



QUARTERLY U.S. RURAL ECONOMIC REVIEW

Agricultural Markets Settle into Lower, Narrower Price Ranges

This quarterly update is prepared by the Knowledge Exchange Division and covers the key industries served by CoBank, including the agricultural markets and the rural infrastructure industries.

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Key Points:

- *U.S. agricultural sectors – ranging from crops to animal protein to dairy – have been adjusting to lower price environments amidst mounting inventories.*
- *The crop markets await final spring planting allocations for price direction. Tightening grower margins due to ample domestic and global supply, changes in U.S. farm policy and spring weather will dominate the acreage allocation decision process.*
- *The ethanol industry’s leading indicator, the ethanol/corn price ratio, has recently hovered near 2-year lows, compressing margins from over \$2 per gallon in early 2014 to roughly \$0.10 per gallon in early 2015. The forward price curves for ethanol and corn point to further margin deterioration through 2015.*
- *Beef supplies will remain in short supply throughout 2015 and much of 2016, with no material increases in beef production expected until 2017 and beyond.*
- *Since late last year, the hog and pork industry has shifted from a situation of scarcity to one of oversupply. Hog prices have plummeted, and supply has ballooned far beyond the level previously forecasted.*
- *Poultry output continues at a disciplined growth rate and prices are holding steady. The industry remains concerned about a possible outbreak of highly pathogenic avian influenza (HPAI) and its trade implications.*
- *With the dairy product markets having stabilized, the worst of the current cyclical downturn appears to be over for dairy processors and manufacturers. At the same time, the near-term outlook for dairy producers is highly uncertain.*
- *In February, the Federal Communications Commission adopted the Open Internet Order and reclassified broadband as a Title II – or regulated – telecom service. It remains a highly controversial decision.*
- *Numerous coal-fired generators are slated for retirement in 2015, largely due to implementation of the EPA’s Mercury and Air Toxics Standards. To offset these retirements, substantial utility-scale generating capacity will be added, dominated by wind and natural gas.*
- *Water utilities are struggling to design new rate structures that can provide revenue stability while also encouraging water conservation.*

Preview

U.S. agricultural markets – ranging from crops to animal protein and dairy – have been adjusting to lower price environments amidst mounting inventories. For some commodities, the downward price adjustments have been exacerbated by the strengthening U.S. dollar, making U.S. products more expensive in foreign currencies, thereby reducing U.S. competitiveness. The crop markets await final planting allocations for price direction. All major grain, oilseed, and fiber crops are already in ample supply as producers take to the fields to sow their 2015/16 crops. The animal protein and dairy sectors face a wide range of uncertainties, with strong domestic demand, lower feed costs, animal disease outbreaks, and deteriorating exports all impacting these markets – albeit in diverse ways.

Global Economic Environment

The outlook for the global economy in 2015 will be driven by many of the same considerations that were in play last year – i.e., central bank policies, global currency realignments, continued low oil prices, and geopolitical instabilities. Global growth will likely be somewhat stronger in 2015; but major macroeconomic policy initiatives in Europe, Japan and China will need to bear fruit. The U.S. economy will remain the primary global growth engine as it gains momentum through the year.

Going forward, the global economy must navigate increasingly complex and divergent conditions that will make it difficult to steer a steady course and maintain its forward progress:

- **The world's central banks will occupy center stage.** The world's central banks continue to be on divergent paths. The U.S. Federal Reserve and the Bank of England will be moving away from their near-zero interest rate policies and abandoning quantitative easing. In contrast, the Bank of Japan and the European Central Bank (ECB) will be ramping up their quantitative easing and maintaining their near-zero interest rate policies. These divergent transitions will leave financial markets unsettled.
- **The value of the U.S. dollar will climb higher.** Over the past three years, the foreign exchange value of the U.S. dollar has climbed over 25 percent, on a trade-weighted basis. It has increased by 46 percent against the Japanese yen and may reach parity with the euro by year end.
- **Eurozone deflationary pressures will need to respond to the European Central Bank's stimulus.** While issues regarding Greece will continue to create unease within the Eurozone, it will be the outcome of ECB actions that ultimately will drive Europe's economy.
- **China's growth rate is slowing as its economic transition continues.** China's growth rate remains near 7 percent as additional stimulus is being undertaken. But its shadow banking exposure to the real estate sector remains a critical issue.
- **Geopolitical flare-ups will be an ongoing challenge.** The Middle East turmoil appears to be expanding rather than contracting, and Ukraine's problems will linger for some time and impair growth potential in both Russia and Europe.

U.S. Economic Environment

The U.S. economy has evolved into the primary global growth engine. However, growth during the first half of 2015 will probably be weaker than the second half due to uncertainties regarding the impacts of adverse weather in the Northeast, the West Coast port slowdown, energy sector adjustments, swings in business inventories, and the deteriorating trade deficit.

The U.S. economy over the next year will reflect a perplexing combination of forces. Personal consumption expenditures, which historically have accounted for 60-70 percent of U.S. economic activity, will remain strong. The ratio of U.S. consumer debt to income has receded to the lowest levels in over a decade. Home prices are continuing to rise, albeit at a measured pace. Equity markets remain near record high levels, but volatile. The beneficial impacts of significantly lower gasoline prices have yet to be fully realized. These factors should all support consumption demand well into 2016.

At the same time, the continued deterioration in the U.S. trade deficit will act as a significant drag on growth. The sharp increase in the value of the U.S. dollar has made American products more expensive to foreign buyers while sharply reducing the cost of imports to U.S. consumers. With the U.S. economy likely to outperform the rest of the world and the Federal Reserve likely to be the first central bank to abandon its near-zero interest rate policy, the U.S. dollar is highly unlikely to retreat anytime soon.

Swings in investment spending will add to the quarter-to-quarter volatility in U.S. growth. Business fixed investment will likely be supportive of growth in the longer term, but the halving of oil prices will sharply curtail investments in the energy sector in the first half of the year. Swings in inventory investment will remain significant as companies seek to limit inventory buildups and pursue just-in-time strategies. Changes in government spending are likely to have limited impact on overall growth as partisan politics limit the potential for significant spending or revenue actions.

U.S. Agricultural Markets

Following the record-large harvest of 2014/15, the grain and oilseed markets have been adjusting to lower price environments amidst growing inventories. The crop markets await final planting allocations for price direction. All major grain, oilseed, and fiber crops are already in ample supply as producers take to the fields to sow their 2015/16 crops.

At the same time, the animal protein complex is at an early stage of what promises to be an aggressive expansion of meat supplies. Strong domestic demand, lower feed costs, animal disease outbreaks, and deteriorating exports have created an uncertain but generally positive environment for the animal protein and dairy markets. This wide-ranging uncertainty extends across the entire food, fiber and agriculture supply chain, leading to lower fertilizer prices, land rents and cropland values.

If global harvests match current bullish expectations within this global economic setting, and if the livestock and dairy industries continue to realign, further adjustments will ensue across the global supply chains. Persistently lower

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commodity prices could cause net farm income to decline by as much as 20-30 percent. However, the balance sheet of agriculture remains strong with the overall debt-to-asset ratio in 2015 expected to remain below 11 percent, among the lowest in over 50 years.

Grains, Oilseeds, and Ethanol

Grain prices face several headwinds as the 2015/16 planting season approaches. Since the start of the year, corn, wheat and soybean prices have drifted lower. Sluggish global economic growth, falling energy prices and a stronger U.S. dollar continue to place competitive pressure on U.S. originated grain. But so far, grain exports have been relatively strong, albeit at lower prices.

Planting decisions and weather events will be the key directional drivers of trends for the 2015/16 season. (See *Exhibit 1.*) Tightening grower margins due to ample domestic and global supply, changes in U.S. farm policy and spring weather will dominate the acreage allocation decision process.

Corn

Record global production in 2014/15 and falling world trade amidst a continued upward trend in the value of the U.S. dollar will place downward pressure on the price of corn through the 2014/15 marketing season and likely through the remainder of 2015. As we move closer to the 2015/16 market year, increases in feed and export demand should help to reduce domestic supplies. Corn use for ethanol remains flat.

Market prices in the first quarter of 2015 fell modestly from the high set in the first week of January. Record global supplies, growers' reluctance to sell in the early

Exhibit 1: Prospective vs. Actual Acreage Plantings

	Prospective Acreage (Reported March 31)*				Actual Acreage (Reported June 30)*			
	Corn	Soybeans	Wheat	Total	Corn	Soybeans	Wheat	Total
2015	89.2	84.6	55.4	229.2				
2014	91.7	81.5	55.8	229.0	90.6	83.7	56.8	231.1
2013	97.3	77.1	56.4	230.8	95.4	76.8	56.2	228.4
2012	95.9	73.9	55.9	225.7	97.3	77.2	55.3	229.8
2011	92.2	76.6	58	226.8	92.3	75.2	54.4	221.9
2010	88.8	78.1	53.8	220.7	87.9	78.9	53.6	220.4

* Millions of acres.
Source: USDA

pressure on prices. (See Exhibit 2.) World ending stocks are projected to be 8 percent higher year over year (YoY), and 37 percent higher than the 10-year average.

