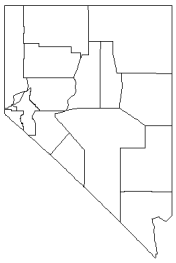
**TECHNICAL REPORT**
**UCED 2016/17-14**

# 2017 Nevada Agricultural Outlook



**UNIVERSITY OF NEVADA, RENO**

# 2017 Nevada Agricultural Outlook

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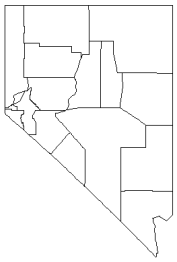

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## Table of Contents

## Introduction

The general global agricultural outlook is for stable grain and oilseed prices which will limit inter-year volatility in the coming ten years. Though major grain and oilseed prices are projected to exhibit only modest upward movement over the outlook period, they will remain between world market levels prior to 2006 and the high prices of 2010-2013. Livestock prices, especially for cattle have peaked and are now on the downward arc of the cycle. These developments in agricultural markets are influenced by a number of major factors, both short term and long term. Among them are the economy, weather, agricultural policy, and technology. Assumptions regarding these factors are keys to the shape of this outlook. The stable characteristics of this outlook stem, among other things, from assumptions of global economic growth near the long-term potential, normal weather in producing regions, and a moderately upward petroleum price path. Of course, we recognize that there will be developments that will move us from these assumptions at some time in the next decade, we do not know when or where. This outlook therefore serves as a baseline against which we can compare unforeseen developments.

A factor impacting major crop markets in the next several years is the more-than-adequate supply of grains and oilseeds that have developed in the past three years. If the normal temperature and precipitation patterns assumed in this analysis are realized continuing healthy crop supplies will exist, even at relatively low, stable prices projected. Lower prices have alleviated high feed costs for livestock markets and food processors. 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."

Contrary to expectations of the past several years, global economic growth remains below the long-term potential in 2017, as several large nations continue to suffer from economic issues. Particularly China and Russia are having significant impacts on overall emerging economy growth, and that of the world, as a whole. The global and individual country economies are finally expected to reach potential growth next year, buoying demand. The growth in demand will limit further downward movement of prices, and allow agricultural producers the returns necessary to keep pace with global consumption. Most of the increase in production will come from yield increases, as returns are not expected to be adequate to induce substantial expansion of crop area in most regions. 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. Nevertheless, the rate of economic growth, both globally and regionally projected this year is marginally lower than in previous years. This implies a view of long-term global economic expansion being somewhat less robust than previously expected. This slightly reduced rate of growth will have a modest impact on agricultural markets.

The U.S. dollar is at the end of a period of strengthening relative to many other currencies that has occurred since 2012. On average, the dollar is expected to lose some of the gains of the past few years, but performance against specific currencies will be mixed. Although

strengthening is expected to continue against a basket of developing nation currencies, weakening is expected relative to those of developed countries. However, when adjusted for relative rates of inflation, the purchasing power of nearly all nations is expected to rise.

Agriculture in Nevada faces a weak price outlook. Feeder steer operations are the largest of the agricultural industries in Nevada and feeder steer prices are expected to drop substantially in 2017, although not as severely as in 2016. Nevada ranchers will face declining prices through 2019 before another cyclical strengthening takes place in the last half of the projection period. Dairy production is also a major industry. Milk prices are expected to rise from 2016 lows this year and edge upward over the next ten years. However, the price increases will be limited and profitability will be constrained at a time dairy producers in the northern part of the state are trying to expand their herds to meet the needs of the whole milk powder processing plant. Hay prices are also down as the effect of the drought on hay supplies in Nevada and surrounding states has lessened.

A feature of this outlook is Nevada producers will face a generally constrained financial situation in the first five years. With expectations of slowly rising costs offsetting some of the slight upward movement in prices received by producers, profitability will return, but not likely reach record levels. Nevertheless, the outlook is for positive net returns across a wide array of agricultural operations.

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, geo-political developments, and technology all have the potential to impact agriculture and positively or negatively alter the outlook.

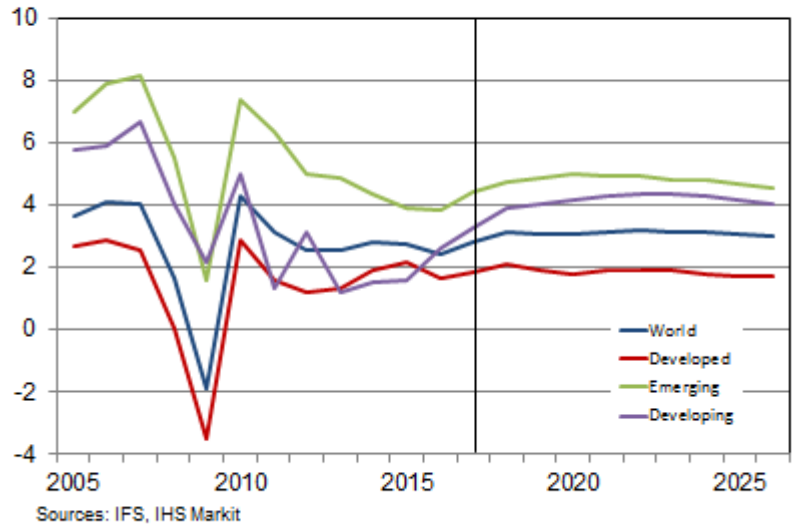
Weather can disrupt both crop and livestock production. Normal weather is assumed here because the frequency, location, and severity of weather events are unknown. Shocks to feed supplies in a number of locations around the world will also impact U.S. and Nevada crop and livestock prices and therefore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

**The Economy**

The global economy is expected to accelerate in 2017 but not all regions will see growth pick up from the sub-par pace of the past few years. Growth is not expected to reach the long-term potential in most regions until after 2017 (Figure 1). Emerging and developing economies will see the fastest rates of growth in the recovery period and beyond.

**Figure 1. Still Coming Up Short of Potential Growth**

*Real GDP, % change*




Sources: IFS, IHS Markit

That potential has proven to be elusive, as expectations of reaching such rates have been dashed by a series of economic and geo-political disruptions in recent years. Appendix Table 1 presents an overview of economic assumptions utilized in the outlook.

The U.S. and Canadian economies are expected expand near long-term potential rates in 2017. Much of Western Europe will also see improved economic performance, although the UK is expected to see growth slow as it moves through the Brexit process. Japan's expansion will again be modest, similar to the performance of last year.

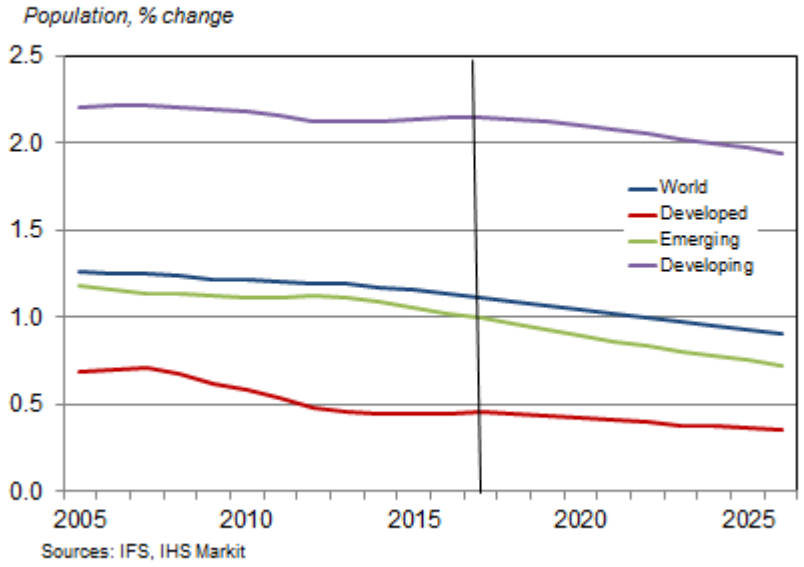
China is expected to slow again in 2017, whereas India will accelerate. Furthermore, both China's and India's economies are beginning to show signs of maturing, including the typical gradual evolution towards slower-growing service industries. Both these countries are expected to experience slowing growth over the next decade.

Oil exporters are seeing their economies begin to recover from the precipitous drop in petroleum prices in 2015 and early 2016. However, the pace of petroleum price increases is expected to be gradual, and it will take several years for the economies of those nations to fully recover. Russia and other former Soviet energy-dependent economies will see accelerating rates of growth over the next few years. Middle Eastern and North African oil exporters will

experience improved growth, but some countries in that region will still see economic contraction due to war in that politically unstable region.

The slowing in population growth rates will persist in all global regions in the long term (Figure 2). Annual global population expansion will fall below 1% within the next 10 years, although individual nations' growth rates will vary considerably.

**Figure 2. Population Growth Slowing in All Regions**




Middle East unrest has pushed many refugees from their homelands and a large proportion of those people are heading for developed countries, especially in Europe and North America. There are political issues surrounding the settlement of refugees which will impact regional population shifts in the medium term.

Developing and emerging economies are projected to exhibit significant slowing in population growth. Even with economic and geo-political issues, developing nations overall will still have the highest growth rates. Developed nations will continue to experience population growth declines, although at a very gradual pace.

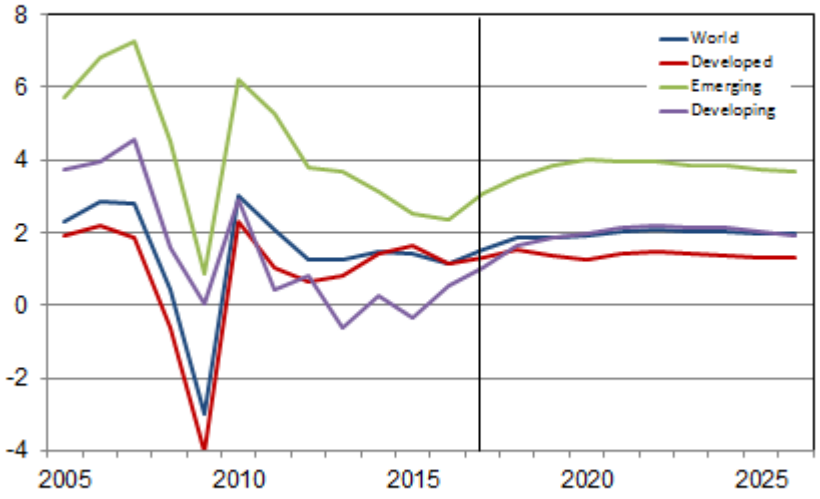
Emerging nations will experience slower than average population growth. With high income growth, this group will enjoy robust per capita income increases (Figure 3), increasing purchasing power, especially as the economies of energy-dependent nations re-accelerate.

Despite high total GDP growth in developing countries, rapid increases in population dilute per capita income expansion 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.

Some of the poorest nations have incomes below the developing nation average of $2,100, and those populations often live on subsistence agriculture, without much ability to purchase additional food.

**Figure 3. Per Capita Developing Growth Only Average**

*Real per capita GDP, % change*

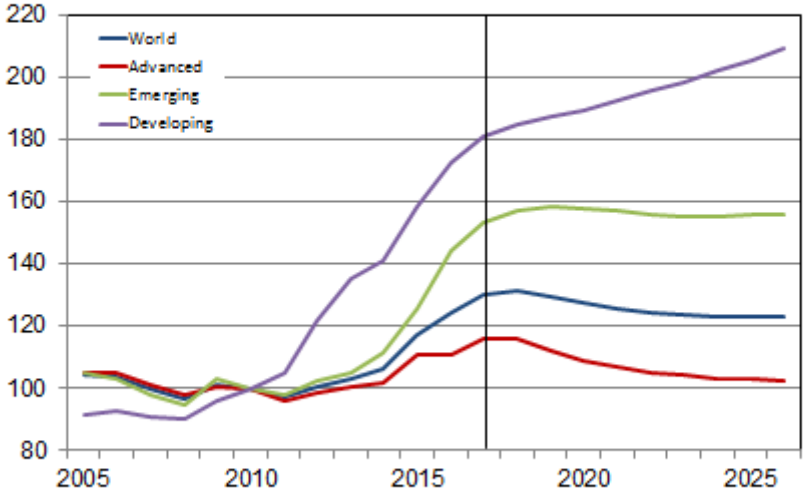



Sources: IFS, IHS Markit

The U.S. dollar strengthened relative to a global basket of currencies last year and is expected to continue to appreciate in 2017 then settle somewhat in the following year before weakening slightly thereafter (Figure 4). The broad strengthening of the dollar this year will reduce competitiveness of U.S. goods in the short term. Despite low prices of grains, oilseeds, and livestock products on domestic markets this year, the stronger dollar could give modest support to prices in international markets.

