California Drought in 2015 and its Economic Impact on Agriculture

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Introduction

California is now heading into its fourth year of severe drought. All Californians face significant water restrictions during 2015. For urbanites, the restrictions will represent an inconvenience, including brown lawns and empty swimming pools. For growers, ranchers, and agribusinesses, the restrictions pose a threat to their livelihoods. The primary purpose of this report is to assess the drought's potential economic impact on California's agriculture sector.

Following are our four key takeaways:

• The damages wrought by the drought in 2015 will be worse than those in the previous year, but far from catastrophic. With each successive year of drought, the underground water tables decline further, boosting the cost of pumping groundwater to the surface and increasing the likelihood of well failure.

• Not all commodities will be impacted equally. Those yielding the highest returns on investment will be affected least by the drought because growers will redirect the limited water supply to these plants and away from those yielding the lowest returns. California's highest yielding crops are its permanent plantings, including nuts, citrus and other tree fruits, and vine-grown fruits and vegetables.

• Growers will again fallow some of their land and redirect the water that would have been used to irrigate those acres toward more profitable crops grown in other fields. They are expected to fallow 550,000 to 600,000 acres this year, about 6-7 percent of total irrigated acreage and 30 percent more than they fallowed in 2014. The resulting losses in revenue will fall most heavily on field crops such as corn, wheat, cotton, rice, hay, pasture, and beans.

• Agriculture lenders will experience some deterioration in the credit quality of their California-based borrowers, but it will be modest in scope. The borrowers connected with the permanent-plantings will be least affected, whereas those connected with field crops and dairy production will bear the brunt of the continuing drought.

Our bottom line conclusion is that most California-based growers, ranchers, and agribusinesses will remain in the black in 2015, albeit with a few outliers posting modest losses and slight deteriorations in credit quality; but their financial stress will worsen if the drought persists into 2016. This is much the same conclusion that we reached last year at this time in assessing the drought damages in 2014.
Severity of the Current Drought

According to the state’s Department of Water Resources, California’s 2014 water year, which ended on September 30, 2014, was the third driest of the past 119 years. It was also the warmest year on record. However, the three water years spanning 2012-14 rank as California’s driest three-year period on record in terms of statewide precipitation. The state’s three previous droughts most comparable to the current one are the six years spanning 1987-92; the two years, 1976-77; and the six-years, 1929-34.

California’s current drought is intensifying but not broadening in scope. (See Map 1.) On May 26, 2015, 47 percent of the state’s land area was blanketed in “exceptional drought,” the most severe category. A year ago, only 25 percent of the state was so encumbered. However, on May 26, 2015, 67 percent of the state’s land was in either “exceptional drought” or “extreme drought,” the second most severe category. A year ago, 77 percent of the state was included in the two worst categories.

California’s Water Restrictions in 2015

On April 1, 2015, Governor Brown issued executive order B-29-15 directing the State Water Resources Control Board to impose a 25 percent reduction on the state’s 400 local water supply agencies, which supply water to the state’s cities and towns. The newly mandated curtailments will be measured against total water use in 2013. Agricultural water users are exempted from the executive order, although the order does require these water users to provide more water use information to state regulators.

Apart from executive order B-29-15, California’s farmers and ranchers also face significant water restrictions, except for the Palo Verde, Coachella and Imperial Valleys which draw water primarily from the Colorado River. As of March 31, water stored in California’s vast network of reservoirs was only 65 percent of the historical average, slightly better than a year ago but still well below the level needed to forestall punishing water restrictions.

As of April 1, the Sierra Nevada’s snowpack, which
normally provides about 30 percent of the state’s water supply as it melts in the springtime, had only 5 percent of the historical average amount of water stored in the snowpack, the lowest level on record.

Reduced water allocations for junior rights holders have already been announced by the two major agencies responsible for administering the state’s surface water: the State Water Project (SWP), governed by the California Department of Water Resources, and the Central Valley Project (CVP); overseen by the U.S. Department of the Interior. The surface water under the CVP’s control is normally used to irrigate about 3 million acres of farmland, while that under the SWP’s control is normally used to irrigate about 1 million acres, mostly in Kern and Kings Counties. (California’s total farmland includes approximately 9-10 million irrigated acres.) On February 27, the Bureau of Reclamation announced that this year’s water allocations to agricultural, municipal, and industrial contractors would be zero percent of their contract quantities, unchanged from 2014. The California Department of Water Resources has set the allocation to its customers at 20 percent, up from 5 percent in 2014 but still woefully inadequate. Senior rights holders will also see cutbacks, but the level of the curtailments will vary by region.