South American corn acreage remains uncertain as a result of late soybean plantings tightening

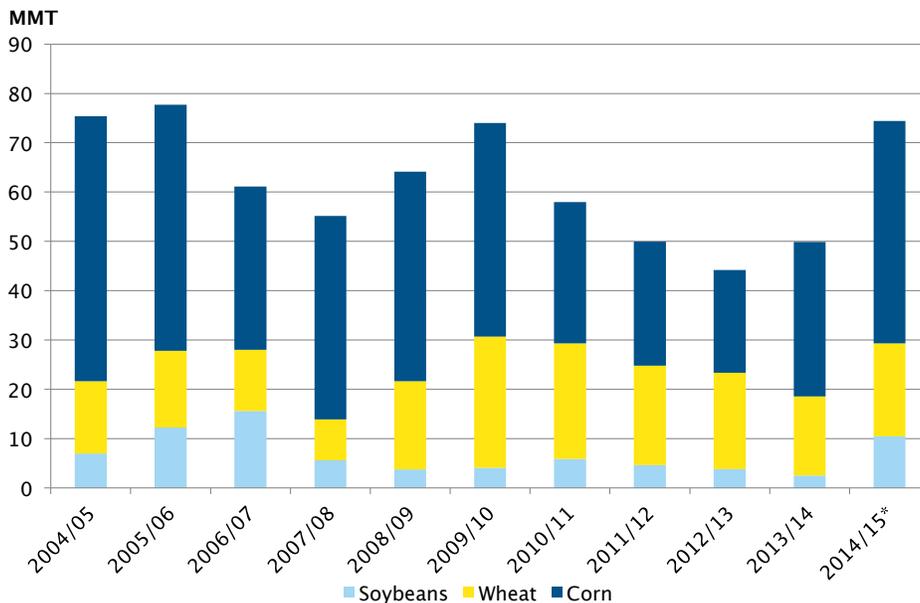
the window of opportunity to plant second season corn. Current estimates for Brazil and Argentina corn production remain a moving target as uncertainty related to Brazil's planted area is compounded by flooding in Argentina. While planting conditions may not be ideal, the weakening real and peso have improved corn prices on a relative basis, adding incentive for growers there to plant.

Turmoil in the Black Sea region may push up production costs in Ukraine. While it is still uncertain what impact the lack of capital will have on planted acreage, a drop in production may turn some additional overseas

demand to the U.S. In China, excess grain supplies and record sorghum imports will keep Chinese imports of U.S. corn near zero through 2014/15.

The impending U.S. planting season will swing the market focus to weather events and planted area. Current estimates project a 1.4 million acre reduction in U.S. corn plantings. Yields may also drift lower following last year's near-perfect growing season. If we assume normal growing conditions and trend yield, corn stocks could fall YoY through the 2015/16 market season. However, the decline

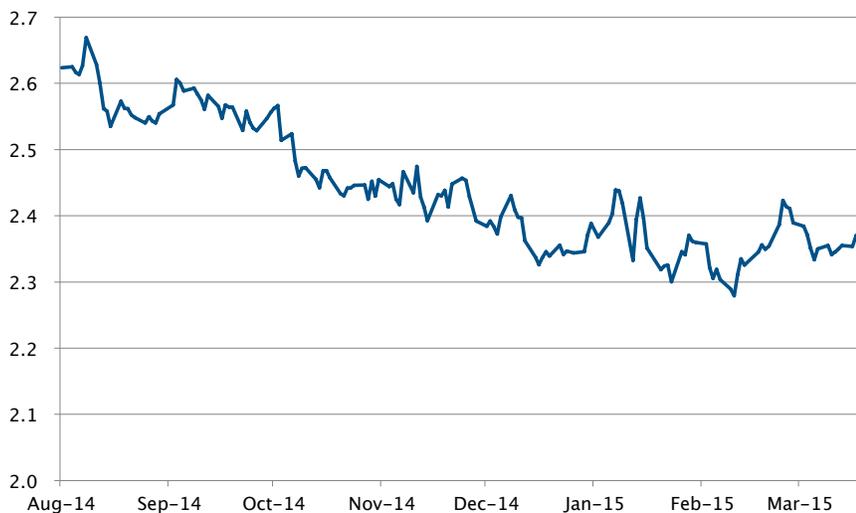
Exhibit 2: U.S. Ending Stocks



Source: USDA

part of the season, and an export pipeline brimming with soybeans worked prices lower early in the quarter. As grower sales picked up either on selling opportunities or cash flow needs and soybean traffic lightened, corn exports picked up and are now nearly on par with year-to-date (YTD) averages for previous years – but 2014/15 exports are projected to be 6 percent below last year. While the demand for corn has improved since the start of the quarter, U.S. ending stocks in 2014/15 are expected to be 44 percent higher than last year, keeping

Exhibit 3: New Crop Soybean/Corn Price Ratio



Source: CME

Note: Ratio calculated as Nov 2015 soybean price over Dec 2015 corn price

isn't likely to trigger a prolonged bullish price response as stocks will remain comfortable.

Soybeans

In 2014/15, soybean production is set to increase in all of the top-ten producing countries, with the exception of a slight reduction in Uruguay. Global soybean production will set a record with current estimates showing an 11 percent increase over last year. With global soybean ending stocks in 2014/15 surpassing the previous year by 35 percent, global supplies should be plentiful heading into the 2015/16 market year.

The lightning fast U.S. soybean export pace following the 2014/15 harvest ratcheted lower in the first quarter following seasonal trend. While U.S. exports are projected to increase 8 percent over last year, record production will boost ending stocks to over 3 times year ago volumes and 1.5 times larger than the previous 5-year average. Record South American production will add to available soybean supplies in 2015/16. At the close of the 2014/15 market year, Brazil is expected to increase its ending stocks by nearly 50 percent while Argentina will increase its ending stocks by 20 percent. A large increase in available South American supplies and the current downward trend in the value of the real will provide

headwinds to U.S. soybean exports through the remainder of 2014/15 season and into 2015/16.

South American soybeans are now mostly harvested and in transit to the seaports amidst farmer protests in Argentina and trucking strikes and fuel shortages in Brazil. The recent turmoil in South America created brief soybean shortages at key Brazilian ports. With the supply lines restored, foreign buyers will look increasingly to South America, and less to the U.S., for soybeans.

The U.S. soybean crush is expected to increase 4 percent in 2014/15 with exports of soy meal increasing 11 percent. Since the start of the calendar

year, soybean meal prices have fallen around 7 percent in line with soybean price reductions.

The USDA's prospective plantings estimate for U.S. soybean area points to a slight YoY increase, which would set a new record high of 84.6 million acres. However, given the current outlook for good planting conditions, corn planting may start earlier than usual, favoring corn over soybeans. And at less than 2.5 during 2015 YTD, the soybean/corn price ratio is currently showing a slight advantage to planting corn, whereas the average price ratio has been 2.52 since 1975. (See Exhibit 3.)

However, soybeans may be seen as a less costly crop to plant and therefore less risky all else equal. The additional soybean acres and ample carryover stocks are likely to prevent sustained price rallies in the near to medium term.

Wheat

The U.S. continues to be the residual supplier of wheat in the global market. Hard red winter wheat prices have fallen over 14 percent since the start of the first quarter. The quality of U.S. produced wheat will be increasingly important for demand in a well-supplied market. Record setting global wheat production in 2014/15 continues to place strong competition in wheat export markets despite a YoY shortfall in U.S. production. While Australia,

Canada and the U.S. had short crops, the EU and Black Sea region countries raised excellent wheat crops. Growing wheat supplies have outpaced demand. If the 2015/16 crop has a normal growing season, stocks will continue to build and prices will likely retreat.

Given the limited price reaction to the tax increases on Russian wheat exports in early February, the market has signaled that wheat supplies are more than sufficient for the 2014/15 market season. Much of the gap in supplies that would have been filled by Russian wheat was filled instead by the record EU production. During the rest of 2015, weather will be the driver of directional price trends. Wheat's ability to recover from harsh weather conditions creates challenges in estimating weather driven production issues. Absent major weather concerns in key wheat producing regions, there is little evidence to make a bullish case for wheat.

Total U.S. wheat acres are projected to decline 3 percent in 2015/16. However, improved yields and fewer abandoned acres, given an assumption of better growing conditions, are expected to boost total wheat production and ultimately raise domestic ending stocks.

If estimated ending stocks increase, prices will likely move lower and provide opportunities to feed wheat and export more bushels. Wheat feeding is a viable option when wheat prices are 10-15 percent higher than the price of corn. While exports and wheat feeding could increase demand potential, the additional use is unlikely to be enough to move the needle over the medium term.