**Figure 4. Dollar to Rise Against Developing Currencies**

*Exchange rate index, 2010=100*




Sources: IFS, IHS Markit

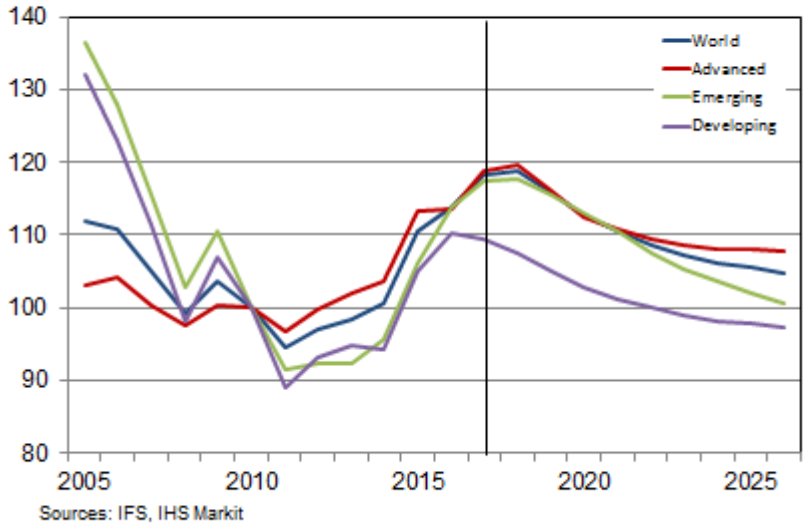
The pace of dollar appreciation slowed substantially in 2016, and this year's strengthening is expected to be similar to last year's pace, although the mix of currencies that depreciate against it will change somewhat. The Japanese yen regained some lost ground against the dollar in 2016, and the Euro stabilized. The Russian ruble continued to slide, but at a slower pace than in 2015. Whereas the EU and Japan are expected to weaken substantially in 2017, the strengthening Russian economy will help underpin its currency, which is expected to strengthen this year.

Overall, developing country currencies will weaken the most relative to the dollar. Depreciation of local currencies is expected to occur widely in Africa and Latin America. The Chinese yuan will weaken relative to the dollar from 2017 through 2019, as that country's financial system regains firmer footing. At that point it will appreciate through the rest of the projection period. This is a relatively weak view of the yuan in the short to medium term and could impact trade with the U.S.

While depreciation of currencies, especially steep and rapid weakening, causes reduced ability to purchase goods in the short and medium term, often longer-term effects are mitigated by adjustment in the relative price levels of the importing vis-à-vis the exporting country. As such, longer-term real purchasing power of our trading partners is expected to eventually increase (Figure 5).

**Figure 5. Long-Term Purchasing Power Will Increase**

*Real exchange rate index, 2010=100*




Sources: IFS, IHS Markit

The Euro is currently facing challenges that are resulting in weakening against the dollar. As the Eurozone countries are projected to get their fiscal situations back on track, and deal successfully with Brexit, the Euro will appreciate against the dollar in real terms.

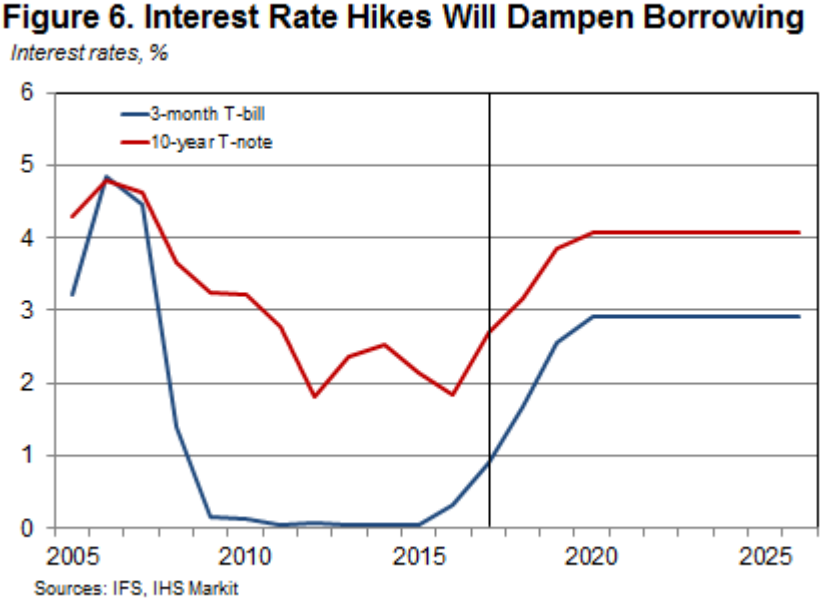
In inflation-adjusted terms, the Mexican peso is expected to regain some ground over the medium term before depreciating for the last half of the outlook.

Emerging countries real exchange rates are expected to appreciate in the next few years, led by the stabilization and eventual strengthening of the Chinese yuan. Developed and developing nation currencies are expected to strengthen in the medium term before stabilizing toward the end of the projection period.

The overall long-term picture is for one of increasing purchasing power relative to the dollar. As such, U.S. goods should increase competitiveness on world markets.

The Fed remains watchful for signs of inflation and has already reacted to a more robust U.S. economy with two hikes in interest rates. A less accommodative stance is expected to be continued and rates are expected to rise periodically over the next several years (Figure 6). The Fed will be engaged in a balancing act between keeping inflation in check and maintaining favorable lending standards to support the mortgage market and for consumers and businesses to borrow.

**Figure 6. Interest Rate Hikes Will Dampen Borrowing**



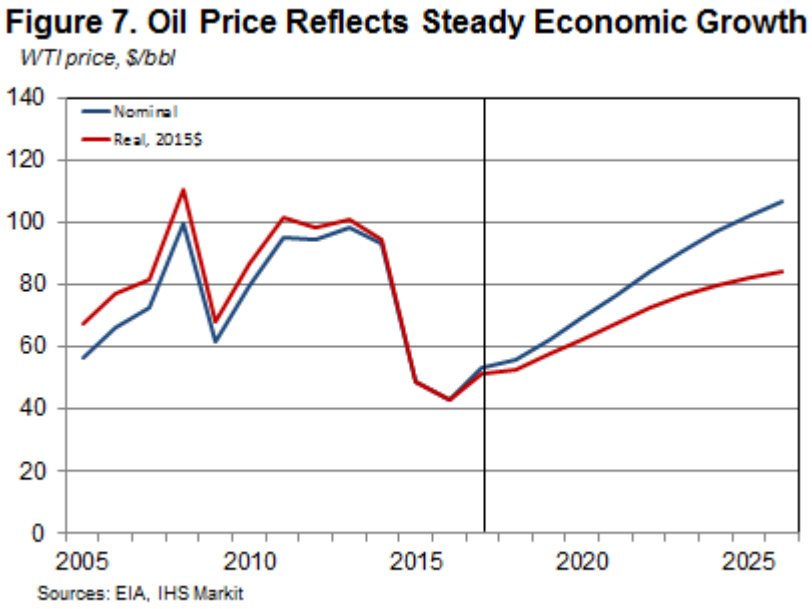

Low interest rates have been beneficial for agricultural producers that demonstrated credit worthiness. Low short-term interest rates for annual operating expenses reduced costs of borrowing. Longer-term interest rates have also been low, benefitting producers with capital and equipment needs. As interest rates are bumped higher in the next few years, operating expenses will increase and longer-term lending rates will be less encouraging for expansion or establishment of new enterprises.

The outlook for crude oil prices is for an increase this year as the global economy picks up the pace of growth, with an average between $50 and $55 per barrel (Figure 7.). Steady, yet moderate price increases are projected thereafter, but not topping $100 per barrel until 2025.

Oil price outlooks always have substantial risk around them, and this year the uncertainty is still present. Factors including the still tepid growth of the global economy, whether OPEC members will adhere to the recent production reduction agreement, the war against ISIS in Syria and Iraq with consequences for Iraqi production and deliveries, excess production capacity resulting from recent exploration and development, and sizeable reserves existing in various production region around the world all suggest that volatility will remain a fact of life in

petroleum markets. The recent OPEC agreement amounts to about four percent of that organization's daily production.

**Figure 7. Oil Price Reflects Steady Economic Growth**



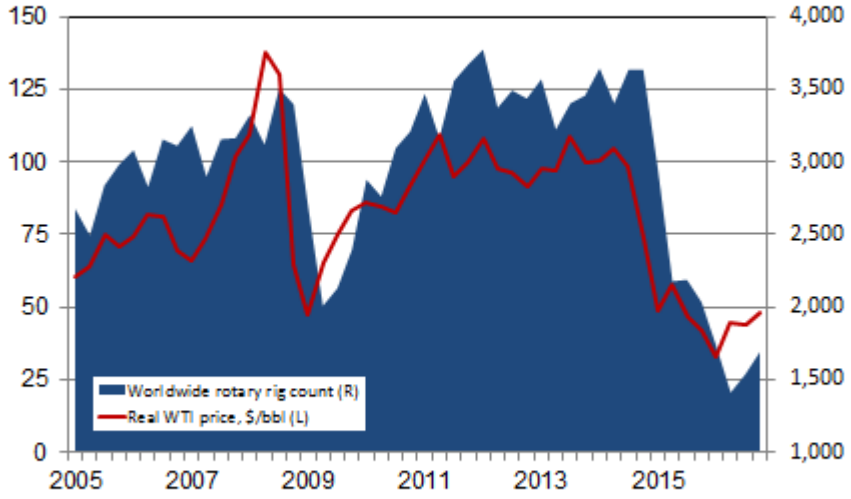

In the past several years, extended periods of high prices induced substantial exploration and expansion of production capacity that is beyond current demand. As a result, some of this capacity was idled as prices plummeted in 2015. However, prices are slowly strengthening again and this capacity could come back on line in a relatively short time. This will dampen any increases in crude oil prices in the short to medium term.

In addition, recent price increases have resulted in a small uptick in exploration activity (Figure 8). Global active rotary rig counts have been slowly increasing since the middle of 2016. As developed production capacity becomes utilized over time, exploration and development activity will increase. Without additional geo-political shocks, the petroleum price increases should be able to induce drilling at a pace to prevent steep price spikes.

Although petroleum product prices have been edging up with creeping oil prices, distillate prices remain relatively low compared to the period prior to 2015. Nevertheless crude oil price increases are expected to be moderate, and fuel prices will not be a burden to consumers while the economies of oil importing nations will experience increased growth in the next few years.

Agriculture will benefit from moderate fuel prices in terms of keeping a lid on production and transportation costs. Low fuel costs not only make it less expensive to operate machinery, but will also contain costs for purchased inputs.

**Figure 8. Exploration Responds to Prices**

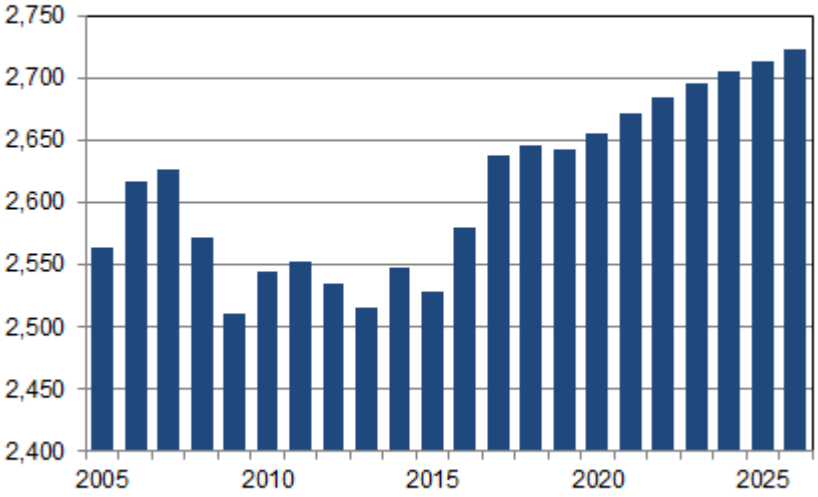



Sources: EIA, Baker-Hughes

The disappearance of jobs and income during the past recession had a direct effect on food consumption. During the economic boom of the mid-2000s, real per capita expenditures for food increased in step with real income. With the crash in late 2007, food expenditures exhibited a marked decline (Figure 9).

**Figure 9. Food Spending Exceeds Pre-Recession Levels**

*Real per capita food expenditures off premesis, $2010*




Sources: BEA, IHS Markit

After 2009 there has been an increase in per capita food expenditures, but this also coincided with an increase in the real price of food. As such, consumers paid more for the same basket of

food even in inflation-adjusted terms than prior to the recession. More recently, crop prices are lower, and prices for meats and livestock products are also retreating, allowing consumers to purchase increasing quantities of higher-quality, higher-priced foods, as well as more convenience products. The long-term expectation is that food spending will increase primarily with modest food price inflation. Even with low relatively contained prices, food expenditures are expected to surpass pre-recession peaks this year.