In May 2015, a deal was brokered between the state and farmers with riparian water rights in California’s Sacramento-San Joaquin Delta. (Riparian water rights are those belonging to landowners whose land parcels abut a surface water source.) Roughly 1,000 farmers in the region proposed to reduce their surface water usage by 25 percent in 2015 (compared with 2013), with the understanding that their water rights would not be further curtailed. State officials have accepted their proposal, and California’s water agency is said to be weighing similar arrangements for alternative and voluntary programs in other parts of the state.

**Increased Reliance on Groundwater**

Growers’ first line of defense against the 2015 water restrictions will be to draw more heavily on their underground water reserves. Not everyone has equal access to these underground basins, however. Where groundwater is available, growers will pump more of it to offset the reductions in their supply of surface water; and they’ll also drill more and deeper wells.

Californians currently face no state-mandated regulatory restrictions on groundwater extraction or newly drilled wells. Today, landowners are allowed to exercise an “overriding right” to drill as many wells and pump as much groundwater as they wish. A few local government entities have imposed restrictions on new drilling (e.g., Paso Robles on the Central Coast), but they remain the rare exceptions rather than the rule.

This largely unencumbered “overriding right” is in the process of being dialed back, though not in time to impact the current situation. Last year, California’s lawmakers enacted new legislation designed to impose restrictions both on groundwater pumping and on drilling new wells. The new laws direct that local agencies prepare “groundwater sustainability plans” by 2017, and also include fines for violations. The catch is, these new rules don’t begin to take effect until 2020 and won’t be fully operative until 2040.

The vast majority of California growers with access to underground water basins thus will pump more groundwater to offset their restricted allocations of surface water. Depending on their access to these underground basins, some growers will be able to offset all of the reductions while others will be able to offset only part of the restricted allocations. Last year, economists at UC-Davis projected that the reduced allocations of surface water to California farmers would amount to about 6.6 million acre-feet, but that increased groundwater pumping would make up about 75 percent of that loss, leaving a net water shortage of about 1.6 million acre-feet. (California’s irrigated acreage consumes roughly 34 to 35 million acre-feet of water in a normal-precipitation year, and less than that during a drought.)

The UC-Davis economists expect surface water allocations to be reduced by an additional 32 percent in 2015, or 8.7 million acre feet less than average. Once again, farmers will rely on increased pumping of groundwater to offset some of those reductions, but the net loss in water usage will be larger than it was last year.
Last year’s pumping lowered the underground water table by varying degrees across the state. In some parts of the southern San Joaquin Valley, the water table has fallen as much as 50 feet since last year, whereas the water table is unchanged in other areas within the central and northern San Joaquin Valley. Hence, some existing wells will dry up, and it will also be more expensive to pump water from the lower depths. On balance, the net water shortage in 2015 will probably be closer to 2.5 million acre-feet. But this is just a guess, and there will be no way to verify its accuracy after the fact. California’s State Water Resources Control Board currently does not monitor or measure groundwater extractions.

**Drought Impacts Vary Widely by Agricultural Region**

All of California is being impacted by the drought, but its severity varies widely across the state. At the one extreme, farmers who have excellent water access will likely benefit from higher crop prices or by selling water rights. At the other extreme, producers who have insufficient access to water may be pushed to the brink. Most California producers, however, are somewhere in between. For them, the drought impacts will be significant, but they are finding ways to adapt.

**Western San Joaquin Valley**

The most severely affected region is the western San Joaquin Valley. (*See Map 2.*) The heavy clay layer in the western portion of the Valley makes it difficult for groundwater to recharge even in good times, so wells here can extend thousands of feet into the ground. As a result, farmers in the western part of the Valley have been using drip irrigation and other conservation techniques for years. These farmers are the ones who will likely fallow the most acreage as water allocations have continued to tighten and surface water can be very expensive to purchase here. The western San Joaquin Valley is also susceptible to salinity issues in its groundwater, which can be compounded during severe droughts. A wide variety of agricultural commodities are produced in both the western and eastern portions of the San Joaquin Valley, including vegetables, fruits, other field crops, and dairy.