Ethanol

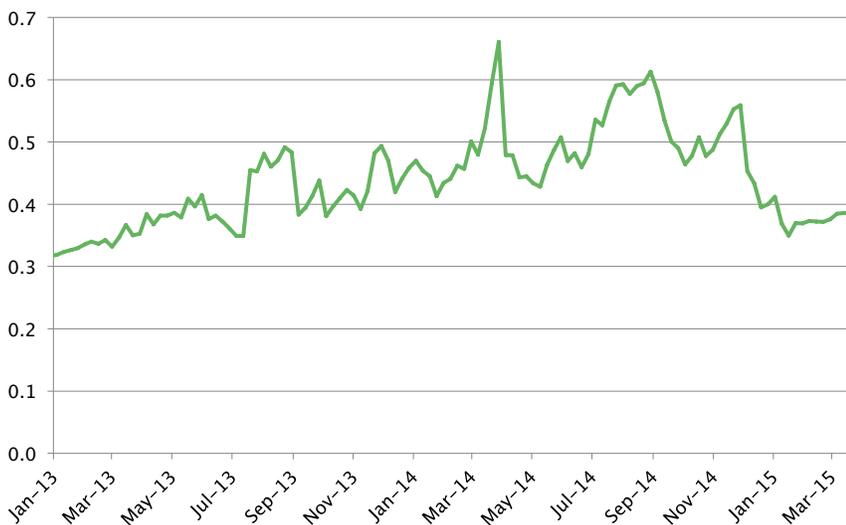
The ethanol industry has been impacted by the decline of oil prices to a far greater extent than most other agribusiness sectors. But despite oil's negative impact on ethanol prices, plant operators are maintaining positive margins, albeit at much lower levels. Margins have been supported by favorable price relationships of plant outputs (ethanol, distillers grains, and corn oil) as their prices have generally trended higher than input costs (corn and natural gas) and substitutes (gasoline and crude oil).

Ethanol prices have fallen by more than half since their peak a year ago; but relative to gasoline prices, ethanol is still valued above its historical average. Prices for distillers grains (DDGs), an ethanol co-product, have also improved relative to corn prices. And the value of corn oil has

remained relatively steady over the past year, even as corn and crude oil prices both fell sharply. All of these price relationships are keeping most ethanol producers in the black.

The most important price relationship for plant operators, however, has not moved in their favor. The ethanol/ corn price ratio has recently hovered near 2-year lows, compressing margins from over \$2 per gallon in early 2014 to roughly \$0.10 per gallon in Q1-2015, and the forward price curves for ethanol and corn point to further margin deterioration through 2015. (See Exhibit 4.) The futures market has priced in a consistent carry in the corn market through mid-2016, which would add nearly \$0.50 per bushel by next July. Conversely, ethanol's

Exhibit 4: Ethanol/Corn Price Ratio



Source: CME
 Note: Ratio calculated using nearby futures prices

forward curve shows a consistent slippage in price into 2016. These divergent trajectories signal the market's expectation for corn supplies to tighten through the coming year, and ethanol supplies to build.

Much of ethanol's pricing will depend on foreign buyers' appetites in coming months. Ethanol production has steadily increased since bottoming in 2013. Plant output is now 6 percent higher than a year ago, and 17 percent higher than 2 years ago. Meanwhile, domestic use has grown only marginally, with no dramatic increase expected over the medium term. Therefore, export sales will largely determine inventory levels. Ethanol exports, which rose to a 3-year high in 2014, wobbled toward the end of the year, and could be vulnerable through 2015 as petroleum-based octane remains inexpensive.

Policy will also have its say in the pricing of ethanol in coming months. The Environmental Protection Agency is long overdue in determining mandated blend levels for 2014 and 2015. The Agency is widely expected to release its new blending schedules for 2014 (retroactively), 2015, and 2016 within the next couple of months. The updated mandate could have an appreciable impact on prices, but at this point it is entirely unclear in which direction. Congress has also taken renewed interest in the Renewable Fuel Standard (RFS), with a few lawmakers recently proposing a bill that would overhaul, and weaken, the mandate. While such a bill is unlikely to gain enough momentum to pass in both the House and Senate, there is noticeably less support for biofuels in this newly formed Congress than in those of the past several years.

Animal Protein Industries

The animal protein complex is still in the early stages of an aggressive expansion of meat supplies. Domestic demand for meat remained intact in early 2015, but the industries will have several headwinds to overcome in both the domestic and international markets as the year progresses. Beef supplies will remain in short supply throughout 2015 and much of 2016, with no material increases in beef production expected until 2017 and beyond. In contrast, pork output is rapidly outpacing previous forecasts, and

“*The animal protein complex is still in the early stages of an aggressive expansion of meat supplies.*”

prices are adjusting to clear the available supply. Poultry output continues at a disciplined growth rate and prices are holding steady. However, fears of highly pathogenic avian influenza (HPAI) and its trade implications have the industry concerned about an oversupply of product that will need to be absorbed by U.S. consumers.

Beef

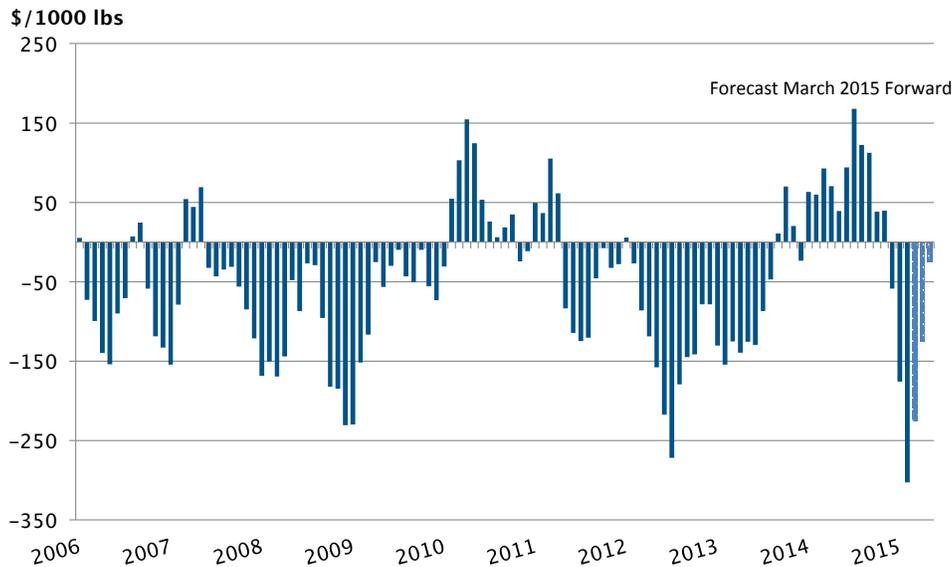
The U.S. beef cow herd bottomed out in 2014 in its most recent inventory cycle, and is currently in the early stages of herd rebuilding. According to the USDA's Cattle Inventory Report issued in January 2015, the U.S. beef cow herd grew 2 percent and beef replacement heifers grew 4 percent in 2014.

Off the heels of a very profitable 2014 for all sectors of the supply chain, the marketplace is answering the call to produce more pounds of beef in the future. Lower feed prices, improved pasture/range conditions, and continued strength of demand both domestically and internationally have contributed to the profitability picture and provided incentive for producers to grow the cow herd. However, a significant increase in the beef supply probably won't be realized until 2017.

Total U.S. beef production is expected to ease 1 percent in 2015, with the decline front-loaded in the first half of the year. YTD beef production in 2015 is currently down nearly 5 percent versus a year ago. The industry expects 2016 output to be virtually flat, with continual YoY increases beginning in 2017. Mother Nature is the single most unpredictable and influential factor in beef's outdoor production system, with the ability to derail current herd rebuilding progress.

Volatility in the marketplace and uncertainty about the consumer's willingness to support record-high prices will be ongoing concerns. Proper risk management strategies

Exhibit 5: Average Returns to Cattle Feeders, Southern Plains



Source: Livestock Marketing Information Center

are paramount to the beef industry's ability to preserve the equity that was captured in 2014, especially for those margin operators in the business.

The profitability outlook remains brightest for cow/calf producers. Net returns per cow are expected to be slightly lower than 2014, but average net returns should remain at a very profitable level of nearly \$500/cow. It is this sector that will dictate just how fast the herd expansion unfolds. Given beef's long production cycle, one can confidently predict that feeder cattle supplies will remain tight throughout 2015 and into 2016.

Tight supplies in combination with "green grass fever" as we head into spring-like weather patterns should be supportive of calf and feeder cattle values into the summer grazing season, trumping concerns of softening supply and increased production of competing meats. Cow/calf producers will benefit from competition among market participants up the supply chain as they work hard to secure adequate supplies.

Cattle feeders face a much more challenging business environment in 2015 versus the healthy profitability that was experienced in 2014. The fundamental shift

downward in feed grain prices remains intact and will be a positive factor for profitability. However, projections from Livestock Marketing Information Center suggest that feedlots will post substantial losses during upcoming closeout months, primarily reflecting significant declines in projected fed cattle prices since feeder cattle were purchased in the mid to late 2014 timeframe.

Looking ahead, the number of available cattle for placement on feed will continue to decline over the next couple of years causing continued competition to fill pens. Lower feed costs are not fully compensating for high feeder

cattle inputs and the correction in fed cattle futures prices. On the revenue side of feedyard operations, fed cattle prices should remain supported throughout 2015 by tight front-end supplies, but will ultimately be determined by consumer demand for beef. Cattle feeding margin levels will be a concern in 2015 and proper risk management strategies will require detailed attention. (See Exhibit 5.)