**Agricultural Policies**

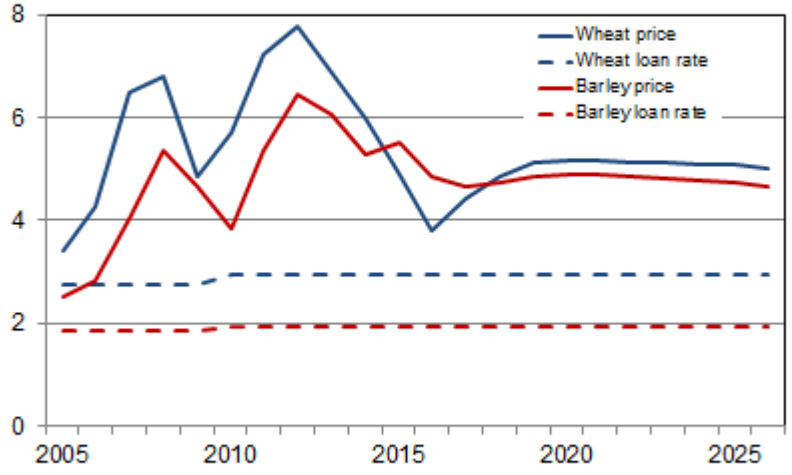
The baseline incorporates provisions of the Agricultural Act of 2014. For crop producers, this includes the elimination of direct and countercyclical (DCP) payments and the average crop revenue election (ACRE) program. It includes price loss coverage (PLC) and agriculture risk coverage (ARC), as well as crop insurance policies. Policy assumptions are presented in Appendix Table 2.

The focus of grain and oilseed producer risk mitigation in the U.S. has shifted to insurance programs. Agriculture Risk Coverage (ARC) provides payments to participating producers when revenues fall below a trigger tied to past market prices and county yields. The Price Loss Coverage (PLC) is another option for grain and oilseed producers. For both ARC and PLC, payments are made on 85% of the base acres for a particular crop.

The provisions of the Marketing Loan Program that were under the 2008 farm bill were continued. Crop loan rates are assumed to be maintained at current levels. Prices are expected to be well above those policy rates, therefore they will not be effective in these projections and will not trigger marketing loan payments (Figure 10).

**Figure 10. Marketing Loans Will Not Be Triggered**

*$/bushel*

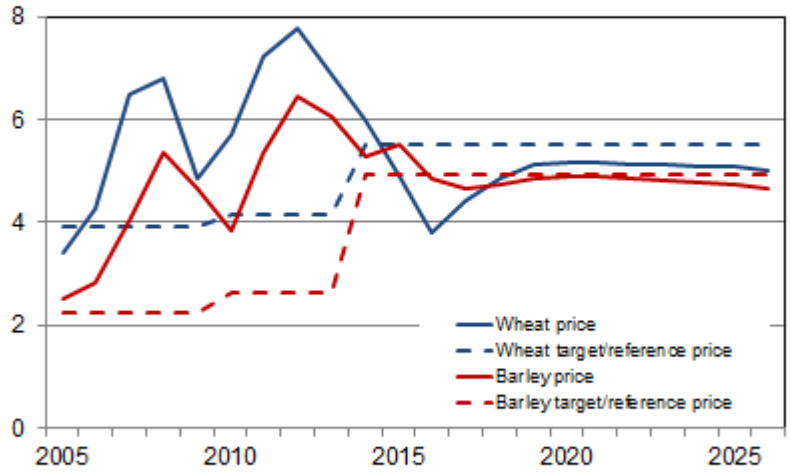



Sources: USDA, FAPRI-MU

Producers participating in the PLC program receive a payment when national season-average farm prices fall below fixed reference prices. The reference prices are higher than the target prices that were used in calculating countercyclical payments under the previous farm bill. Because wheat and barley prices are expected to be below reference prices, PLC payments will occur (Figure 11).

**Figure 11. PLC Payments Will Occur Every Year**

*Prices, $/bushel*



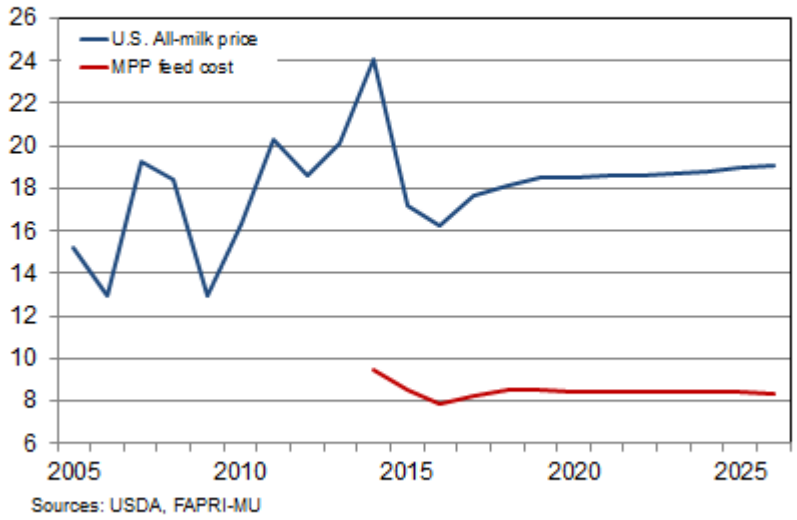

Sources: USDA, FAPRI-MU

ARC is another option for grain and oilseed producers. Payments occur when county or farm-level revenues per acre fall below 86 percent of a benchmark. The benchmark depends on moving five-year Olympic averages of national prices and county or farm yields. The new PLC and ARC programs cost little when crop prices and revenues are high, but could make large payments when prices or revenues are low.

The Dairy Margin Protection Program (MPP) replaced the Milk Income Loss Contract Program (MILC) that existed under the previous law. The MPP establishes a margin floor and reduces the volatility in margins. 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 fall with lower feed costs projected in this baseline (Figure 12).

The basic margin protection level is $4 per hundredweight at no cost to the producer (other than an annual $100 administrative fee) for the entirety of the producer's historical base production. However, higher margins (up to $8 per hundredweight) can be obtained for a premium to be paid by the dairy farmer.

**Figure 12. MPP Pays Little**




For coverage above the basic $4 per hundredweight margin, the premiums are significantly higher for annual base production above four million pounds. This feature makes the legislation geared more toward small dairy producers rather than large operations such as those found in the west. While milk prices are expected to be high enough and feed component prices low enough not to trigger payments at the $4 margin, it is conceivable that some payments will be made at higher levels of margin coverage in the baseline.

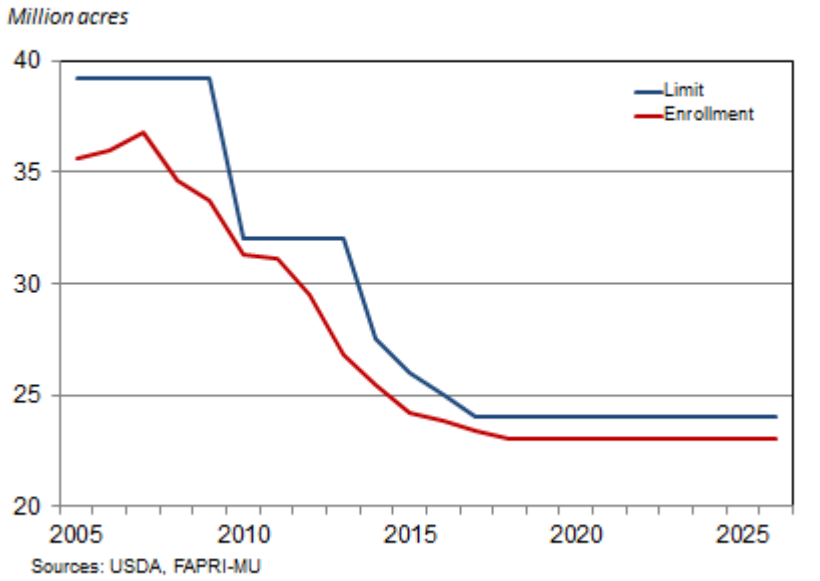
The MPP was conceived and implemented in an environment when feed costs were extremely high. If that environment persisted, the program would pay substantially more to dairy producers. However, with expected low feed costs over the next ten years, the program will be largely ineffective, especially at 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, especially as the basic $4 margin is covered for the nominal $100 administrative fee. From either perspective, this program has flaws that will likely result in it being one of the areas that will be changed in 2018 with the next farm bill.

Sheep and wool producers historically relied on a variety of government programs. As some of those programs, such as the long-standing National Wool Act of 1954 were eliminated, 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.

In the 2014 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. The current legislation also authorizes 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.

Under the 2008 farm bill the size of the conservation reserve was limited to no more than 32 million acres beginning in the 2010/11 crop year. In 2014, the maximum level of the conservation reserve fell from 32 million acres in 2013/14 to 24 million acres in 2017/18. Not only does this result in budgetary savings, it will have an effect on acreage that could come into production (Figure 13). Where this area expansion occurs will have an impact on land available for traditional or cellulosic crops, and for pasture land.

**Figure 13. Declining CRP Limit Makes More Land Available**




Since the peak in Conservation Reserve Program acreage in 2007, more than 11 million acres have come out of the program as expiring contracts have added acres back into the land inventory, although not all of this acreage is suitable for crop production. It is precisely this potential for CRP land to re-enter the production system that makes the lower maximum CRP acreage limit under the new farm bill so important. Additionally, production increases with rising yields as improved varieties and management practices are utilized. During the run-up in ethanol production, much of the corn supply increase was a result of rising yields, as available crop land is limited.

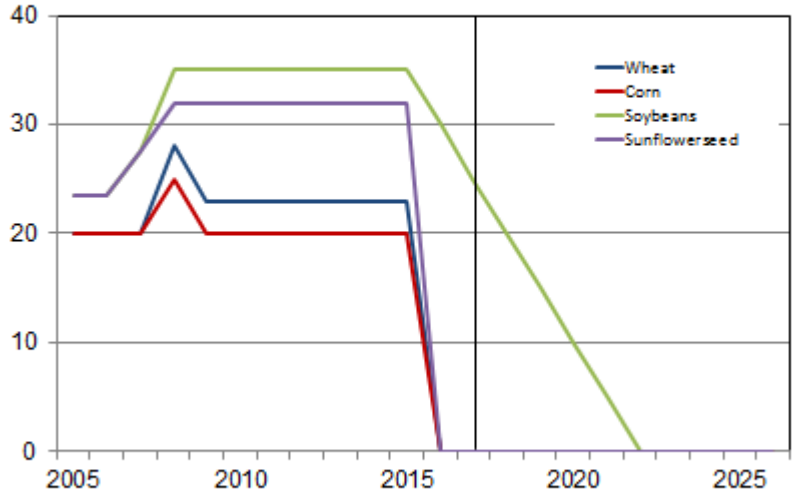
A newly instituted policy that will have some impact on Argentine crop production and trade, therefore impacting U.S. and other exporter trade is the Argentine export tax policy change. Export taxes for grains and most oilseeds and products were eliminated in December

2015 (Figure 14). Soybean and product export taxes, however, will be ratcheted down over the next several years, eventually going to zero in 2022. Because of the importance of soybeans, meal, and oil exports in generating governmental revenues, those taxes will not be eliminated immediately, but the gradual elimination allows other revenue programs to grow to replace those earnings. The elimination of export taxes results in higher producer prices and will result in some increase in area and production of grains and oilseeds.

An important recent policy change is the Argentine export tax revisions. Export taxes were eliminated for cereals and sunflowerseeds and products in December 2015. Export taxes for soybeans and products will be ratcheted down until being fully eliminated in 2022. The elimination of export taxes on agricultural commodities will result in higher prices for Argentine farmers.

**Figure 14. Argentine Export Tax Policy Benefits Farmers**

*Argentina export taxes, %*




Projected growth in ethanol production over the next several years is limited as the mandate for corn-based ethanol has largely been met. These projections assume U.S. growth to 10 percent of motor fuel use. Ethanol production grows slowly as RFS requirements for cellulosic and other non-corn ethanol increase. Cellulosic and non-corn ethanol production levels contribute relatively minor quantities to the total. Declining motor fuel use in later years implies a slight decline in volume requirements.