**Eastern San Joaquin Valley**

The eastern San Joaquin Valley is less impacted than the western Valley. It has sandy, loamy soils, much better water access, and less salinity concerns. Also, the eastern side of the Valley was settled by the state’s first farmers, so there is a large concentration of senior water rights holders here. But water access can still be a problem for growers.
in this region, especially for those who have expanded permanent crop plantings eastward, closer to the foothills.

**Salinas Valley**

The Salinas Valley is popularly known as the “Salad Bowl of the World” and produces roughly 80 percent of all domestically grown vegetables. Growers here have always been heavily dependent on groundwater for irrigation, so the drought’s greatest impact on them has been the increased costs of having to drill deeper wells and pumping water from greater depths.

**Central Coast**

Growers in the Central Coast are also heavily dependent on the use of groundwater for irrigating fruits and vegetables, including wine grapes. While the drought is lowering the water table in some areas of the Central Coast and causing growers to drill deeper wells, most of this key agricultural region has received more rain in recent months than during the same period a year ago.

**Sacramento Valley**

The Sacramento Valley is located in Northern California, and growers there typically have better access to groundwater and surface water than their counterparts in the San Joaquin Valley. In addition, these growers own a disproportionately high concentration of riparian and senior water rights. They grow many different crops including rice, row crops, and tree nuts.

**Imperial Valley**

The Imperial Valley, located in the southeast corner of the state, is an agricultural powerhouse. It produces much of the nation’s winter vegetables and is the largest alfalfa hay growing region in the world. Rain falls infrequently in the Imperial Valley, so its growers are totally dependent on the Colorado River for irrigation water. The headwaters of the Colorado River are in the Colorado Rocky Mountains, where snow and rain have been quite adequate in recent years, so there is little near-term risk to water allocations in the region. The longer-term outlook, however, is iffier. Hydrologists anticipate “significant shortfalls” between projected water supplies and demand within the Colorado River Basin in coming decades.

**California Farmland Prices**

All throughout California, farmland prices continue to creep higher despite the drought’s negative effects. With prices at near record highs for most crops produced in California, growers’ cash flows have remained strong. Few farms have also been put up for sale during the past year, adding to the upward price pressure.

**Growers’ Responses to the 2015 Water Restrictions**

If California growers find that their access to surface water and groundwater is insufficient for their needs, they have four options. First, they can purchase additional water from senior rights holders, who are entitled to sell as much as 20 percent of their annual entitlements. California’s water market is still fairly small and inefficient, however, and even last year there were only a handful of actual sales. Prices reportedly climbed as high as $2,000 per acre foot in last year’s sales, but most transactions occurred at prices below $1,000 per acre foot.

Second, growers can fallow some of their land and redirect the water that they would have used on those acres to more profitable crops planted in their other fields, particularly when the less profitable crops are also the “thirstiest” ones. Some growers in the Central Valley, however, have found excess salinity in their groundwater and are having to blend their groundwater with surface water in order to use it for irrigation. Due to reductions in surface water allocations, these growers are forced to fallow a portion of their fields. Plus, many growers will discover – as they did last year – that they can earn more money by selling their water rights than they can by farming the land. Last year, California growers are estimated to have fallowed somewhere between 425,000 to 450,000 otherwise irrigated acres. This year, growers will likely fallow 550,000 to 600,000 acres – with some news reports mentioning that as many as 1,000,000 acres could be fallowed.

Third, growers can respond by shifting their crop mix in favor of crops that require less water. *(See Charts 1 and 2. These USDA estimates for 2010 are the latest*
To make such a shift, growers may have to acquire new knowledge about how best to grow these new crops, and they may also have to invest in new farm equipment. As a result, growers will generally be willing to change their crop mixes only if they believe that the reductions in their water supply are long-lasting.

Fourth, they can also install more efficient irrigation equipment to enable them to make better use of their current water supplies. But this is really a longer-term option. Growers would have had to acquire and install the equipment many months ago in order to reduce their water needs in 2015. Such equipment tends to be fairly expensive, so growers will be reluctant to make these capital investments unless they think that the reductions in their water supplies will be long-lasting. Smaller producers with fewer acres and smaller balance sheets face greater challenges. These producers have found it difficult to keep up with their neighbors who are drilling wells several hundred feet deeper, and may also be unable to afford to install more efficient irrigation systems.