Owing to the tight supplies of market-ready cattle, the packing industry continues to experience excess capacity. Packers are faced with the dilemma of procuring enough cattle to efficiently operate their plants, while uncertainty looms regarding the sustained demand pull-through that largely influences packers' profitability. High YoY fed cattle prices and a disproportionate rise in beef cutout values pushed packer margins into the red during 2014. Packer margins will remain a challenge throughout 2015, but they could turn out to be better-than-expected insofar as robust consumer demand supports record-high retail beef prices.

Beef demand, in fact, has held up surprisingly well in the face of record-high retail prices in the U.S. January was an excellent month for beef demand, with retail prices

increasing an impressive 17 percent YoY, exemplifying the consumer's willingness to pay higher prices. The continued strengthening of the U.S. economy and lower gas prices should support the trend of robust beef demand in 2015. However, the realization of greater supplies of domestic pork and poultry and thus lower prices has the potential to create some headwinds curtailing the continued strong growth in beef demand.

U.S. beef exports are experiencing pressure from a strengthening U.S. dollar and increased global competition. According to the U.S. Meat Export Federation, beef exports were at a 4 month low in January. However, beef export value averaged \$271 per head of fed slaughter, a figure that is \$20.26 higher than year ago levels. Temporary shipping delays caused by the West Coast labor dispute disrupted trade flows, and global competitors capitalized on the U.S.'s inability to move product in a timely fashion. On top of that, the weakened currencies of our major beef exporting competitors (i.e., Australia, EU, Brazil and Canada) have made U.S. product relatively more expensive on a global stage.

Limited supplies of U.S. beef production in 2015, along with a strengthening dollar, could constrain beef export

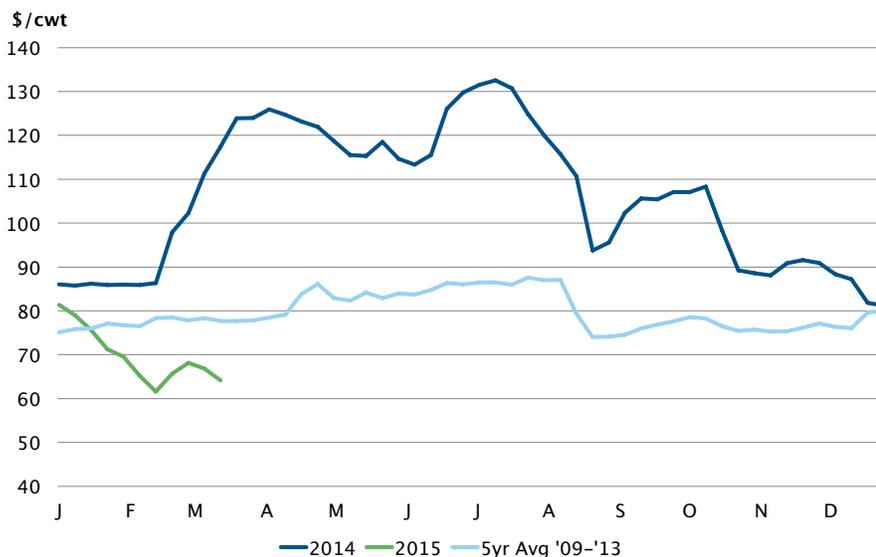
potential in 2015. At the same time, a stronger U.S. dollar and continued strong demand for ground beef will support import demand, but a tightening of supply in Australia will limit growth of lean trimmings imports into the U.S. in 2015.

Pork

Since late last year, the hog and pork industry has shifted from a situation of scarcity to one of oversupply. Hog prices have plummeted, while supply has ballooned far beyond the level previously forecasted. Two major factors have contributed to this reversal. First, export sales to key Asian destinations have slowed significantly, partly in response to a strengthening U.S. dollar. Second, the impact from porcine epidemic diarrhea virus (PEDv) on hog losses has greatly diminished.

Those two forces have quickly and dramatically altered the business landscape for the U.S. hog and pork industry. Average hog prices in Q1-2015 were nearly 35 percent lower than year ago levels. (See Exhibit 6.) Production has moved sharply in the other direction. Whereas total production slipped 2 percent in 2014, it grew nearly 4 percent during the YTD-2015. Total production for all of 2015 is expected to be up 6 percent.

Exhibit 6: Lean Hog Nearby Futures Price



Source: CME

Asian import demand has been strong, but the U.S. port bottleneck will hurt sales to the region for the next several months. The port dispute was settled in late-February and product flow should return to normal within a few months, but it will take time to regain the Asian customers whose orders were not fulfilled during the strike. In January, pork exports were down 16 percent in volume and 15 percent in value. The port slowdown, the strengthening U.S. dollar, and competition from relatively cheaper EU pork in the global market have created serious headwinds for U.S. pork exports.

This glut of supply in the domestic market has changed the bargaining leverage for market participants. Not

only did product destined for the export market end up in domestic supplies, but the efficiency gains of less than expected losses from PEDv have started to show up in the form of increased market-ready hog numbers at a faster than expected pace. Pigs per litter, a key measure of production efficiency, was a record-high 10.17 for the December 2014 to February 2015 pig crop – highlighting the industry’s resilience in swiftly reducing the impact of PEDv. The abundance of supply has tilted pricing leverage further in the favor of retailers and foodservice operators at the expense of packers and producers.

In an effort to remain current and make room in the barns for an increased supply of feeder pigs, the industry is starting to see faster marketings, and reduced carcass weights are the result. Weights could easily run below year ago levels through the summer, reducing production relative to slaughter head counts. Given the current pace of production growth in early 2015, the industry has concerns of reaching seasonal packing capacity in late 2015 and major concerns for the same period in 2016.

With fundamentally lower feed inputs and the outlook for production costs to remain relatively constant, producer profitability is dependent on hog prices. The erosion of prices in the oversupplied market has pressured producer margins in the latter part of the first quarter, which have at times been in the red on a cash-to-cash calculation. It seems likely that the hog and pork markets found seasonal lows in February, and if that holds true, producer margins should improve with better hog prices and steady production costs.

Pork packer margins declined in early 2015, but remained positive through mid-March. Aspirations for improved pricing through the summertime hinge on the cutout value, which has the potential to be supported by robust demand. At the same time, however, the concern looms that pork prices will be influenced by excess poultry supplies in the domestic market. The protein markets are dynamic and are expected to heavily influence each other in 2015 as the markets will ration the available supply at the appropriate price level.

Poultry

The ultra-contagious highly pathogenic avian influenza (HPAI) in the U.S. has created enormous uncertainty regarding broiler production in 2015. The former consensus forecast of disciplined supply growth and healthy profitability is now in doubt.

Fears of trade restrictions are growing as avian flu has jumped from the Pacific flyway to the Mississippi flyway, and positive cases are found in turkey flocks in key poultry producing states. If the bird flu continues to spread and trade restrictions are imposed, the result would likely be a supply glut in the domestic market, which would have ripple effects for production and profitability across the poultry, beef, and pork complexes. It’s important to note that positive cases have only been found in backyard flocks and on commercial turkey farms, not commercial broiler flocks. Nevertheless, several other countries have implemented bans on specific states and have included all poultry, including broiler products in the bans.

How serious this HPAI problem becomes depends on the degree to which the avian flu spreads, and also on how importing countries will respond. Should the flu incidence worsen, export sales could decline rapidly, leaving greater supplies to weigh on the domestic market. Lower prices would quickly follow in order to attract new domestic and foreign customers. The U.S. poultry export markets are very diverse, with 154 countries as current customers. Mexico is by far the biggest customer, representing 21 percent of U.S. chicken exports and 63 percent of U.S. turkey exports. Beyond Mexico, no other individual market makes up more than 6 percent of the total export volume.

Broiler production continues to experience steady growth, with the hatchery flock stabilizing and increasing in early 2015. Gradual increases are expected throughout the year. Chick placements have increased 3.5 percent YTD, while average weights have risen over 4 percent, lifting broiler production 6 percent YoY.

The profitability outlook remains positive, pending any potential negative pricing impact of trade restrictions. Improvements in performance metrics such as livability, feed conversion, higher breast meat yield and live weights

will also contribute to increased production volume. Along with lower feed costs, these production efficiencies equate to lower overall production costs and should help maintain solid industry returns. Average live weights are expected to increase as more companies are shifting toward a larger proportion of big bird production. Whole bird values remain well supported inasmuch as the shift to larger birds decreases the available supply of small birds.

Looking forward, the broiler hatchery supply flock will gradually grow in numbers through 2016. The resulting increase in chicks placed and an expected gradual rise in average live weights should equate to steady 3 to 4 percent YoY increases in total output through 2015 and 2016. Overall production costs should drift lower over the next two years with a favorable grain price outlook. As the industry grows per capita supplies in the next two years, we can anticipate a slight erosion of wholesale prices for whole birds, boneless/skinless breast meat, and wings. In contrast, leg quarter export volume and prices will remain an unknown until the market processes avian influenza impacts on trade volumes and the resulting domestic supply of dark meat. Industry profitability will be highly dependent on how the trade situation unfolds.

