.1
Producer prices	-1.0	-2.7	17.0	16.2	-4.5	-2.1	0.5	2.0	2.2	1.6
Interest rates, %										
Fed funds rate	2.16	0.38	0.08	1.68	5.07	5.07	3.47	2.65	2.63	2.63
Prime rate	5.28	3.54	3.25	4.85	8.21	8.19	6.59	5.77	5.75	5.75
30-yr mortgage	4.08	3.18	3.03	5.38	6.58	6.04	5.36	5.07	4.99	4.93
WTI crude oil price										
\$/barrel	56.98	39.25	67.99	94.78	75.33	73.33	78.94	82.19	85.40	87.11
% change	-12.2	-31.1	73.2	39.4	-20.5	-2.7	7.6	4.1	3.9	2.0
Population, % change										
U.S.	0.6	0.4	0.2	0.4	0.5	0.5	0.5	0.5	0.5	0.5
World	1.1	1.0	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.8

Sources: S&P Global

Table 2. 2021 Gross Domestic Product, million dollars

	Total	Agriculture	% Agriculture
United States	23,594,031.0	225,670.0	0.96
Nevada	194,486.6	368.9	0.19
Nye	2,208.8	80.2	3.63
Churchill	1,426.6	63.5	4.45
Elko	3,216.2	57.6	1.79
Washoe	32,864.4	32.7	0.10
Pershing	464.4	28.8	6.20
White Pine	880.6	26.9	3.06
Lander	1,094.8	23.9	2.18
Lincoln	194.5	20.4	10.50
Clark	136,198.7	8.3	0.01
Lyon	2,140.0	7.3	0.34
Eureka	1,811.0	5.8	0.32
Humboldt	1,690.4	5.5	0.32
Mineral	261.6	5.2	1.99
Douglas	3,152.6	1.4	0.04
Storey	2,607.5	1.2	0.05
Carson City	4,225.6	0.1	0.00
Esmeralda	49.0	0.1	0.21

Source: Bureau of Economic Analysis

Table 3. Production Cost Indices, 2020=100

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Producer price index	103	100	117	136	130	127	128	130	133	135
% change	-1.0	-2.7	17.0	16.2	-4.5	-2.1	0.5	2.0	2.2	1.6
Seed	100	100	104	115	127	107	114	130	151	159
% change	-2.3	0.2	4.0	10.2	11.2	-16.0	6.8	13.8	16.2	5.4
Fertilizer	106	100	134	194	177	127	116	110	130	119
% change	2.4	-5.4	33.9	44.6	-8.7	-28.2	-8.3	-5.0	17.3	-8.0
Agricultural chemicals	103	100	108	150	161	160	142	150	137	144
% change	-4.3	-2.6	7.7	39.2	7.4	-0.3	-11.3	5.1	-8.5	5.1
Feed	98	100	115	134	131	117	112	110	109	107
% change	3.0	2.1	14.6	16.6	-2.0	-10.6	-4.2	-1.9	-1.3	-1.0
Farm machinery	99	100	117	137	127	111	110	121	139	142
% change	-1.4	1.2	16.7	17.7	-7.5	-12.9	-0.8	10.2	14.9	2.2
Trucks & Autos	100	100	102	105	107	106	106	107	108	109
% change	0.7	-0.2	2.4	2.8	1.4	-0.5	0.1	0.5	0.7	1.0
Fuels	118	100	133	191	158	103	120	114	157	178
% change	-4.8	-15.0	33.2	43.1	-17.0	-34.8	16.8	-5.2	37.9	13.1
Wages	96	100	106	114	118	123	128	132	136	141
% change	5.5	3.8	5.7	7.4	4.0	4.5	3.4	3.4	3.3	3.3
Farm services	100	100	104	114	123	124	122	127	125	128
% change	1.9	-0.2	3.6	9.9	7.9	1.3	-1.9	3.8	-1.3	2.3
Farm repairs	98	100	106	118	114	122	120	126	127	134
% change	2.4	1.6	6.4	11.3	-4.0	7.6	-2.3	5.4	1.2	4.8
Farm supplies	98	100	109	120	121	122	124	126	129	132
% change	3.5	1.6	8.6	10.7	0.5	0.8	1.7	2.1	2.2	2.2