### Drought Damage in 2014

Last year marked California’s third year of severe drought, and the lack of water and withering heat impaired the health of its agricultural sector. But the extent of the damage varied across individual commodities and industries – and also across individual growers, ranchers, and agribusiness companies. In principle, those crops that yield the highest returns on investment should be the ones least impacted by the drought because growers will redirect the available supply of water toward these plants and away from those yielding the lowest returns. And this is precisely what happened in 2014.
California’s highest yielding crops are its permanent plantings. At the end of last year when the harvests were complete, we reviewed and assessed the season’s outcomes for six high “net-return” crops – almonds, pistachios, walnuts, wine grapes, processing tomatoes, and oranges. We found that in four cases, crop yields posted declines – some substantial – from the 2013 harvests (e.g., almonds, down about 10 percent; pistachios, down nearly 25 percent; wine grapes, down 5-10 percent; and oranges, little affected), but crop prices were up from year-earlier levels, and often by an even bigger margin so that revenues ended up being higher year-over-year. In two cases, i.e., walnuts and processing tomatoes, the 2014 harvests set new record highs, suggesting that water scarcity was not a meaningful constraint.

In short, the changes in the 2014 harvested crops from a year ago varied widely and significantly among those six commodities. Not all of the year-over-year changes can be attributed to the drought alone. Other factors also came into play such as frosts, last year’s withering heat, and the “alternate bearing” nature of some of the crops (e.g., nut tree yields typically vary from year to year, with one to three high-yielding years followed by a low-yielding year). Based on these results, we concluded (a) that while the yields for many permanent-planted crops (but not all) ended up lower than the previous year, the shortfalls were generally more benign than the worst fears of many growers, packers, and processors; and (b) that the crop prices were generally higher. Evidently, California growers did indeed redirect the limited supply of water to those plants yielding the highest returns on investment.

But this isn’t the whole story. It ignores, for instance, the incremental costs of securing the water used to irrigate the permanent plantings, beyond the “normal” costs. Some of this water was purchased at high prices through California’s volatile water market. Additionally, a much larger than usual share of the irrigation water was obtained from underground basins, where the power used to pump the groundwater to the surface constituted an extraordinary cost.

It also ignores the opportunity costs incurred as growers opted to divert their limited supplies of water to the permanent plantings at the expense of their field crops. The yields on fallowed fields were zero, so growers ended up earning lower overall profit in 2014 than they would otherwise have posted. In total, California’s growers responded to the scarcity of water by fallowing an estimated 425,000 to 450,000 acres last year, delivering an estimated $1.5 billion in foregone revenues and higher costs to their collective bottom line -- which were concentrated among the growers of those field crops generating the lowest returns on investment. (See Figure 1.) By comparison, California’s total agricultural revenues amounted to roughly $45 billion in 2014. Crop insurance offset some of these lost revenues, although not all of California’s field crops are eligible for coverage. For example, apricots, peaches, plums, nectarines, and lettuce are not covered under the crop insurance program. We haven’t found any estimates, or even ballpark conjectures, of the extent to which crop insurance offset last year’s losses.

Furthermore, it ignores the longer-term, less visible damages. Many growers are worried, in particular, that the extended drought will do damage to their vines and tree roots, impairing the health and yields of their future crops. Water quality issues are also at risk of being exacerbated by the drought, further imperiling the long-term health of their vines and tree roots. Moreover, scientists report that California’s groundwater deficit now exceeds 63 trillion gallons, and will take many years of average precipitation to restore.

**Drought Damage in 2015**

California’s growers, ranchers, and agribusinesses now face a fourth year of drought, and the resulting financial damages will be worse than those in the previous year – but far from catastrophic. All six of the major agricultural regions will be impacted by the drought, some more than others. (See Map 3.) With each successive year of drought, the state’s underground water tables decline further, boosting the cost of drilling new wells and of pumping groundwater from lower depths to the surface.

Not all agricultural commodities and industries will be impacted equally, and neither will all growers,
California is now heading into its fourth year of severe drought. All Californians face significant water restrictions during 2015. For urbanites, the restrictions will represent an inconvenience, including brown lawns and empty swimming pools. For growers, ranchers and agribusinesses, the restrictions pose a threat to their livelihoods.

Severities of the current drought:

- 2012-2014 driest 3-year period on record (statewide precipitation)
- 65% of historic average

Increased reliance on groundwater:

- 2.5 million acre-feet shortage
- 6.6 million acre-feet

UC Davis projects that the reduced allocations of surface water to California farmers will amount to about 8.7 million acre-feet, but that increased groundwater pumping will make up about 70 percent of that loss.