**The Outlook**

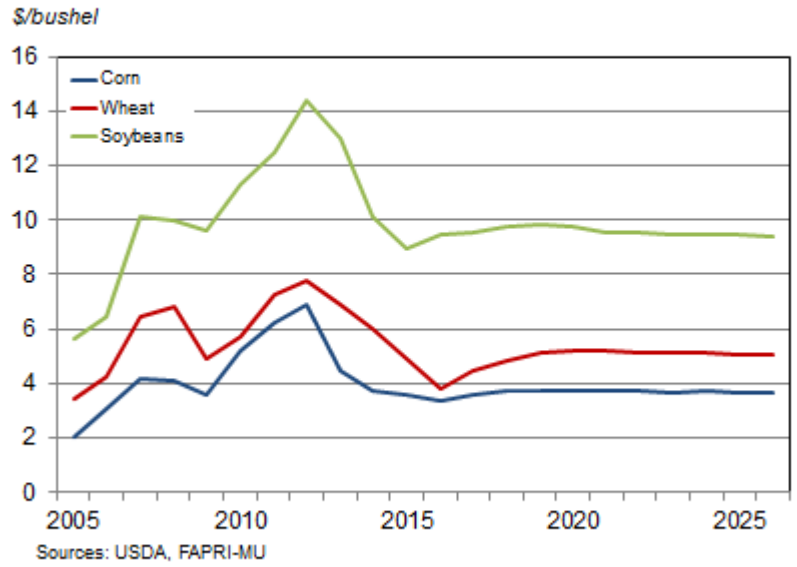
Nevada agriculture revolves around livestock, especially beef cattle production. In 2012, nearly 40% of state agriculture gross receipts stemmed from beef cattle. Dairy production also accounts for a large proportion of the value of agriculture. While hay is the largest crop, it is

directly related to cattle, dairy, and sheep production. As such, livestock, especially cattle production dominates the state's agricultural sector.

The contours of the long-term Nevada agricultural outlook remain similar to those of a year ago, the short term view is considerably weaker as the period of high prices, especially for cattle, dairy, and hay has come to an end. It is generally expected that the state's producers will be able to maintain or expand most sectors, with the exception of those that have been exhibiting long-term declines such as sheep and wool. In reality, there will be periods when gross receipts far exceed costs in a year, and there will be periods when profitability is lacking.

Assumption of normal weather around the world leads to projections of adequate food and feed production and lower grain, oilseed, and hay prices than in the past few years (Figure 15). While prices and revenues will be lower than in the recent peak years of 2010-2013, they will be sufficient to maintain positive net returns for producers. With modest cost appreciation most crop and livestock sectors are expected to remain profitable although less so than in the past several years.

**Figure 15. Stability Projected for Ag Markets**



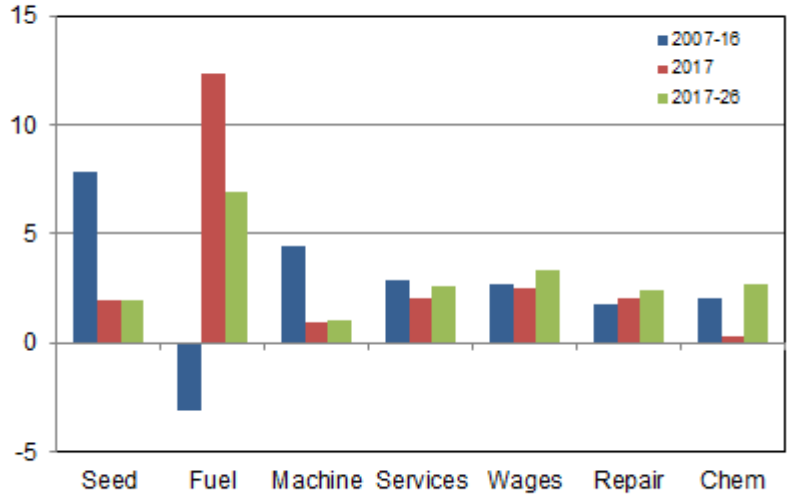

*Production Costs*

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. 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 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 16).

**Figure 16. Steady Cost Increases Ahead**

*Costs, annualized % change*




Sources: USDA, BLS, IHS Markit, UCED

In the period from 2007 to 2016, seed costs increased relatively faster than any other major category, but will be considerably dampened going forward. Fuel was the most volatile category, with large increases over the decade being wiped out by the crash in petroleum and distillate prices in 2015 and early 2016. In 2017 and over the coming decade, not all cost categories are expected to behave as in the previous decade. Fuels are exhibiting sharp upward price adjustments this year, and the slower rate of increase expected in the next ten years still remains the fastest pace of growth of any cost category.

Machinery and repairs are projected to have the lowest average annual cost increases. Wages are projected to increase at a slightly faster rate in the next ten years than in the past decade, which was influenced by wage stagnation during the recession. As the excess pool of labor decreases, 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 and therefore job market is driving the wage rate projections, these items will also follow a relatively smooth upward path that suggests controlled inflation.

The volatility and potential for sharp increases in fuel prices means that this category embodies significant risk for producers. However, fuel costs are generally not among the largest

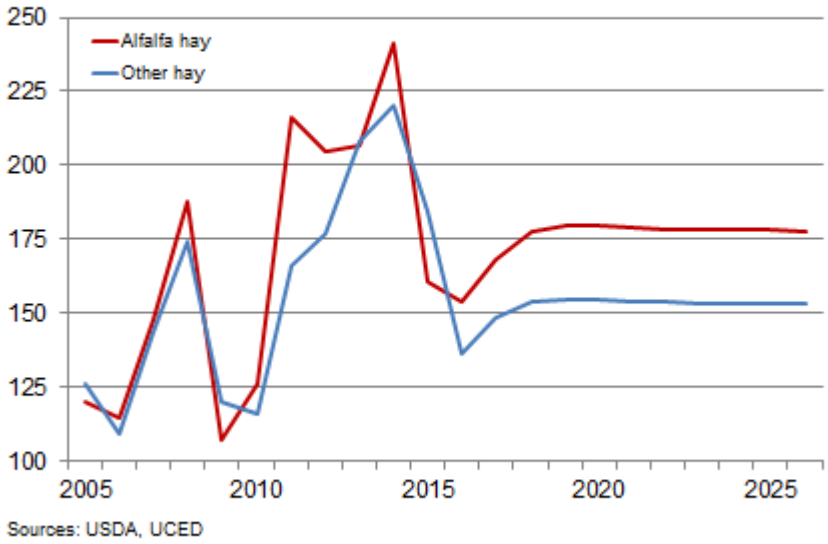
cost categories. For livestock, feed costs generally account for the largest category. For crops, it is usually fertilizers and other agricultural chemicals.

*Hay*

Hay prices continued their slide from 2015 highs last year as the impacts of the drought subsided (Figure 17). Although Nevada hay production was still constrained last year due to widespread severe water shortages, supplies from surrounding states were available and suppressed prices. Despite plentiful water supplies in 2017 Nevada alfalfa prices are expected to show a rebound, with alfalfa gaining $10 to $15 per ton with prices for other hay moving a smaller amount. There is considerable uncertainty around hay prices this year, primarily on the downside because of the potential for a substantial recovery in statewide production. Early 2017 prices for alfalfa as reported by the USDA are similar to those of a year ago, but other hay prices are lower. Hay prices are expected to fall even more once the first cutting is made. The price outlook for important Nevada commodities is presented in Appendix Table 4.

**Figure 17. Hay Prices Will Bounce off Bottom**

*Nevada hay prices, $/ton*




Sources: USDA, UCED

What remains to be seen this year is how the greatly improved water availability will impact harvested acreage. In addition, production in the short term will be affected by the ability of producers to establish new stands that were damaged by the lack of water. Production for the past few years was reduced by lower acreage harvested and to a lesser extent, yields because of the severe, widespread drought.

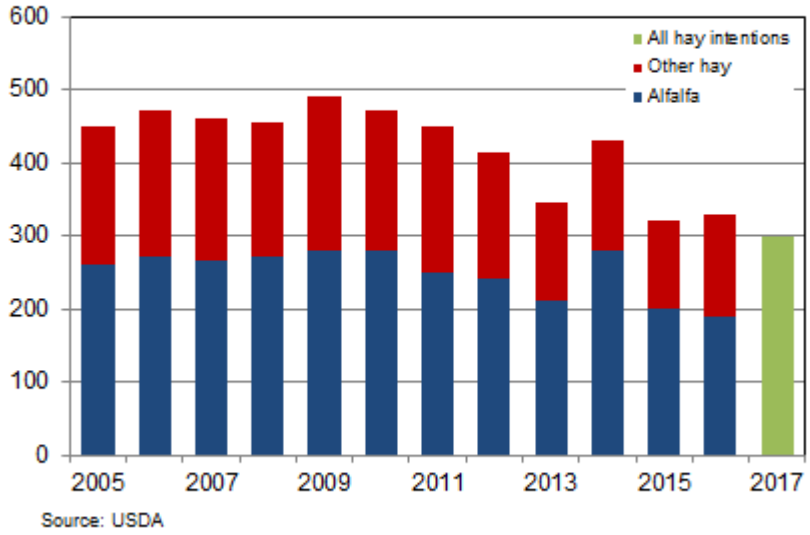
A significant portion of the state's hay is shipped westward to supply California dairy and cattle production. Hay production, especially alfalfa hay, has been declining since 2008 in California. This has tightened the regional market for high-quality alfalfa hay and will be a major contributing factor to the expected higher prices for hay in the next several years. In addition,

expanding beef cattle and dairy production will boost demand for all feeds. Dairy herd expansion, especially that resulting from the DFA whole milk powder plant in Fallon will put upward pressure on regional hay and other feed demand, supporting local prices and providing the opportunity for eventual greater production. Here, again, water will be a crucial factor in the ability of hay producers to increase output. The plentiful water supplies that Nevada will enjoy this year are no guarantee that severe drought will not return in subsequent years.

The March 2017 *Prospective Plantings* report indicates that Nevada hay producers intend to harvest a higher number of hay acres this year (Figure 18). But with anticipated increased water allocations, it is possible that yields will increase. Although reported alfalfa yields show little movement over time because virtually all of it is irrigated, mitigating the impacts of variable precipitation, the steep cut to water allocations in the past few years did result in average yield reductions. As such there is likely to be an uptick in alfalfa yields this year.

**Figure 18. Hay Producers Are More Optimistic**

*Nevada hay acreage, ths*



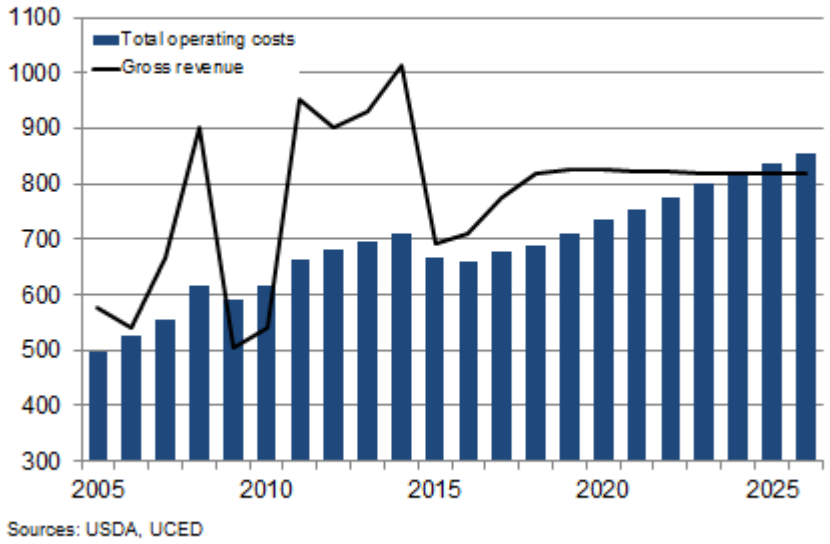

Source: USDA

Nevada cow-calf producers are partly insulated from rising feed costs because of federal grazing fees. However, the need to purchase seasonal and supplemental feed exposes them to fluctuations in feed costs and those cattlemen that utilize private grazing lands are subject to more variation in costs from contract to contract. However, the La Nina weather pattern that lasted only a few months in 2016 might be giving way to the return of El Nino later in 2017. That suggests that range conditions that will improve with the larger water supplies this year will continue to benefit from adequate precipitation in the next year or so, reversing some of the damage done to grazing lands during the recent drought. As a result, the forage quality and quantity is expected to be improved in the medium term. However, the range will not recover completely in a single year, leaving lingering effects on grazing, and purchased feed requirements could still be greater than normal in this region again this year.

As the effects of the drought diminished and prices fell more in line with hay prices in other parts of the country, the large per acre profits of the past few years declined in 2015 and 2016 (Figure 19). One factor helping to retain some profitability was lower operating costs for hay producers, primarily from lower fuel costs. For hay, the largest cost categories are machinery, fuel, and irrigation, with wages also reflecting considerable labor costs. Hay is more exposed to fuel costs than most other crops. Hay is also water-intensive, making growing competition for this vital commodity a major risk factor. Somewhat higher prices expected in the next few years will boost returns over costs until stabilizing prices and steadily rising costs erode profitability again in the last part of the projection period. Net returns for major Nevada agricultural commodities are shown in Appendix Table 5.