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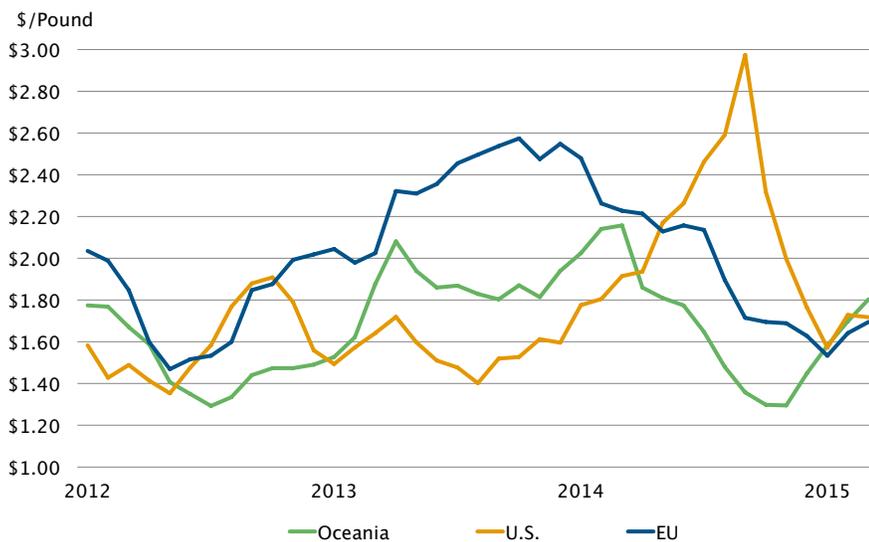
The shifting landscape for competing meats will heavily influence poultry prices in coming months as well. Record high beef prices have the potential to provide support to the entire meat complex, which could only improve the profitability outlook for broiler production. Alternatively, growing supplies of chicken and pork, and the resultant lower prices, will widen the price gap between beef and other meats, potentially limiting upward price movements for the entire red meat complex.

Dairy

Dairy product markets appear to have stabilized in recent weeks, confounding the gloomy predictions circulating in the closing weeks of 2014. The unforeseen event that turned the tide of global negativity was the headline news that New Zealand was experiencing another drought and that milk production there would be off sharply from earlier forecasts.

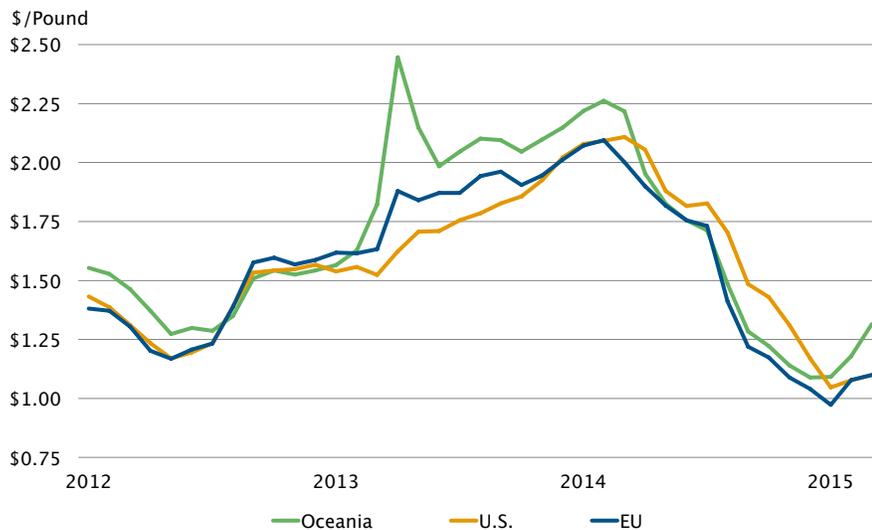
Since year-end 2014, global dairy product prices have leveled off, and so have U.S. product prices. Here and abroad, dairy product prices today are far below the cyclical highs posted last year. (See Exhibits 7 and 8.) However, dairy product prices on the CME did stage modest rallies during the first quarter. Butter prices, for example, climbed to \$1.71 a pound for the week of March 14 from \$1.55 in the week of January 24. Block cheddar cheese prices advanced to \$1.57 a pound for the week of March 14 from \$1.48 in the week of January 24. And nonfat dry milk

Exhibit 7: International Butter Prices



Sources: USDA and CME Group

Exhibit 8: International Skim Milk Powder (SMP) Prices



Source: USDA

(NDM) prices rose to \$1.13 per pound in the week of March 7 from \$0.99 in the last week of January.

With the dairy product markets having stabilized, the worst of the current cyclical downturn appears to be over for dairy processors and manufacturers. Granted, dairy product prices here in the U.S. are still running at a slight premium to those in global markets, suggesting that U.S. prices may still have a ways to fall before they reach the cyclical bottom. But the disparities between U.S. and global prices are appreciably narrower than they were in the closing months of 2014, and the steep fall in U.S. milk prices over the past four or five months has brought them back into alignment with U.S. product prices – and, in the process, restored processors' and manufacturers' margins to wider, more normal levels. Assuming that U.S. dairy product exports end up no worse than they did in January, dairy processors and manufacturers should be able to book stable, somewhat improved margins during the rest of the year.

Global milk production continues to expand. There are sharply conflicting assessments of the rate of expansion. At the high end, one estimate has milk production for the big three global producers (i.e., the EU, New Zealand, and the U.S.) growing at 2-2.5 percent a year. At the low

end, another estimate has it not growing YoY at all in January for the top six global exporters (i.e., the same three above, plus Australia, Argentina, and Brazil).

Both of those estimates of global production are well below the 4 percent-plus growth posted during much of 2014, so global production is definitely slowing – and that's a positive for the outlook. Similarly, U.S. milk production grew around 2 percent a year in early 2015 from 2.4 percent for all of 2014. Last year's rapid growth in global milk output clearly outpaced world demand, especially during the last four to five months of the year, and it was this imbalance that triggered the sharp declines in global product prices. In

coming months, the slowdown in global milk production will allow global demand to catch up. However, which of those two estimates proves to be closer to reality will make a big difference in how global market conditions unfold during the rest of the year.

Uncertainties abound concerning global dairy production and pricing:

1. Drought conditions in New Zealand have impaired milk production there. However, since these dry conditions were first reported in January 2015, recent rainfall and favorable weather forecasts have diminished concerns. The growth in milk production there will clearly fall short of last year's bullish forecasts, yet it is unclear today whether the YoY growth will end up being positive.
2. Russia's ban on dairy products imported from the EU, Norway, Australia, and the U.S. remains in effect. Hence, the substantial production of dairy products in those targeted countries that would have gone to Russia (especially the EU) will now have to be redirected to other dairy importers or end up as greater inventories. Either way, dairy product prices will face compelling downward pressure in the global marketplace.

3. The EU's dairy quotas formally ended as of March 31, 2015. In response to a slowdown in EU exports and to the prospect of super-levy fines for over-quota production, dairy farmers there applied the brakes to production in the opening months of 2015. Following the quota sunset, dairy production is likely to grow, perhaps substantially.
4. Chinese importers of dairy products remain on the sidelines. Their demand for milk powders slackened appreciably during the second half of 2014, following decidedly aggressive purchasing during the first half. Its milk powder imports in January were down 36 percent from a year ago. Analysts are anticipating that China's overstocked inventories will be whittled down later this year to the point where the Chinese step up their purchases from abroad. But it's hard to say exactly when that will occur.

“*The near-term outlook for U.S. dairy producers can be summed up as highly uncertain.*”

Lags in the issuance of market statistics compound the global marketplace's opacity. It's possible to construct alternative scenarios that would propel global dairy product prices either upwards or downwards. In our judgment, the downside risks will predominate during the rest of the year; but if global dairy product prices do end up ratcheting lower, the declines will likely be less dramatic than those that occurred late last year.

U.S. dairy exports fell sharply in January. In volume terms, cheese exports were down 26 percent from a year ago to their lowest level since February 2013; butter exports fell 82 percent; NDM exports slipped 10 percent, and whey exports dropped 27 percent to their lowest level since January 2008. Total U.S. exports, on a milk solids basis, accounted for 11.2 percent of U.S. production in January, down from the 15.4 percent exported on average in 2013-14. This disappointing

outcome was the result of the U.S.'s uncompetitive dairy product prices, the pronounced run-up in the value of the U.S. dollar, the Russian ban on imports from the West, and China's sharp pull-back on dairy imports. Absent a material improvement in the U.S.'s current market environment, its dairy exports aren't likely to fare much better during the next six to nine months than they did in January.

Against this backdrop, the near-term outlook for U.S. dairy producers can be summed up as highly uncertain. In recent months, milk prices have skidded downward, and so have producers' dairy checks. The Class III milk price, for example, was about \$15.50 per hundredweight (cwt) in March, versus \$17.82 in December and \$23.33 a year ago. Classified prices for the other milk classes have also fallen. But even at these lower milk prices, producers were still reportedly making money on the milk that was produced, though margins were far below last year's cyclical highs. Futures prices for Class III and Class IV milk point to further modest dips in milk prices during the next few months – followed by an upturn in prices during the second half of the year. And in that event, producers' margins would trace out a similar path, narrowing slightly in the next few months and then reversing and widening.