Reduced water allocation:

- Agricultural, municipal & industrial:
  - 0% of central valley project
  - 20% of state water project

Economic impact:

- Impact to agriculture (billions of dollars):
  - 2015: 1.8
  - 2014: 2.0
- Growers will likely fallow 550,000 to 600,000 acres

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packers, and processors within a given industry. In principle, those crops that yield the highest returns on investment should be least impacted by the drought because growers will be able to redirect the available supply of water toward these plants and away from those yielding the lowest returns. This is precisely what happened last year, and it will happen again in 2015.

In California, the crops yielding the highest returns on investment are permanent plantings. They include nuts, citrus and other tree fruits, and vine-grown fruits, where growers’ investments in the trees or vines tend to be greater than those in the farmland. Hence, California’s permanent crops will be left unirrigated only as an absolute last resort. At the same time, the crops that are most likely to be fallowed are the field crops – and especially those that require significant water in relation to their net returns. It’s the growers of such field crops as corn, wheat, cotton, rice, hay, pasture, and beans who will be the hardest-hit by the 2015 drought with the biggest losses.

California growers are also relying more extensively on risk management tools in response to the drought. Crop insurance coverage used to be a tough sell in California, because premiums often exceeded indemnity payments by a ratio of 2 to 1. However, between 2012 and 2014, crop insurance coverage expanded from 4.6 million acres to 6.8 million acres. And while uncertainties related to the drought have been a driving force of the increased coverage, they are not the only cause. Greater acreage in permanent plantings and higher prices for all crops have increased the stakes for growers, putting more dollars at risk. Many growers who purchase crop insurance are worried that the cost of these insurance policies may increase dramatically if the drought persists into 2016.

Growers of nearly all crops will have the advantage of an early start to the 2015 growing season. With most fruits, nuts, and vegetables about 3-4 weeks ahead of their usual seasonal schedules, less water will likely to be needed during the warmest weeks of August and September.

Dairy and cattle operations will also be hard-hit by the drought. Feed supplies, much of which is locally grown, represent their highest operating cost; and further losses of locally grown silage, hay, and pasture will raise their feed costs significantly. Dairies will be especially vulnerable. While hay costs are down slightly from last year, farmgate milk prices are off nearly 40 percent from a year ago. Last year, California dairies’ bottom lines were spared from the ravages of the drought by the nationwide run-up in milk prices. They won’t be so lucky in 2015.

**Agricultural Commodities and Industries**

Looking ahead to the current 2015/16 crop year, here’s how we think the major commodity groups will fare, going from those least affected to those affected the most:
Permanent Plantings: Tree Nuts

This industry-group is the one least susceptible to the California drought, as the high net returns on investment ensure that growers will direct as much water as they can to this crop.

- Tree nut producers are not anticipating meaningful declines in acreage, and for the most part, have sourced adequate water supplies for 2015.
- Those growers with unimpeded access to groundwater will fare the best. However, as reliance on groundwater grows, the larger concentrations of contaminants in the groundwater become more detrimental to the health of the trees, especially almonds, resulting in lower nut yields.
- Producers who have groundwater access will incur higher energy bills pumping irrigation water, while other producers may be forced to purchase water at costly levels.
- Insufficient water during the growing season runs the risk of permanently stunting young trees, especially almond trees, during the rest of their economic lives.
- Some growers are replacing older, low yielding trees with new trees that require 75 percent less water than a fully mature tree.
- Lower yields and smaller nut size are expected in 2015, but any reductions in supply should be offset by higher prices, provided that export demand remains stable.
- The possibility of decreased yields could have an impact on nut processors. Lower throughput would reduce their profitability, and they would have fewer hulls to sell for dairy feed if yields decline significantly.
- If the drought persists into 2016 and commodity prices decline, growers will face some grim decisions. Some will opt for extreme pruning or “stumping” (i.e., trimming trees back to the point where they will not produce for the following three years) in an effort to save their investments. Other growers will conclude that the water costs are too high to justify the investments, and they’ll push the trees out of production.

Permanent Plantings: Other

This is another low-risk category because, like nuts, the high net returns on investment ensure that growers will supply as much water as they can to these crops.