**Figure 19. Profitability Improves in the Medium Term**

*Nevada alfalfa, $/harvested acre*




Sources: USDA, UCED

*Grains*

While the long-term outlook for U.S. and Nevada agriculture is for generally stable grains prices over the next ten years the short-term situation is out of balance, particularly for wheat. Another increase in global production in 2016/17 coupled with abundant stocks and expectations of further increases resulted in supplies far exceeding demand. As a result wheat prices have dropped and are currently at their lowest level since 2005/06. Wheat is currently priced similar to feedgrains on the world market.

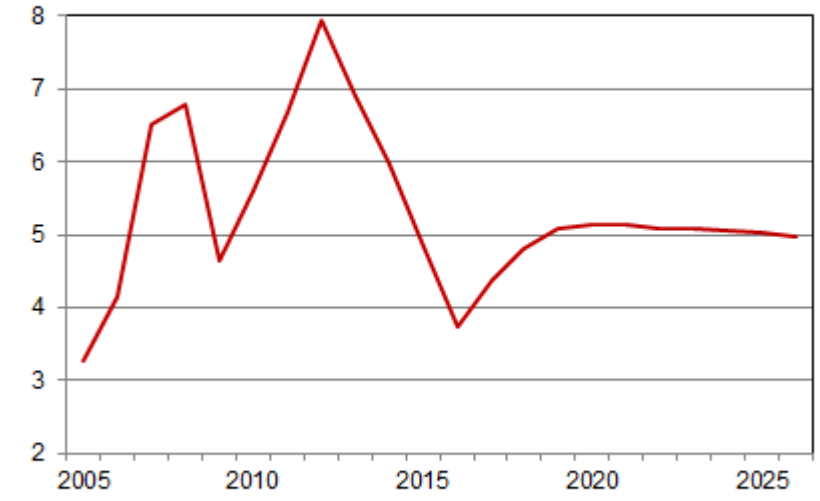
With the assumption of normal weather and average yields in coming years, production is expected to decline to levels that will balance global supply and demand at higher, yet stable prices. These prices will ensure that wheat successfully competes for land against other crops.

Barley prices are reflecting that grain's two distinct markets. The lower price at Rouen, France, reflects the feed market, much lower than the premium price for malting barley. The U.S. price more reflects that higher-priced market, which has risen relative to wheat in recent years.

Grain production is not as large in Nevada as in neighboring Western States. The state's wheat producers are expected to see prices rise from the low levels of 2016/17, then enjoy a brief period of strengthening in line with the national and global markets (Figure 20) before stabilizing over most of the outlook, returning to a normal relationship with barley and other feedgrains.

**Figure 20. Wheat Will Recover From Discount**

*Nevada wheat prices, $/bushel*

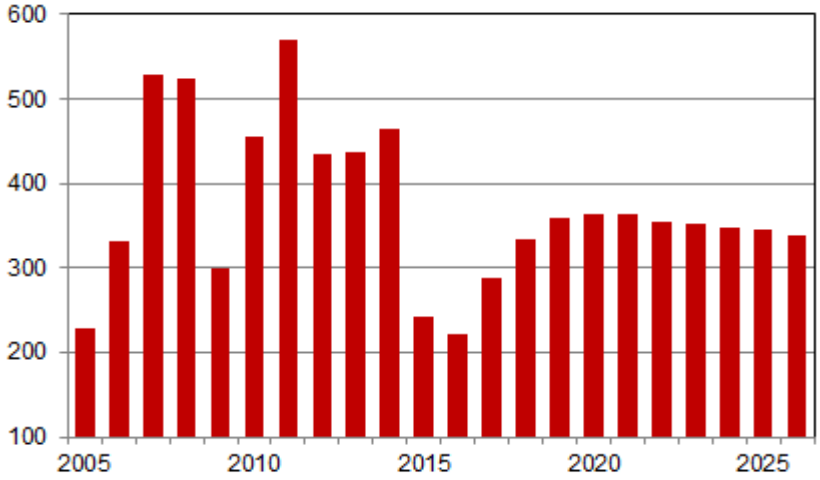



Sources: USDA, UCED

Low grain prices, especially for wheat have reduced net returns for producers. With a modest uptick in prices expected in the next few years revenues will regain some lost ground and grains will be moderately profitable (Figure 21).

**Figure 21. Solid Returns Ahead for Grain Producers**

*Nevada wheat net returns, $/acre*



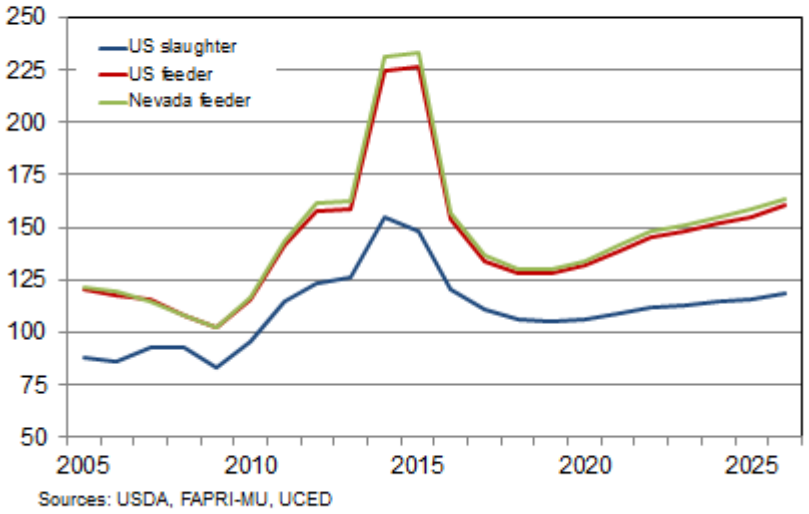

Sources: USDA, UCED

*Cattle*

U.S. and Nevada ranchers saw cattle prices fall sharply in 2016, and prices are expected to continue sliding through 2018 (Figure 22). In early 2017, feeder steer prices are at the lowest level since the 2010-2011 period. Nevertheless, cattle inventories are expected to increase through 2019 induced by previous high prices and recovery from drought in western states. After that, profits will be wrung out of the industry and inventories will begin a cyclical decline.

**Figure 22. Cattle Producers Facing Tough Period**

*Cattle prices, $/cwt*



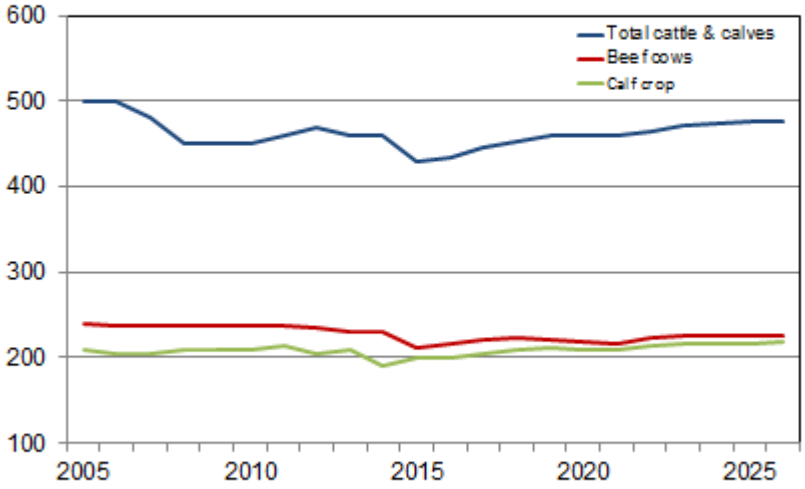

Sources: USDA, FAPRI-MU, UCED

The period of drought prevented Nevada cow-calf producers from expanding inventories even as prices gained traction after 2010. The preliminary January 2016 cattle inventories indicate that the Nevada herd increased by approximately 2% during 2016 (Figure 23). With declining returns expected over the next several years, Nevada cattle numbers are only expected to exhibit modest increases, topping out around 2019. After that time, prices reflecting the downside of the cycle will induce inventories to decline for a few years.

While non-feed costs are assumed to increase at recent historical rates, feed costs are expected to remain below recent high levels. In addition, many western herds are grazed on federal lands where grazing fees will remain at long-term historical rates, adding further stability to feed costs during the projection period. In the short term, however, this insulation may be limited by the period it will take for far western rangelands to fully recover following the recent drought. This will exacerbate eroding prices and their impacts on potential herd expansion.

**Figure 23. It Will Be Difficult to Regain Herd Size**

*Nevada cattle, 1,000 head*

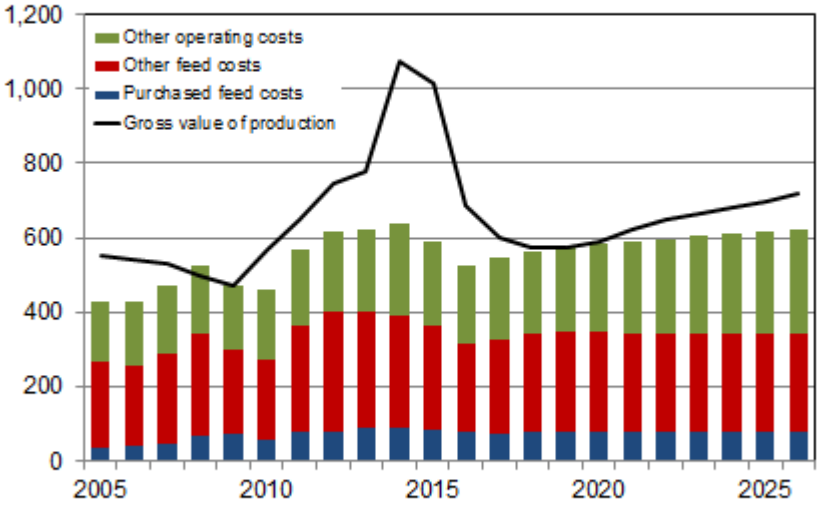



Sources: USDA, UCED

As cattle prices fall over the next several years and costs rise at a moderate rate, returns will diminish and cow-calf profitability will all but disappear for a few years (Figure 24). As this portion of the cycle develops, herd contraction will take place until inventories fall to levels that will constrain marketings resulting in a return to price strengthening. Because of the high proportion of cow-calf operations in the west this region will be heavily impacted by the contraction of the cattle industry and weaker cyclical demand for calves.

**Figure 24. Weak Prices, Rising Costs Will Erode Profits**

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



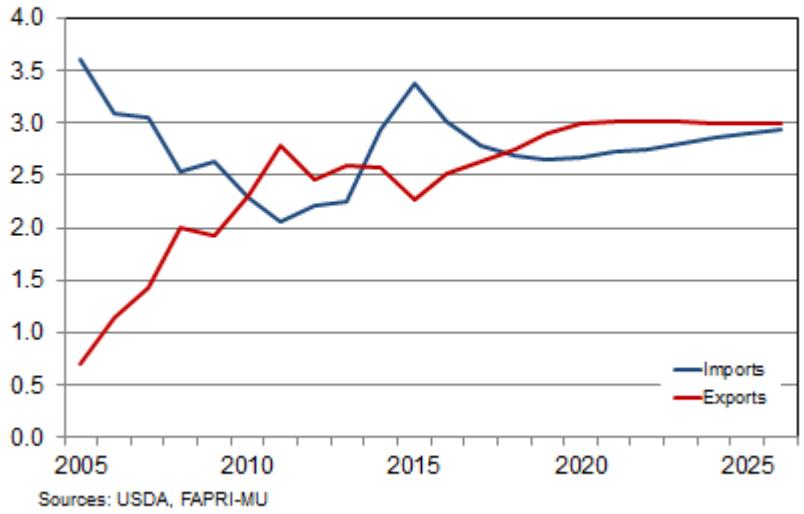

Sources: USDA, UCED

When the current expansion of herds slows and ultimately ends in the next couple of years, below-average prices will discourage marketing, while at the same time expectations of waning profitability will discourage expansion of herds. These two conflicting objectives will result in gradual reduction of the breeding herd while absorbing the decreases in marketing while net returns are low.

The strong U.S. dollar constrained beef exports and supported beef imports by the U.S in 2016 (Figure 25). Nevertheless, declining beef prices mitigated dollar strength somewhat, and the trade balance showed an improvement last year as exports ticked up and imports pulled back modestly. As beef prices decline further and the dollar stabilizes and eventually weakens relative to other currencies, U.S. beef will regain a competitive position on world markets. U.S. exports are expected to be competitively priced on international markets in the long run.