Many dairy analysts maintain that the dairy production side of the industry is nearing the cyclical bottom with milk prices then staging a modest rebound during the second half of the year. Producers' margins are the lynchpin behind this forecast. Analysts at Blimling and Associates, for example, are projecting that producers' margins nationwide will bottom out at about \$2.00 per cwt in the spring (far below the \$10.00-plus cyclical peak posted last fall) and then widen to about \$4.50 by year-end 2015. Under this scenario, most dairy operations should remain in the black throughout the rest of 2015. With margins having shrunk from a year ago, analysts are also projecting that growth in U.S. milk production will slow to about 1 percent during the second half, thus facilitating a possible upturn in milk prices.

While this scenario conforms not only to the consensus outlook but also to futures prices, lending it additional credibility, it does rest on a key assumption – namely,

that the four major uncertainties identified above end up counterbalancing each other so that global dairy product prices are left little changed from current levels. This is indeed the outcome that industry insiders are expecting to see. However, the risks lean toward the downside.

Other Commodities

Cotton

Cotton growers continue to battle burdensome global supplies, long after China began stockpiling bales. (See Exhibit 9.) U.S. 2014/15 production exceeded expectations on good yields and lower than average abandonment rates. With continued weak demand for cotton products, and prices hovering near \$0.60 per pound, U.S. planted area could decline as much as 15 percent in 2015, to a 6-year low. Even this reduction in plantings may not be enough to curtail supplies, however. Factoring in an average yield and abandonment, the domestic stocks-to-use ratio is expected to remain just under 30 percent for a second consecutive year.

World plantings are likely to slide only 5 percent this spring, preventing a global supply reduction. Oil's price

collapse has furthered the price competitiveness of synthetic fibers over cotton, widening the divide for two straight quarters. While an improving global economy is expected to increase demand for clothing and textiles, cotton will reap a declining share of that benefit. Global cotton stocks-to-use is forecast to remain steady in 2015/16, with roughly one year's worth of supplies expected in inventory. In like fashion, prices are expected to be flat to down, with limited opportunities for upward price pressure in the coming season.

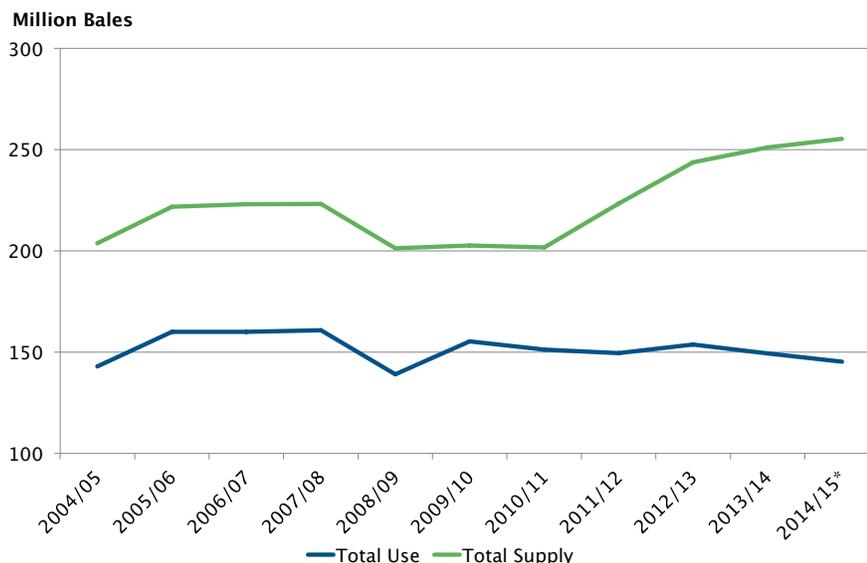
Rice

The U.S. rice industry has experienced a healthy rebound in demand during the 2014/15 season. U.S. long grain production, accounting for nearly two-thirds of the U.S. rice crop, hit a 4-year high this year. This has enabled the U.S. to regain competitiveness in export markets. Long grain ending stocks will climb by more than 50 percent in 2014/15. In contrast, small and medium grain rice, challenged by water restrictions in California, did not see a resurgence in production this year. Prices for the two varieties have remained above multi-year averages, and export sales have suffered as a result.

Globally, the rice situation has tightened slightly over the past two years, and is projected to do so again in 2015/16. World production has been steady on consistent area and yield, while consumption continues to climb with population increases. The result will be a third consecutive year of declines in stocks-to-use, which could fall below the recent lows of 2006/07 and possibly test 40-year lows. If such a situation develops, it could aid U.S. exports and support prices for Mid-South producers.

Still, U.S. rice plantings are likely to slip in 2015. Lower long grain prices have incentivized growers in the South to diversify their plantings into alternative crops. And a deal in California to sell water from the North to municipalities in the South will again

Exhibit 9: World Cotton Supply and Use



Source: USDA

limit water access for the state's rice producers. U.S. long grain stocks and price levels in the upcoming crop year will be largely determined by South America's appetite for foreign rough rice. Forecasts now project slight increases in crop output there, which would limit the potential for expanding U.S. exports. Therefore, the U.S. all-rice season average cash price would likely erode slightly from this year's low-to-mid \$14 per cwt to mid-\$13 per cwt in 2015/16.

Sugar

On March 19, the U.S. International Trade Commission voted to uphold a controversial agreement that will change Mexico's ability to export sugar to the U.S. The agreement was signed in December with the aim of applying limits to Mexican imports and setting minimum import prices. Prior to the agreement, U.S. sugar producers had alleged that Mexico was dumping subsidized sugar in the U.S. under the protection of the North America Free Trade Agreement (NAFTA).

Earlier in 2014, the U.S. levied import tariffs on Mexican sugar after ruling that it was being illegally dumped in the U.S. The new agreement does away with the tariff. While the pact applies limits to imports from Mexico, it also provides clarity for both sides, and will normalize the sugar trade again. Mexican imports will increase in the coming months as a result, and sugar supplies in the U.S. will be adequate for the remainder of 2014/15 and into 2015/16. Domestic prices had fallen modestly over the past few months in anticipation of the ruling, but are still well above multi-year averages. The decision benefits U.S. growers, but is unfavorable for U.S. sugar refiners and food manufacturers. The agreement officially tightens access to U.S. sugar markets at a time when sugar is in ample supply throughout the world and world sugar prices are at multi-year lows.

U.S. sugar production is up slightly in 2014/15, on improved yields for Florida sugarcane. Spring planted area for sugarcane and sugarbeets is expected to be relatively unchanged compared with last year, with the potential for a slight uptick in sugarbeet acreage. Going forward, U.S. prices will be determined largely by the level of Mexican imports. U.S. supplies are expected

to gain modestly, but prices will remain at historically elevated levels in the low 20 cent per pound range.

Specialty Crops

California's rainy season is nearing an end. It usually extends from October through April. With a few weeks left to go, California's water situation looks bleak. Absent unusually heavy rainfall over the next few weeks, California will enter its fourth year of severe drought.

All Californians, including farmers and ranchers, are facing significant water restrictions, except for the Imperial Palo Verde, and Coachella Valleys, which draw their water primarily from the Colorado River. As of late March, California's vast network of reservoirs was only about 66 percent of historical levels, slightly better than a year ago but still well below the level needed to forestall punishing water restrictions. As of March 7, the Sierra Nevada's snowpack, which would normally provide about 30 percent of the state's water supply as it melts in the springtime, had less than one-quarter of the normal amount of water stored in the snowpack, its second lowest level on record.

Reduced water allocations for junior rights holders have already been announced by the two 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); governed 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.) 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 water rights holders may also see cutbacks in their allocations.

California agriculture will be especially hard-hit by the sharply curtailed surface water allocations. Economists at UC Davis estimated that the 2014 drought resulted in a

6.6 million acre-foot reduction in surface water available to agriculture. This year's reduction in surface water allocations will likely be a little less draconian, but still problematic. As they did last year, California's farmers and ranchers will necessarily increase their reliance on groundwater, partly offsetting the sharp curtailment in the allocations of surface water. The UC Davis economists estimated that last year's loss of 6.6 million acre-feet of surface water was partially replaced by increased pumping of 5 million acre-feet of groundwater – for a net shortage of 1.6 million acre-feet. (By comparison, California's farmers and ranchers normally use 34-35 million acre-feet of water a year for irrigation.)

This short-term relief involves a drawdown of groundwater held in reserve storage, resulting in a substantial increase in overdrafting of groundwater and often leading to a deterioration in water-quality. Growers are hoping that this palliative will enable them to get through the year with minimal damage to their crops and that drought conditions will have lifted by next year. They used this same strategy last year and the year before. Due to the increased pumping, groundwater levels are falling, the costs of pumping water to the surface are rising, wells are running dry, and the cost of drilling new wells is rising. Consequently, each successive year of drought exerts more damage to the bottom-line than the year before, and the negative effects are cumulative.