- Citrus, tree fruit and wine/table grapes also provide high net returns on investment and should also fare well during the current season.
- Citrus production in the Eastern San Joaquin Valley (a major citrus-growing region) will likely compare poorly to the rest of the industry due to decreased surface water allocations and to its inferior access to groundwater.
- Water allocations in the Southern San Joaquin Valley have also been limited and groundwater quality issues remain a concern for citrus producers in the southern region.
- More citrus is expected to be sent to juice production, instead of fresh pack, due to decreased quality and increased fruit-drops due to drought conditions.
- Table/wine grape growers are reportedly trimming canes back to prevent stunted growth and yields into 2016 due to decreased water supplies. Large wine companies have the ability to buy bulk juice from around the world to supplement short domestic production in case of drought.

Annual Crops

This industry-grouping is one of the higher-risk categories, but some of the crops in this category are less susceptible to drought than others. The high-risk crops include corn, wheat, cotton, rice, hay, pasture, and beans; this acreage is the most likely to be fallowed. Annual crops also encompass fruits and vegetables, and some of these field crops generate net returns on investment comparable to the permanent plantings.

- In response to this year’s drought, California growers will fallow an estimated 550,000 to 600,000 acres of otherwise irrigated farmland, up about 30 percent from the previous year.
- This year’s economic losses from fallowed acreage should exceed last year’s. The 2014 losses are
This year’s losses, like last year’s, will be concentrated among the various field crops, but not all such crops will be affected equally.

Those field crops yielding the highest net returns on investment will be impacted less by the drought because growers will redirect the limited supply of water to these crops and away from the others. Fruits and vegetables tend to be high on the list of highly profitable field crops.

In California, the field crops yielding the lowest returns on investment include corn, wheat, cotton, rice, hay, pasture, and beans. It is these crops that will bear the brunt of the drought.

Any reductions in acreage planted in cotton or rice will pose challenges to processors and distributors, which are sensitive to volume throughput.

**Dairy Industry**

This industry group constitutes another high-risk category and includes processors and producers.

Dairy operations will also be hard-hit by the drought, as feed supplies, a portion of which is locally grown, represent their highest operating cost. Further losses of locally grown silage, hay, and pasture will raise their feed costs significantly.

California dairy producers, on average, import 50 percent of their feed sources during non-drought years. In drought years, these producers are expected to increase their feed imports to 60-70 percent.

California dairy farms are likely to be much more vulnerable to the drought in 2015 than they were in the previous year. Last year, milk prices nationwide soared to record-high prices, which shielded California dairies from the drought’s effects on feed prices. With milk prices having plummeted nearly 40 percent from a year ago, California dairies won’t be so lucky in 2015.

Some dairy producers who grow their own silage are converting some of this acreage to nut trees, where the net returns are higher. Other producers are fallowing those acres due to water constraints, diverting water to other commodity crops or selling it to nearby farms.

Dairies should have access to sufficient feed in 2015. But more of it will travel longer distances and be more expensive, spurring some dairies to shift the composition of their feed rations. The resulting changes in rations are likely to reduce protein content in dairy diets and lower milk output to some degree.

In the face of sharply narrowing margins, California dairy operators have begun to shrink their herd sizes, culling the less productive cows and moving more cows outside of California.

Some larger dairy operators, with the available capital, are leasing or buying additional land to gain extra water rights. Many smaller dairies (500-750 cows) are reassessing their futures in California. A few have sold off their herds in the past year, and the land has been planted for tree nuts or citrus.

If the drought continues through 2016, feed supplies will become more constricted and California dairies will reduce their milk production, putting a greater strain on the California dairy processing sector, which focuses on skim milk, powder and cheese production.

The approaching regulation of groundwater is likely to have a detrimental impact on the long-term health of the California dairy industry. Greater consolidation of small and medium sized dairies is expected.

**Animal Protein**

This is a moderate-risk industry-grouping. The main drought-related risk hinges on the higher cost of locally grown feed, and it shares this risk with California-based dairy producers. In the case of dairy producers, milk prices have plummeted from a year ago. In contrast, within the animal protein complex, prices have held up fairly well from a year ago.
• Poultry and egg layer production is expected to remain steady through 2015. Feed costs are also expected to remain steady; and broiler prices, supported by strong demand, are expected to maintain healthy margins through 2015.

• California’s beef cow herd was unchanged from January 2014 to January 2015, at 600,000 head. Excellent cow/calf operator profitability has provided incentive for ranchers to retain their herds, and enabled them to deploy several drought management strategies.