**Figure 25. Falling Prices Will Reverse the Trade Gap**

*Beef trade, bil lb*




Sources: USDA, FAPRI-MU

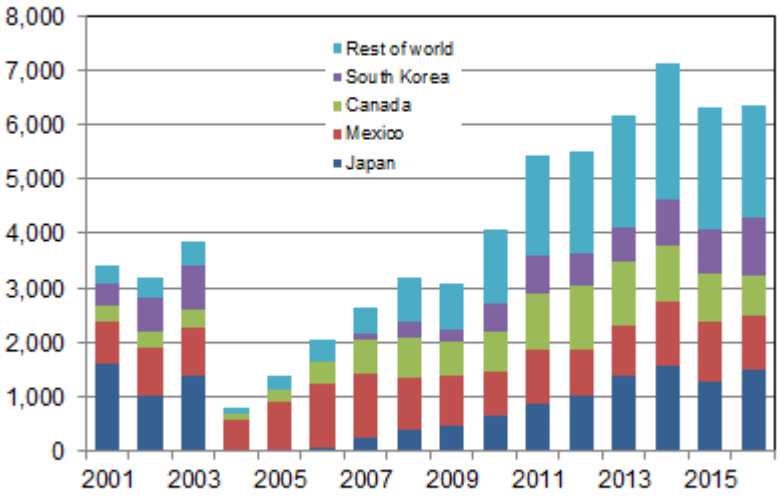
The slightly improved beef export volume last year contributed to the stabilization in value, despite lower prices (Figure 26). In coming years, the recovering global economy, especially for developing countries, will expand meat, including beef demand. China's recent economic slowdown aside, rising affluence has been the dominant driver of rising commodity imports by that nation for several years. Other 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 are not capable of producing domestically.

Importing country restrictions placed on U.S. beef because of earlier detection of BSE have been gradually eased since 2006. U.S. beef is flowing to these nations' consumers again,

especially to Japan and South Korea. With the safeguards put in place since 2003, confidence has been restored in the U.S. beef production, processing, and shipping chain.

**Figure 26. Lower Beef Prices Dampen Values**

*U.S. beef exports, $mil*




Source: US Census Bureau Trade Data

As beef prices fall in the next several years, export volume will expand, helping to maintain export values. Although export quantities are projected to flatten after 2020, the return of strengthening prices at that time will boost export values. Japan, Mexico, and South Korea are expected to maintain their positions as top international markets for U.S. beef.

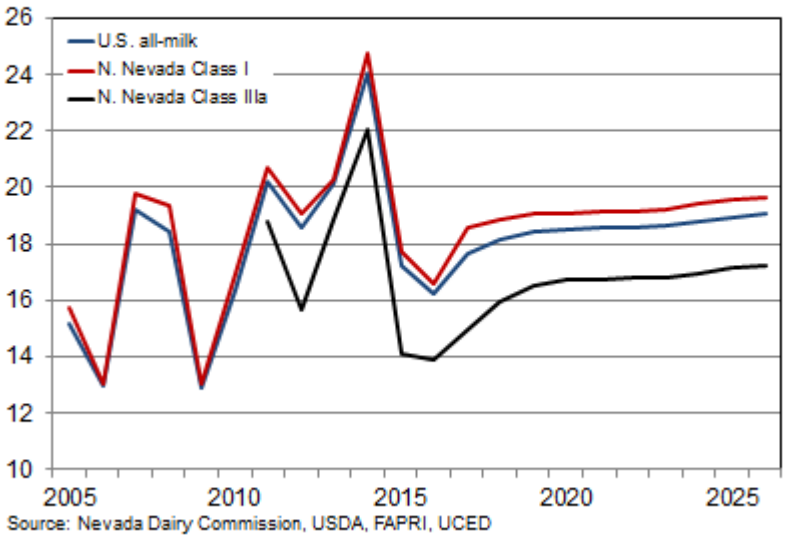
*Dairy*

Following a sharp drop in 2016 and a smaller decline last year, milk prices are experiencing an uptick in 2017 (Figure 27). However, they are not expected to regain the highs of the past several years. Factors contributing to the increase in milk prices include slightly higher feed costs than a year ago, increasing domestic use of dairy products, strengthening in international dairy product markets, and declining inventories expected by the end of this year.

Compared to feed costs, margins are expected to be high enough over the baseline period that the Margin Protection Program (MPP) payments will not occur at the basic $4 per hundredweight level, and will occur relatively infrequently at most higher levels of coverage. However, 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 MPP is based on those standard rations. As a result, there could be a disconnect between Nevada dairy feed costs and the MPP trigger.

**Figure 27. Nevada Milk Prices Reflect Processing**

*Milk price, $/cwt*

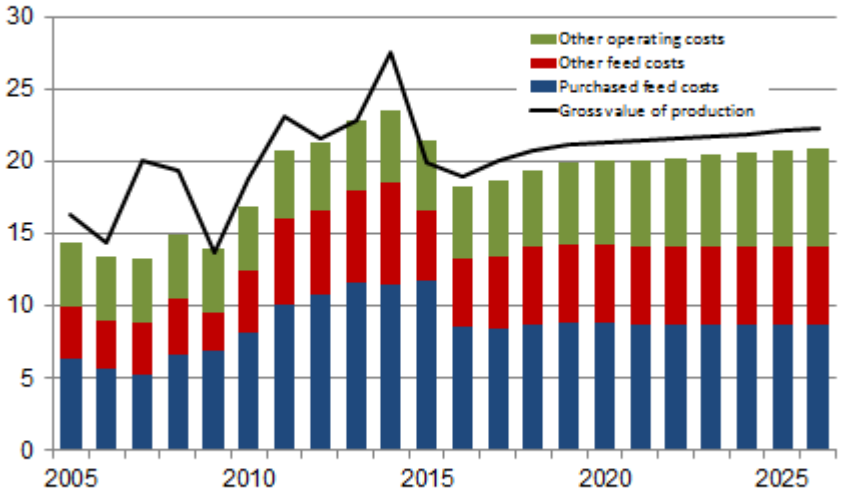



Source: Nevada Dairy Commission, USDA, FAPRI, UCED

With modest increases in milk prices in coming years, dairy profitability will be maintained. Relatively favorable feed costs will help dairy producers maintain margins at the unremarkable level of milk prices expected (Figure 28).

**Figure 28. Enough Profits for Expansion?**

*Nevada dairy, $/cwt of milk sold*




Sources: USDA, UCED

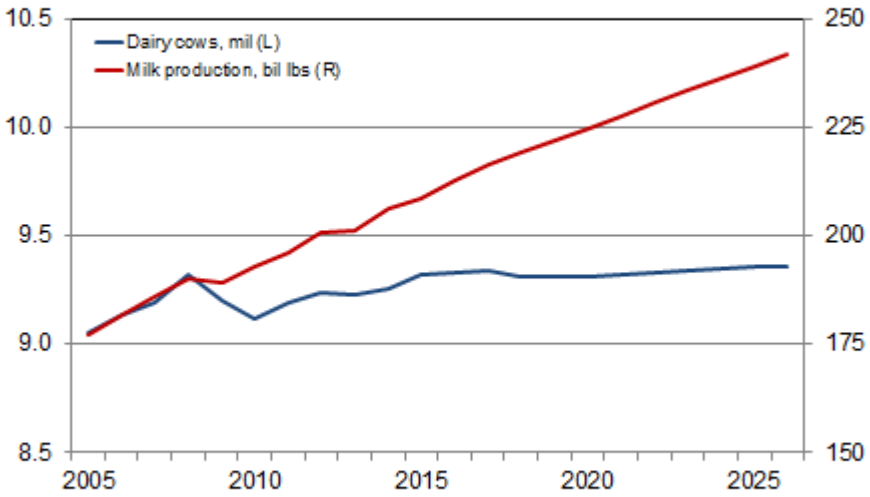
Other costs are expected to increase at rates similar to historical averages so that when total operating costs are considered, the rate of increase will not outpace the increases in dairy gross revenues. Margins will increase slightly this year and will remain positive for the remainder of

the outlook, albeit at relatively low levels. This suggests that small dairies that are unable to withstand low margins will face challenges, and larger operations are more likely to be the source of expansion. As such, the larger dairies characteristic of Nevada have the potential to make the expansions that are intended 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 declining cattle prices through 2019 the value of cattle sales for dairy producers will constrain profitability in the medium term, but less so in the long run.

Milk prices will be insufficient to induce expansion of herds in the next two years, but milk cow inventories are expected to edge up slowly beginning in 2020. Although dairy cow inventories have been relatively stable since 2000 milk production increased nearly 20% over that time (Figure 29). Ongoing increases in milk yield per cow will be instrumental in supplying the milk requirements of the U.S. Breeding, nutrition, veterinary science, and lactation cycle management are among the factors combining to 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.

**Figure 29. Yield Growth Will Drive Production**

*U.S. dairy*




Sources: USDA, FAPRI-MU

The potential for dairy expansion in Nevada, especially in the northern part of the state is different than at the national level. Milk prices are now impacted by the whole milk powder plant in Fallon. Most Northern Nevada produced milk will be utilized at the plant and be bought from producers at the lower Northern Nevada Class IIIa (California Class 4a) price instead of a Northern Nevada Class I (California Class 1) price. In order to supply Class 1 milk to California bottlers, Northern Nevada producers received a lower price as they had to meet transportation costs to California points. Because they will now sell the majority of their milk to the Fallon plant, those transportation costs will be much less, allowing them to sell milk at the lower Class

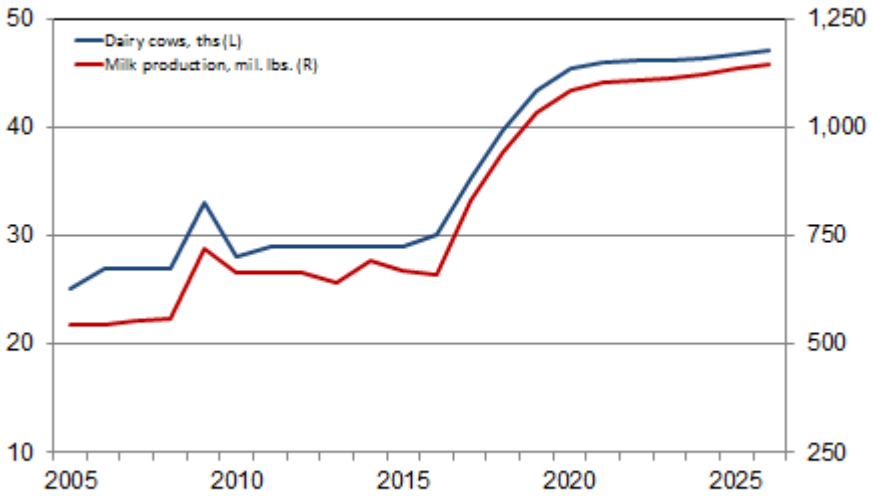
IIIa price. The price differential is expected to be made up by no longer having to factor transportation costs to California into the local milk price.

However, the necessary addition of approximately 16,000 head of dairy cattle required to increase milk production to levels to meet the plant's two million pound per day capacity has been delayed. The major limiting factor has been water. 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. As a result, the herd expansion has barely gotten underway by the beginning of 2017. With improved water supplies this year some of the anticipated expansion will likely get underway.

Local dairy farm expansion, restarts of idled farms, and new operations will be necessary to supply the required milk (Figure 30). However, with the recent steep decline in milk prices and margins, this expansion may take longer than previously anticipated. There have been plans for several large dairy farms to open in Northern Nevada to meet the needs of the plant. Supplying milk to the plant will end the flow of milk out of Nevada and provide the basis for prices for local producers, who historically sold milk for California prices less transportation costs.

**Figure 30. Supplying the WMP Plant With Local Milk**

*Nevada dairy*




Sources: USDA, UCED

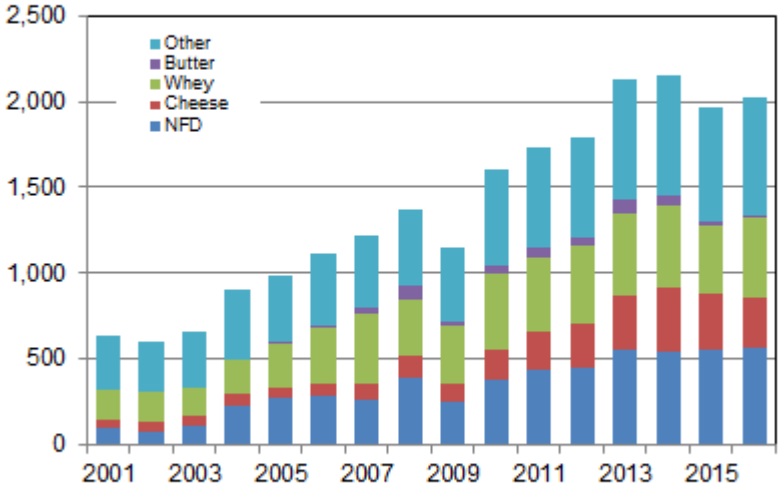
In addition to supporting expansion of Northern Nevada's dairy industry, feed demand, especially for locally-grown hay and corn silage would increase, providing expanded local markets for those crops and supporting prices for them. Despite the plentiful precipitation of the winter of 2016-2017, a major 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 excellent market opportunities for dairy products (Figure 31). Like many other

agricultural commodities, global markets for dairy products are viewed as an opportunity for expanding the domestic industry. Nevertheless, U.S. dairy product market share requires competitive prices, and the strong dollar of the past two years has somewhat dampened U.S. competitiveness. With the expectation of a weaker dollar in the long-term the international market will remain a vital supporter of the domestic dairy industry.