Another year of drought will challenge all agriculture sectors in California, but many growers will be able to adjust plantings and water usage to make it through the 2015 harvests without severe financial impairment to their operations. Last year, for example, many growers fallowed some of their croplands and redirected the water to their more profitable permanent plantings; and they also stepped up their free-market purchases of water, often at highly elevated prices. Late last fall, after the harvests were completed, we reviewed how well six of California's high-margin specialty crops had fared – i.e., almonds, pistachios, walnuts, wine grapes, processing tomatoes, and oranges. [See the Specialty Crops section in CoBank's previous Quarterly Industry Update for Q4-2014.] We found that the 2014 drought had inflicted only minor damage to these six crops, with

“*Another concern weighing on the minds of specialty crop growers – along with all the other agricultural exporters – is the West Coast port dispute.*”

two of them (wine grapes and processing tomatoes) virtually unscathed. Judging by these results, yields for many of California's permanently planted specialty crops ended up lower than the previous year; but the shortfalls were generally more benign than the worst fears of many growers, packers, and processors. We suspect that the 2015 crops will fare similarly.

However, those 2014 outcomes for the six specialty crops understate the drought's overall impact on the rest of California's agriculture sector. Many growers are worried that a fourth year of drought will cause long-term damage to their vines and tree roots, impairing the health of their future crops. In addition, the six specialty crops mentioned above are among California's most profitable, and their growers often chose to divert their limited supplies of water to these permanent-plantings at the expense of their other crops. Hence, even with higher prices and fairly normal harvests, many growers still ended up booking less profit than in previous years, owing to the high cost of securing water and the outright losses posted on their other crops.

In fact, in response to last year's scarcity of water, California's growers fallowed an estimated 425,000 to 450,000 acres of otherwise irrigated cropland, thus generating virtually no income to their owners. (In normal times, California's irrigated land totals about 9 million acres.) In 2015, California's growers are expected to fallow somewhere around 550,000 acres. The hardest-hit crops will again be cotton, broccoli, garlic, peppers, and rice, as well as feed grains. Last year's direct costs of the drought to California's agriculture sector were estimated at \$1.5 billion. This year's losses will likely be even greater.

Another concern weighing on the minds of specialty crop growers – along with all the other agricultural exporters – is the West Coast port dispute. Although the labor dispute itself ended in late February, the congestion from the backlog of containers that accumulated during the four month-long dispute continues to hamper trade traffic through the ports. For agricultural exporters, this delay will mean additional spoilage and losses. More importantly, many exporters are concerned that their Asian customers will turn to alternative suppliers, never to return because of the perceived unreliability of American suppliers.

On the east coast, citrus growers face a different set of challenges. Citrus greening continues to ravage the Florida orange groves and impair production potential. Pockets of severe drought in central Florida have exacerbated the situation. Florida produces two-thirds of the country's oranges, and this year's harvest there is estimated at 102 million boxes, the smallest since 1968. (See Exhibit 10.) Similarly, total U.S. orange production for 2014/15 is estimated at 154 million boxes, also a 47 year low.

Crop Nutrients

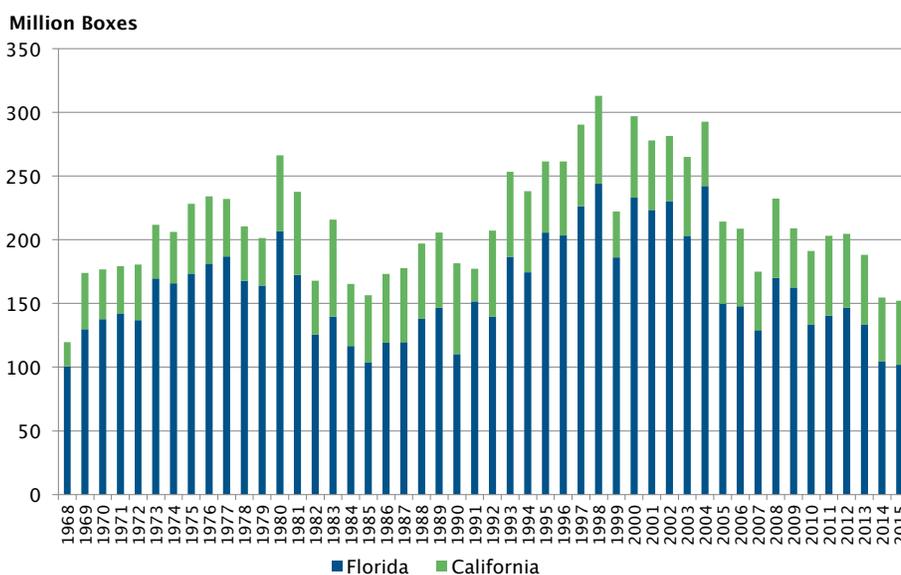
Falling grain prices and reduced acreage are expected to have an impact on farm inputs in 2015. Net farm income is expected to fall 20-30 percent in 2015. USDA projections call for crop receipts to fall by \$15.6 billion in 2015, and corn and soybeans are estimated to account for more than half of the total decline. This highlights the pressure on growers to become more efficient, and thrifter, regarding input procurement. Of the major crop input expenses, seed and chemical costs will remain steady to slightly higher, while fertilizer expenditures will decline marginally as fertilizer use slips. Fuel and oil expenses are expected to fall 27 percent due to the recent decline in crude oil prices.

The current environment of falling grain prices has kept many retailers and producers on the sidelines waiting to purchase inputs. The spring application season will be busier than usual, as many producers were kept out of their fields post-harvest due to weather while others delayed their fertilizer purchases assuming that prices

would fall by springtime. Spring season logistics will become increasingly important as just-in-time decisions are made and field work begins. Retailers remain cautious regarding additional purchases to mitigate inventory price risk.

Ammonia demand was lackluster for 2014 fall application leading to substantial inventory carryovers into the spring season. Domestic prices are trending flat over lack of spring demand thus far. Ammonia prices have fallen slightly since the start of the first quarter and have trended flat for the last few weeks. Carryover tons will fill any early spring demand and alternative origins are expected to fill additional needs in the global market if Trinidad supplies fall short.

Exhibit 10: Florida and California Orange Production



Source: USDA

Plentiful global supplies of urea continue to plague the market. Domestic prices have recently trailed lower as import volumes are above year ago levels and growers have been reluctant to book tons. Wholesale tons are moving into position; but if growers book tons at a brisk pace this spring, prices will likely rise insofar as local demand puts pressure on the just-in-time network. Near term prices will remain under pressure with ample global and domestic stocks. Urea prices should firm as field work picks up.

Competing forms of nitrogen will weigh on UAN prices this spring. Carryover stocks of ammonia are plentiful and as such will have an influence on how many tons of UAN are needed based on weather driven ammonia application this spring. If ammonia can't be applied in a timely fashion, UAN demand will likely pick up. Retailers are putting product in place, but continue to wait for grower demand to pick up before making any additional substantial purchases. Prices are likely to trend flat as we move into the heart of the planting season with the potential to increase if competing forms of nitrogen are not applied.

Phosphate prices have picked up since the close of 2014. Current global demand for phosphates is somewhat limited as buyers are looking for lower prices. South American demand has been on the sidelines waiting for lower prices. Phosphate producers are waiting to see who blinks first with regard to South American purchases and are holding the line with regard to price. Light buying activity has ensued as the U.S. planting season gets closer. However, retailers are still reluctant to bring in large amounts of inventory given the lack of grower purchases. Similar to nitrogen, a large demand increase in the spring will likely raise prices in the current cautious supply environment.

Potash prices have remained relatively flat over the first quarter. Domestic supplies remain constrained, but imports continue to weaken supply concerns. As is the case with the other forms of fertilizer, retailers are reluctant to take on additional tons as grower demand is uncertain. In the short term, potash prices are expected to run flat until grower demand picks up.

A cautious overall tone in the farm supply sector continues as planting expectations have the potential to

shift and grower margin expectations change. Over the next few weeks, there will be more certainty about grower acreage allocations and input requirements, especially in the fringe corn and soybean states that have the flexibility to grow many different crops.

Infrastructure Industries

Communications Industry

Groundbreaking regulatory rulings by the Federal Communications Commission (FCC) in the first quarter dominated headlines. Its first of two major actions came in January with the release of its 2015 Broadband Progress Report, in which it raised benchmark speeds defining broadband (i.e., from 4 megabits per second (Mbps) for downloads and 1 Mbps for uploads to 25 Mbps upstream and 3 Mbps downstream) and deemed U.S. broadband deployment insufficient.

Under the new definition, nearly 17 percent of Americans lack access to broadband – mostly in rural America. While this is almost a three-fold improvement over the 6 percent who had lacked access to 25/3 Mbps speeds in 2011, the number still falls far short of the FCC's vision of ubiquitous broadband access. The 2015 Report also addresses the urban/rural digital divide and reiterates the need for a support mechanism for high-cost rural areas. However, the 2015 Report only cites one-time deployment funding and fails to address the issue of ongoing support that would further incentivize deployment of higher speeds in high-cost areas.