Sources: USDA, BLS, S&P Global

Table 4. Nevada Agricultural Commodity Prices

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Livestock & product prices										
Feeder steers, \$/cwt	156.82	148.63	161.01	185.99	245.41	279.36	285.10	277.23	263.46	248.66
2020 dollars	152.53	148.63	137.67	136.87	189.11	219.87	223.33	212.83	197.88	183.78
Milk, \$/cwt										
N. Nevada Class I	18.28	25.21	18.28	25.21	21.52	20.63	20.44	20.11	19.93	19.92
2020 dollars	17.78	25.21	15.63	18.55	16.58	16.24	16.01	15.44	14.97	14.73
N. Nevada Class IIIa	16.30	13.49	14.38	24.64	19.32	18.41	18.11	17.75	17.59	17.57
2020 dollars	15.85	13.49	12.30	18.14	14.89	14.49	14.19	13.62	13.21	12.99
Hay, \$/ton										
Alfalfa	175	183	229	313	271	249	232	225	224	227
2020 dollars	170	183	196	230	209	196	182	173	168	167
Other hay	171	183	216	293	240	220	209	205	205	208
2020 dollars	166	183	185	216	185	173	164	157	154	154
Grains, \$/bushel										
Wheat	4.58	5.06	7.70	8.93	7.65	6.37	5.94	5.82	5.82	5.86
2020 dollars	4.46	5.06	6.58	6.57	5.90	5.01	4.65	4.46	4.37	4.33
Barley	4.86	4.92	5.47	7.53	6.88	6.11	5.60	5.36	5.34	5.38
2020 dollars	4.72	4.92	4.68	5.54	5.30	4.81	4.38	4.11	4.01	3.98

Sources: USDA, FAPRI-MU

Table 5. Nevada Estimated Returns

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Livestock and products										
Cow-calf, \$/bred cow										
Gross revenue	669.96	671.96	720.53	832.63	1093.06	1241.83	1266.99	1232.48	1172.15	1107.30
Variable costs	593.72	586.87	657.58	780.81	1084.10	990.76	984.07	975.42	978.38	987.40
Net returns	76.24	85.09	62.95	51.82	8.95	251.07	282.92	257.06	193.76	119.90
2020 dollars	74.15	85.09	53.82	38.14	6.90	197.60	221.62	197.34	145.53	88.62
Milk, \$/cwt										
Gross revenue	21.03	20.65	20.05	27.34	22.32	22.58	23.17	22.89	22.62	22.48
Variable costs	15.98	15.38	16.88	20.67	21.32	18.70	17.38	17.24	17.29	17.67
Net returns	5.05	5.27	3.17	6.67	1.00	3.87	5.78	5.66	5.33	4.81
2020 dollars	4.91	5.27	2.71	4.91	0.77	3.05	4.53	4.34	4.00	3.56
Crops, \$/acre										
Alfalfa hay										
Gross revenue	857.50	805.20	1167.90	1377.20	1302.92	1171.86	1089.65	1056.48	1053.10	1065.05
Variable costs	696.03	677.51	784.16	976.70	944.25	827.65	812.51	855.45	950.15	984.62
Net returns	161.47	127.69	383.74	400.50	358.67	344.20	277.14	201.02	102.95	80.43
2020 dollars	157.05	127.69	328.11	294.73	276.38	270.90	217.09	154.32	77.32	59.45
Wheat										
Gross revenue	559.65	566.42	806.46	875.12	701.98	547.03	477.28	437.44	409.69	386.20
Variable costs	144.05	140.81	164.34	209.78	204.03	170.81	163.24	166.90	182.27	180.33
Net returns	415.59	425.61	642.12	665.34	497.95	376.23	314.04	270.54	227.42	205.87
2020 dollars	404.21	425.61	549.02	489.62	383.71	296.10	246.00	207.69	170.81	152.16
Barley										
Gross revenue	592.60	549.45	572.06	737.29	630.42	524.07	449.34	402.78	375.61	354.16
Variable costs	146.55	144.00	165.52	206.12	200.71	171.88	165.37	169.58	183.80	182.65
Net returns	446.06	405.45	406.54	531.17	429.72	352.19	283.96	233.20	191.81	171.50
2020 dollars	433.84	405.45	347.59	390.89	331.13	277.18	222.44	179.02	144.06	126.76

Sources: USDA, NAES