**Figure 31. International Market Supports US Dairy**

*U.S. dairy exports, ths tonnes*




Source: US Census Bureau Trade Data

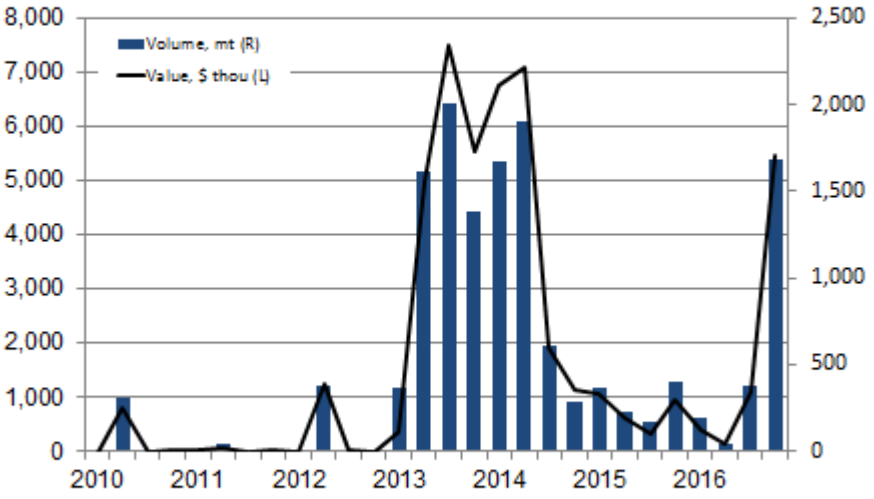
Competing exporters like New Zealand and Australia have more favorable exchange rates and their products are less expensive on foreign markets. Nevertheless, the U.S. dairy industry's growth potential is greatly enhanced by international demand. China, specifically, is viewed as an immense market to target for increasing dairy product exports.

The developing world market is precisely the impetus behind the evolving dairy product industry in Nevada. The market for the products of the Fallon plant is primarily China which is increasingly looking to the world market for dairy products. However, China pulled back on its milk powder buying spree which had previously benefitted U.S. producers. Whole milk powder is imported, sold on local markets, and reconstituted by consumers for their dinner tables. New Zealand and Australia are dominant exporters, but the market is also attractive to other suppliers.

In the past two years, China has faced some economic issues and purchases from abroad have diminished for many products, including dairy. Adding to that loss of market has been the loss of competitiveness for U.S. powder because of strength of the U.S. dollar, especially against the Australian and New Zealand dollars. As a result, whole milk powder exports from the U.S. to China all but disappeared until the end of 2016 (Figure 32). This is expected to be a short- to medium-term phenomenon and is expected to reverse as the dollar weakens in coming years. If not, other markets will have to be found for milk powder produced in Nevada.

**Figure 32. Will China's Return to U.S. Suppliers Last?**

*China, dry whole milk and cream, imports from U.S.*




Source: USDA: FAS

*Sheep and Wool*

Increasing preference for other meats and competition from other natural and manmade fibers has resulted in U.S. consumer demand shifting away from lamb and wool. As a result, sheep producers have been required to continually reduce the national flock size to reflect flagging demand in order to maintain prices and margins. In the period since 1990, national sheep inventories have fallen by more than half, and in Nevada they have been reduced by 40%. However, some of the reduction in the Nevada flock was a sharp drop in 2016 related to declining forage availability with the drought. Sheep producers depended on a variety of government programs for price support. Now most of those programs have been eliminated and support is primarily from the marketing loan program for wool, which is not likely to be triggered at current and expected wool prices.

The U.S. is not a dominant player in the global sheep and wool markets as it is in many other livestock and products markets. As a result, developments in major sheep producing regions have a more pronounced impact on U.S. producers than for other commodities, and American producers have struggled to maintain competitiveness. Nevertheless, this also provides opportunities for windfalls for domestic producers as they can also benefit from adverse conditions elsewhere that force global wool and sheep meat prices higher.

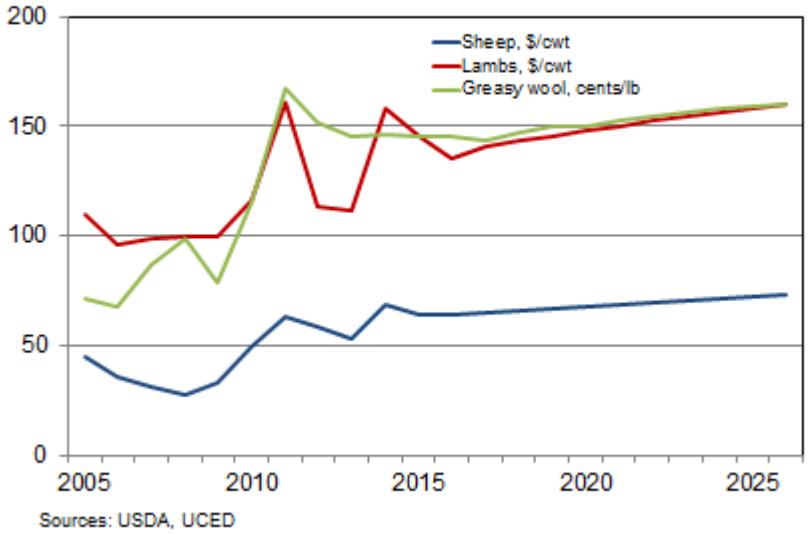
The relatively small share Nevada sheep and wool producers contribute to national and global output leaves them subject to prices largely determined elsewhere. This position of price-takers has limited the competitiveness of American sheep and wool producers for the past six decades and contributed to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

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, developing Africa, and the Former Soviet Union. Even with expected tepid growth in global markets that will offer some support to prices (Figure 33), the sheep and wool industry in the U.S. will continue to decline as rising costs will limit profitability. However, the rate of decline is not expected to be as rapid as in the past two decades. Much of industry profitability will come from the wool side, although wool has a high exposure to prices determined on the Australian market, and domestic producers have little ability to influence those prices.

**Figure 33. Wool Market Underpins Sheep Industry**

*U.S. price*




Sources: USDA, UCED

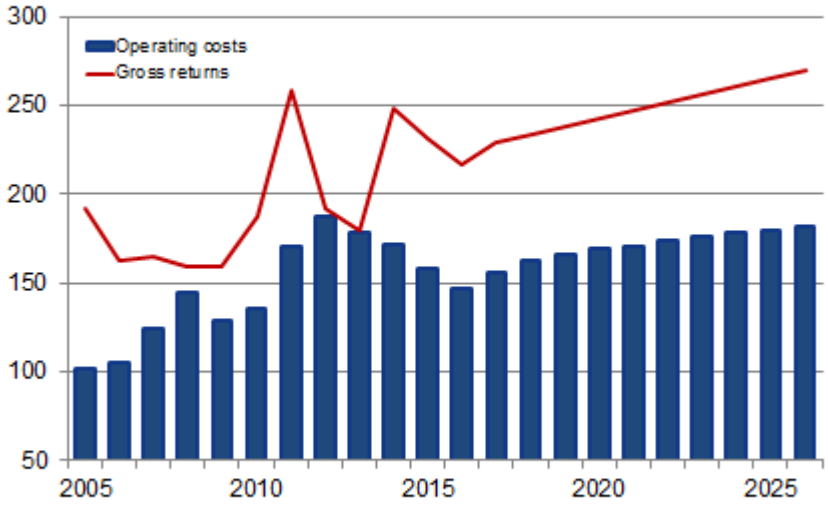
Upward cost pressures are expected to reappear and persist throughout the baseline. Higher costs will force prices, especially for wool, higher to maintain profitability, although maintaining adequate prices and returns will also require sheep numbers to continue declining. However, with the expected continuing downsizing of domestic flocks that will result in higher prices in order to rationalize supply and demand, profitability will be maintained (Figure 34).

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 national average prices do not hold a premium over Nevada prices. Wool prices tend to be slightly higher in Nevada. Quality differences could also influence higher state prices.

**Figure 34. Flock Downsizing Will Help Maintain Profits**

*Sheep and wool, $/bred ewe*




Source: USDA, UCED

**Risks to the Outlook**

The primary causes of risk to the outlook stem from assumptions about the future. Actual economic, technological, energy, geo-political, policy, and weather developments might be substantially different from expectations around which this outlook is formed.

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 or months of abnormal temperature or precipitation that can affect large areas. It can also come in sudden catastrophic events that tend to be more localized in nature. Since most crop safety net programs tend to be price oriented, they generally do not come into play in such instances. 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 are currently 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 to continue pushing U.S. agricultural policy toward more non-market distorting programs.

There are several factors, both domestic and foreign, that could either derail the 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.

U.S. job growth is occurring, nevertheless, the labor force participation rate has remains low, indicating that there are still a number of discouraged workers that have stopped looking for work. Because of the way the unemployment rate is calculated, this is a hidden weakness that

remains in the labor market. High deficits and debt will force resources to be devoted to service these shortfalls in years ahead instead of being used to fuel growth.

One outcome of the last recession and housing crisis was the extended period of low interest rates. But the Fed has begun increasing interest rates. Borrowing rates, both short term for operating costs and long term for capital purchases, will continue to increase this year, with anticipation of several incremental rate hikes. Higher interest rates boost costs for producers. Should inflation resurface in coming quarters, the Fed will be likely to move rates up quicker. Furthermore, efforts to boost home ownership rates could contribute to increasing demand for credit and lead to higher mortgage and other long-term interest rates.

The volatility in energy markets and prices makes them a major risk to the outlook. There are two sources of this volatility that are particularly troublesome and both are very difficult to predict. The first is the perpetually unstable geo-political situation in major petroleum producing regions, particularly the Middle East. Recently, the unrest in Iraq and Syria has added risk to global energy markets and petroleum prices. Iran's interpretation of the recent nuclear deal is leading to tensions that could result in returning to some economic sanctions. Cartels, wars, terrorism, and economic sanctions and their consequences impact the supply and price of oil. The recent OPEC agreement to reduce that organization's daily output by four percent has not yet resulted in steep increases in petroleum prices to date. The second is the speculative trade in petroleum contracts that is often driven by perceptions of risk rather than reality, and often causes wild swings in prices, even when fundamental supply and demand suggest no shift in the current or near-term supply and demand balance and the need to utilize price rationing.

As always, there is uncertainty surrounding the crude oil price, including the increases projected after 2017. In the past several years, extended periods of high prices induced substantial exploration and expansion of production capacity. This presents a downward risk for crude oil prices in the short to medium term.

Recent exploration has resulted in new production capacity that will not be absorbed overnight even as exploration activity has slowed. Although speculators are currently reacting to lower rotary rig counts and economic expansion, pushing up prices of crude oil, gasoline and other distillates, crude oil inventories continue to be more than adequate. 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 good financial situation for agriculture in the U.S. at present will be a major benefit and could alleviate some of 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 a middle of the road estimate of what that environment will look like and provides information to weigh in the decision making process.