• If the drought continues into 2016, cattle producers will be faced with the decision to liquidate their herds, move cows out of state, or incur higher costs by increasing the amount of expensive feedstuffs such as hay and grain in animal rations. As feed resources dwindle, the cattle herd could shrink by up to 30,000 head through 2016.

• The number of cattle on feed in California has been on a steady decline since early 2014 due to reduced regional availability of calves and feeder cattle. The USDA’s Cattle on Feed report for April 2015 indicates that California has 6 percent less inventory from a year ago, while total U.S. inventory is unchanged from April 2014.

Timber and Forest Products
This is an important agricultural industry, but one that isn’t very susceptible to the drought. Forest fire remains the greatest risk for the California timber industry due to limited winter snow fall. However, many of the larger timber companies have disaster insurance that will cover some loss to fire. Otherwise, California’s drought poses no other direct threats to this industry.

Cooperatives, Processors, and Supporting Agribusinesses
The fallowing of 550,000 to 600,000 acres in 2015 will mean less demand for many farm-related products and services, with smaller service-providers and farm product retailers likely to be hurt the most. Production of most crops is expected to decline, but not dramatically; and prices for most California crops are expected to remain high. Consequently, processors will likely see less throughput in 2015 and 2016, but the overall impact on their bottom lines should be modest.

Cooperatives, in general, have reduced their capital expenditures as the drought extended into the second, third, and fourth years. The goal for most coops has been to preserve liquidity in order to survive worse conditions if the drought extends into 2016 or beyond.

Concluding Comments
California’s 2014/15 rainy season has now ended, and it was just as disappointing as the previous three seasons, in terms of precipitation. As California heads into its fourth year of drought, the resulting water restrictions do indeed pose a threat to the livelihoods of the state’s growers, ranchers, and agribusinesses.

Last year’s drought is estimated to have caused about $1.5 billion in direct agricultural losses (i.e., foregone revenues and higher costs). With each successive year of drought, the losses get bigger, so this year’s losses will probably amount to somewhere in the range of $1.8-2.0 billion – a 4-5 percent haircut from the $46 to $48 billion in total revenues that the state’s farmers, ranchers, and agribusinesses would otherwise have earned.

Big as they are, these projected losses could end up being two, three, or even four times bigger. It is the virtually unfettered access to and availability of groundwater that will save the day and spare California’s agricultural producers from incurring many more billions of dollars in losses. As long as California’s underground water reserves remain sufficient, its agriculture sector will survive without crippling losses.

The problem is, this extraordinary dependence on groundwater is a stop-gap, not a long-term solution. Even in normal times when precipitation is ample and at or above the multiyear norm, California water users still pump groundwater at a faster rate than the aquifers are recharging. Water experts are concerned that California’s underground water reserves are being depleted year after year, as evidenced by the continuing and widespread land subsidence problem.
California’s drought will eventually end, though nobody knows when. Climatologists are offering a glimmer of hope that 2015 may be the last year of the drought. They are assigning a higher probability to the development of a strong El Niño event beginning this coming fall or winter. Such weather events typically bring above-average rainfall to central and southern California, and the rainwater could potentially recharge a significant portion of the water lost in California’s reservoirs during the past three years. It was the El Niño occurrence of 1978 that ended the 1976-77 drought, and Californians are hopeful that 2015 will end similarly.

Even if the drought were to end in 2015, it would continue to have both positive and negative effects on California’s agricultural communities. California farmers are learning, for example, how to produce more with fewer resources, making them more sustainable for the future. In large part, these beneficial results reflect improved technology and irrigation methods. Plus, higher crop prices and the industry’s current excellent financial condition are enabling many growers to make these vital investments.

Water management challenges will persist for California agriculture, however. More and deeper wells are being drilled every day; a greater share of the state’s irrigated acreage is being shifted to nuts and other lucrative, but water-intensive crops; and new land is being brought into production even as the drought forces some acres to be fallowed. Going forward, these developments could make it more difficult for the state to implement effective groundwater management policies.

But despite the continuing difficulties and challenges, California’s agricultural industry will continue to adapt to reduced water allocations for as long as necessary, and will find better ways to produce the crops and products that consumers demand.

CoBank’s Knowledge Exchange Division welcomes readers’ comments and suggestions. Please send them to KEDRESEARCH@cobank.com.

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