# Appendix Tables

**Table 1. Economic Assumptions**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Real GDP growth, %** | | | | | | | | | | | | | |
| U.S. | 2.4 | 2.6 | 1.6 | 2.3 | 2.6 | 2.3 | 2.1 | 2.2 | 2.2 | 2.1 | 2.0 | 1.8 | 1.9 |
| Advanced economies | 1.9 | 2.1 | 1.6 | 1.9 | 2.1 | 1.9 | 1.7 | 1.9 | 1.9 | 1.9 | 1.8 | 1.7 | 1.7 |
| Emerging markets | 4.3 | 3.9 | 3.8 | 4.4 | 4.7 | 4.9 | 5.0 | 4.9 | 4.9 | 4.8 | 4.8 | 4.7 | 4.5 |
| Developing countries | 1.5 | 1.6 | 2.6 | 3.3 | 3.9 | 4.0 | 4.2 | 4.3 | 4.3 | 4.3 | 4.3 | 4.1 | 4.0 |
| World | 2.8 | 2.7 | 2.4 | 2.8 | 3.1 | 3.1 | 3.0 | 3.1 | 3.2 | 3.1 | 3.1 | 3.0 | 3.0 |
| **Exch. rate index, 2010=100** | 106.1 | 117.4 | 123.9 | 130.2 | 131.6 | 129.5 | 127.1 | 125.5 | 124.2 | 123.4 | 123.0 | 122.9 | 122.8 |
| **Unemployment rate, %** | 6.2 | 5.3 | 4.9 | 4.9 | 6.0 | 6.5 | 6.1 | 5.6 | 5.3 | 5.3 | 5.5 | 5.5 | 5.6 |
| **Interest rates, %** | | | | | | | | | | | | | |
| Fed funds rate | 0.09 | 0.13 | 0.39 | 1.52 | 1.02 | 0.25 | 0.31 | 1.13 | 2.13 | 2.50 | 2.50 | 2.50 | 2.50 |
| 3-Month T-bill | 0.03 | 0.05 | 0.32 | 1.37 | 0.95 | 0.41 | 0.56 | 1.28 | 2.14 | 2.45 | 2.44 | 2.45 | 2.46 |
| 10-year T-note | 2.54 | 2.14 | 1.84 | 2.50 | 2.09 | 1.85 | 1.85 | 2.00 | 2.67 | 3.53 | 3.88 | 3.88 | 3.88 |
| 30-yr mortgage | 4.17 | 3.85 | 3.62 | 4.15 | 4.25 | 3.93 | 3.75 | 3.90 | 4.56 | 5.47 | 5.91 | 5.90 | 5.88 |
| **WTI crude oil price** | | | | | | | | | | | | | |
| $/barrel | 93.26 | 48.69 | 43.17 | 53.20 | 55.64 | 62.30 | 69.33 | 76.59 | 83.81 | 90.52 | 96.66 | 102.24 | 106.74 |
| % change | -5.1 | -47.8 | -11.3 | 23.2 | 4.6 | 12.0 | 11.3 | 10.5 | 9.4 | 8.0 | 6.8 | 5.8 | 4.4 |
| **Real US food expenditure** | | | | | | | | | | | | | |
| Per capita, $2010 | 2,554 | 2,647 | 2,704 | 2,729 | 2,757 | 2,760 | 2,762 | 2,760 | 2,755 | 2,750 | 2,744 | 2,738 | 2,734 |
| % change | 2.6 | 3.7 | 2.1 | 0.9 | 1.0 | 0.1 | 0.1 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |
| **Population, % change** | | | | | | | | | | | | | |
| U.S. | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 |
| Advanced economies | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 |
| Emerging markets | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 |
| Developing countries | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 |
| World | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 0.9 | 0.9 | 0.9 |

**Table 2. Baseline Policy Assumptions**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wheat, $/bu | | | | | | | | | | | | | |
| Loan rate | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 | 2.94 |
| Target/Reference price | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 | 5.50 |
| Barley, $/bu | | | | | | | | | | | | | |
| Loan rate | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 | 1.95 |
| Target price | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 | 4.95 |
| Dairy MPP cost, $/cwt | 9.42 | 8.53 | 7.86 | 8.25 | 8.55 | 8.56 | 8.46 | 8.42 | 8.42 | 8.39 | 8.43 | 8.40 | 8.36 |
| Wool loan rate, $/lb | | | | | | | | | | | | | |
| Graded (average) | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| Ungraded | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| CRP, mil. acres | | | | | | | | | | | | | |
| Limit | 27.5 | 26.0 | 25.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 |
| Enrollment | 25.45 | 24.18 | 23.88 | 23.40 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 |

**Table 3. Production Cost Indices, 1990-92=100**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fertilizer | 312 | 292 | 297 | 298 | 299 | 310 | 324 | 335 | 347 | 360 | 371 | 380 | 389 |
| % change | -2.1 | -6.3 | 1.8 | 0.3 | 0.5 | 3.6 | 4.5 | 3.2 | 3.6 | 3.7 | 3.2 | 2.5 | 2.2 |
| Agricultural chemicals | 159 | 154 | 156 | 157 | 158 | 163 | 171 | 176 | 183 | 189 | 196 | 200 | 205 |
| % change | 0.9 | -2.7 | 1.3 | 0.3 | 0.5 | 3.6 | 4.5 | 3.2 | 3.6 | 3.7 | 3.2 | 2.5 | 2.2 |
| Seed | 378 | 378 | 386 | 394 | 402 | 410 | 418 | 426 | 435 | 443 | 452 | 461 | 471 |
| % change | 3.6 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Farm machinery | 273 | 281 | 281 | 284 | 286 | 288 | 291 | 294 | 297 | 301 | 304 | 307 | 310 |
| % change | 3.7 | 2.7 | 0.1 | 1.0 | 0.7 | 0.9 | 1.1 | 1.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 |
| Fuels | 212 | 138 | 121 | 136 | 141 | 153 | 166 | 180 | 194 | 207 | 218 | 228 | 237 |
| % change | 0.0 | -34.7 | -12.2 | 12.4 | 3.5 | 8.1 | 9.0 | 8.3 | 7.9 | 6.6 | 5.3 | 4.6 | 3.9 |
| Wages | 207 | 215 | 222 | 228 | 235 | 243 | 252 | 261 | 270 | 279 | 289 | 299 | 310 |
| % change | 1.9 | 3.7 | 3.4 | 2.5 | 3.2 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Farm services | 179 | 184 | 184 | 188 | 192 | 197 | 203 | 208 | 213 | 219 | 225 | 231 | 237 |
| % change | 2.8 | 2.8 | 0.2 | 2.1 | 2.3 | 2.7 | 2.6 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.6 |
| Farm repairs | 177 | 178 | 178 | 182 | 186 | 191 | 196 | 201 | 206 | 212 | 218 | 223 | 229 |
| % change | 1.9 | 0.1 | 0.2 | 2.1 | 2.3 | 2.7 | 2.6 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.6 |
| Farm supplies | 172 | 172 | 172 | 175 | 177 | 180 | 183 | 186 | 190 | 193 | 197 | 201 | 204 |
| % change | 1.9 | 0.0 | 0.3 | 1.4 | 1.4 | 1.7 | 1.7 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.8 |

*Sources: USDA, BLS, IHS Markit*

**Table 4. Nevada Agricultural Commodity Prices**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Livestock & product prices** | | | | | | | | | | | | | |
| Feeder steers, $/cwt | 231.58 | 233.10 | 156.90 | 136.56 | 130.04 | 129.79 | 133.68 | 141.36 | 147.96 | 151.06 | 154.61 | 158.50 | 163.93 |
| Milk, $/cwt | | | | | | | | | | | | | |
| N. Nevada Class I | 24.76 | 17.69 | 16.62 | 18.55 | 18.86 | 19.08 | 19.10 | 19.12 | 19.17 | 19.23 | 19.40 | 19.56 | 19.66 |
| N. Nevada Class IIIa | 22.03 | 14.10 | 13.87 | 14.94 | 15.98 | 16.53 | 16.71 | 16.76 | 16.82 | 16.84 | 16.98 | 17.13 | 17.26 |
| Sheep, $/cwt | 63.09 | 58.53 | 56.72 | 58.09 | 59.12 | 60.00 | 60.90 | 61.87 | 62.83 | 63.72 | 64.54 | 65.37 | 66.21 |
| Lambs, $/cwt | 154.61 | 143.14 | 133.77 | 139.41 | 141.74 | 143.65 | 145.58 | 147.57 | 149.57 | 151.38 | 153.05 | 154.72 | 156.42 |
| Wool, $/lb | 1.95 | 2.10 | 2.00 | 1.88 | 1.95 | 1.98 | 2.01 | 2.03 | 2.04 | 2.05 | 2.06 | 2.06 | 2.07 |
| **Hay, $/ton** | | | | | | | | | | | | | |
| Alfalfa | 241 | 161 | 154 | 168 | 178 | 180 | 180 | 179 | 178 | 178 | 178 | 178 | 178 |
| Other hay | 220 | 184 | 136 | 149 | 154 | 155 | 155 | 154 | 154 | 153 | 153 | 154 | 153 |
| **Grains, $/bushel** | | | | | | | | | | | | | |
| Wheat | 5.97 | 4.85 | 3.73 | 4.38 | 4.80 | 5.07 | 5.13 | 5.15 | 5.09 | 5.08 | 5.06 | 5.04 | 4.98 |
| Barley | 5.56 | 5.78 | 5.14 | 4.91 | 5.00 | 5.14 | 5.17 | 5.15 | 5.12 | 5.08 | 5.04 | 4.99 | 4.93 |

**Table 5. Nevada Estimated Returns**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Livestock and products** | | | | | | | | | | | | | |
| Cow-calf, $/bred cow | | | | | | | | | | | | | |
| Gross revenue | 1076.00 | 1015.79 | 689.33 | 602.22 | 574.29 | 573.22 | 589.86 | 622.77 | 651.03 | 664.34 | 679.53 | 696.20 | 719.46 |
| Variable costs | 637.60 | 591.55 | 527.71 | 544.26 | 562.70 | 574.33 | 581.86 | 588.29 | 596.56 | 604.71 | 613.38 | 619.04 | 623.68 |
| Net returns | 438.40 | 424.24 | 161.62 | 57.96 | 11.59 | -1.11 | 8.00 | 34.48 | 54.47 | 59.63 | 66.14 | 77.16 | 95.78 |
| | | | | | | | | | | | | | |
| Milk, $/cwt | | | | | | | | | | | | | |
| Gross revenue | 27.60 | 19.94 | 18.97 | 20.06 | 20.74 | 21.18 | 21.36 | 21.48 | 21.62 | 21.68 | 21.88 | 22.08 | 22.26 |
| Variable costs | 23.55 | 21.50 | 18.28 | 18.66 | 19.42 | 19.85 | 20.01 | 20.09 | 20.26 | 20.45 | 20.65 | 20.79 | 20.86 |
| Net returns | 4.05 | -1.56 | 0.69 | 1.40 | 1.33 | 1.32 | 1.34 | 1.39 | 1.36 | 1.23 | 1.23 | 1.29 | 1.41 |
| | | | | | | | | | | | | | |
| Sheep & wool, $/ewe (U.S.) | | | | | | | | | | | | | |
| Gross revenue | 247.93 | 230.98 | 217.08 | 228.40 | 233.72 | 237.64 | 242.02 | 247.06 | 251.84 | 256.47 | 260.98 | 265.48 | 269.77 |
| Variable costs | 171.55 | 157.49 | 146.16 | 155.52 | 162.61 | 166.19 | 168.78 | 170.79 | 173.14 | 175.44 | 177.87 | 179.78 | 181.49 |
| Net returns | 77.44 | 73.49 | 70.92 | 72.89 | 71.12 | 71.45 | 73.24 | 76.27 | 78.70 | 81.03 | 83.10 | 85.71 | 88.28 |

**Table 5. Nevada Estimated Returns, continued**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Crops, $/acre** | | | | | | | | | | | | | |
| Alfalfa hay | | | | | | | | | | | | | |
| Gross revenue | 1012.20 | 691.57 | 708.66 | 773.79 | 816.98 | 826.53 | 827.12 | 823.23 | 820.59 | 819.01 | 818.65 | 818.93 | 817.52 |
| Variable costs | 709.78 | 667.43 | 660.40 | 677.73 | 689.25 | 710.89 | 734.57 | 755.20 | 776.89 | 799.02 | 818.71 | 837.51 | 854.66 |
| Net returns | 302.42 | 24.14 | 48.26 | 96.06 | 127.72 | 115.64 | 92.55 | 68.03 | 43.69 | 19.99 | -0.06 | -18.58 | -37.14 |
| Barley | | | | | | | | | | | | | |
| Gross revenue | 583.03 | 469.06 | 515.72 | 497.01 | 509.04 | 526.95 | 535.55 | 537.01 | 537.91 | 537.89 | 537.43 | 535.30 | 532.77 |
| Variable costs | 159.96 | 147.37 | 147.06 | 150.13 | 152.03 | 157.19 | 163.53 | 168.98 | 174.87 | 180.91 | 186.37 | 191.17 | 195.63 |
| Net returns | 423.07 | 321.69 | 368.66 | 346.88 | 357.00 | 369.76 | 372.02 | 368.03 | 363.03 | 356.98 | 351.06 | 344.13 | 337.13 |
| Wheat | | | | | | | | | | | | | |
| Gross revenue | 627.26 | 394.22 | 374.67 | 443.41 | 489.78 | 520.95 | 532.02 | 537.38 | 534.96 | 537.84 | 539.86 | 541.85 | 538.90 |
| Variable costs | 162.10 | 151.41 | 152.12 | 154.65 | 156.45 | 161.67 | 168.13 | 173.54 | 179.44 | 185.56 | 191.14 | 195.96 | 200.49 |
| Net returns | 465.16 | 242.81 | 222.55 | 288.76 | 333.33 | 359.28 | 363.88 | 363.84 | 355.52 | 352.28 | 348.72 | 345.89 | 338.41 |