The FCC's second major action occurred in February. In a partisan vote at the FCC's February open meeting, the three Democrat Commissioners affirmed the Open Internet Order and reclassified broadband as a Title II – or regulated – telecommunications service. Highlights of the Open Internet Order include:

- Rules that apply equally to fixed and mobile providers;
- Three “bright line rules” prohibiting blocking, throttling or paid prioritization of traffic;
- A standard of conduct that bars Internet Service Providers (ISPs) from placing “unreasonable”

interference or disadvantage on consumers or edge providers;

- Establishing the FCC's jurisdiction over interconnection, and granting it the authority to monitor traffic exchange agreements and intervene, if appropriate;
- Stronger transparency rules from which carriers with fewer than 100,000 subscribers are temporarily exempted;
- Forbearance from numerous Title II provisions, including key items such as rate regulation, Universal Service Contributions, and new taxes and fees.

“*Consumers' and businesses' appetite for broadband continues to grow and shows no sign of waning.*”

Open Internet supporters, including consumer and small business advocates, applauded the decision while opponents accused the FCC of a flagrant power grab and criticized the move for imposing an antiquated regulatory framework onto modern telecom services. Legal challenges against the FCC's decision are considered inevitable, with opponents arguing that the FCC lacks the authority to impose these new rules. (Verizon accentuated its opposition by posting a press release, back-dated to 1934, in Morse code.) Proponents of the Open Internet Order claim that Title II regulation, if well executed, can spur investment and innovation in the network, citing the wireless industry as proof.

At the very least, the Order creates an opportunity to implement clear, predictable rules and long-term support mechanisms that rural communications companies seek. The new regulations may even afford Rural Local Exchange Carriers (RLECs) a short-term competitive advance inasmuch as these companies have operated under Title II for decades.

Meanwhile, consumers' and businesses' appetite for broadband continues to grow and shows no sign of waning. In particular, online video and the burgeoning Internet of Things (IoT) market are bolstering demand for faster speeds, more capacity, and expanded availability. Wireline broadband traffic is on a steep growth trajectory, and so is the volume of mobile data traffic. Cisco projects that streaming video will account for nearly 80 percent, or 104 Exabytes, of monthly IP traffic by 2018 – by comparison, every word ever spoken amounts to roughly 5 Exabytes. Netflix alone is responsible for the majority of downstream data during peak hours in the U.S., and 34 percent of downloaded video in the fourth quarter of 2014 was viewed on tablets or smartphones.

IoT connections have begun to surge. By year-end 2015, the number of connected devices is expected to reach 25 billion, and then double to 50 billion by 2020. (By comparison, today's total population worldwide is only about 7 billion people.) Providers are upgrading networks to handle the soaring usage. In an informal tally, Telecompetitor found that in 2014 at least 31 providers announced intent to deploy gigabit service to new markets, with 11 of those companies labeled Tier 3 or rural providers. The recent AWS-3 auction garnered \$41.3 billion for valuable wireless spectrum capable of delivering broadband.

Many top communications and technology companies are focused on capturing part of the IoT market. Gartner, a research consultancy, estimates that incremental revenues from IoT products and service providers will exceed \$300 billion in 2020. The IoT market covers a lot of ground, ranging from cars and houses to manufacturing and agriculture, and opens up vast opportunities. AT&T's strategy, for example, targets consumers with an integrated smart home/car dashboard, while Verizon plans to package applications, connections and cloud storage for the enterprise market. Wireline providers may find success in smart home/business and health care monitoring. In a recent IDC study, nearly two-thirds of respondents indicated they plan to adopt new smart home solutions within the next four years. More than 60 percent of seniors said they would welcome access to health-tracking devices.

Traditional pay-TV providers see little opportunity in the booming consumption of streaming video. Their business model is constantly being challenged by the steep content costs, new technology, and shifts in consumer behavior; and the new Open Internet regulations may add yet another difficulty. Thus far, pay TV providers have been able to sustain the model with TV-everywhere platforms and coveted sports content, while bolstering their revenue with broadband and enterprise services. But live TV viewing actually declined in 2014. Last year, nearly 40 percent of Americans subscribed to a streaming video service, while cable subscriptions fell 9 percent among adults, following a 3 percent decline in 2013. With content giants HBO and CBS slated to begin offering programming directly to consumers in the next quarter (accessed via the Internet and Over-the-Top [OTT] devices) and the penetration rate of households with a streaming OTT device projected to reach 40 percent within the next two years, the potential for a shift to an a la carte business model is a stronger possibility than ever before.

Data centers remain a bright spot within the telecom industry. Over the next 10 years, enterprises are expected to shift 58 percent of data storage to the cloud, more than double the current 28 percent. Fiber transport providers remain an attractive investment due to the stunning, ever-increasing IP traffic and its recurring revenue model. Analysts are keeping a close eye on Windstream's recent REIT spin-off because other mid-tier companies may follow suit. However, the Open Internet Order may emerge as a roadblock for this segment of the industry because it allows for FCC oversight of interconnection agreements.

With increasing amounts of data stored in the cloud and the number of online hacking attacks having doubled last year, cybersecurity is fast growing in importance. Consumers name privacy as a top concern in relation to connected devices and services. The White House, Federal Trade Commission and FCC have all designated Internet security and privacy as high-priority issues, increasing the likelihood of heightened privacy and security laws and regulations in the near-term. Because communications companies provide the connection to the Internet, policymakers will likely view Internet service

“*U.S. oil production has climbed even as companies have idled drilling rigs at a record pace.*”

providers as integral partners in cybersecurity efforts. Going forward, subscribers will continue to look to their communications providers for solutions to help protect their valuable personal information.

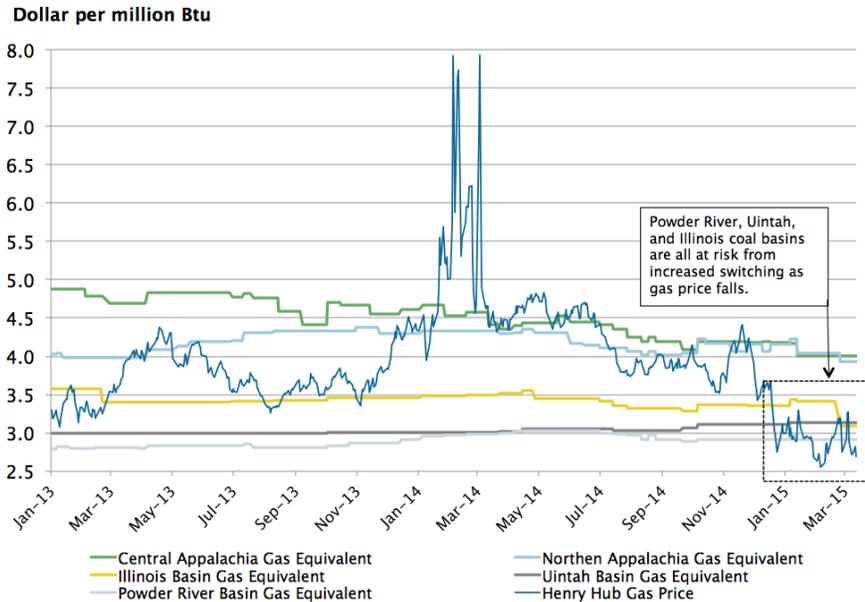
Power and Energy

A brief rally in crude oil prices that began in the first week of February and boosted West Texas Intermediate (WTI) trading to slightly above \$50 a barrel sputtered out by mid-month on the heels of rising U.S. storage volumes. In the past three months, oil supplies at Cushing OK, the hub for WTI contracts, more than doubled to over 50 million barrels, and storage tanks nationwide are almost two-thirds full. This storage glut has clipped about \$10 off the WTI since mid-February and raises the risk of further price slumps to come.

U.S. oil production has climbed even as companies idled drilling rigs at a record pace. Rig counts have declined more than 40 percent in the six major U.S. shale plays since peaking in October 2014. However, oil production in the U.S. continues to expand, although this growth will likely slow in the second quarter, and potentially decline in the second half of 2015. This approaching slowdown in U.S. oil production will also affect volumes of associated gas that is produced alongside crude oil.

Existing gas production in the U.S. experiences a natural rate of decline of around 24 percent per year, or about 16 billion cubic feet per day (Bcf/d). New gas additions have ranged from 18-20 Bcf/d over the past three years, driving annual net growth of 2-4 Bcf/d. Analysts estimate that with the projected slowdown in rig counts, new gas additions in 2015 will taper off to around 16 Bcf/d, resulting in flat growth for the year. However, natural gas demand in the U.S. will likely grow 1.8-3.6 Bcf/d this year.

Exhibit 11: Cost of Coal Generation vs. the Price of Natural Gas



Sources: Bloomberg Intelligence, CoBank

Lower gas supplies and stronger demand later in the year will help balance the domestic gas market and correct the oversupply. Through the first half of March, natural gas prices at the Henry Hub averaged \$2.94 per million British thermal units (MMBtu), compared to \$4.37 in 2014. Prices are likely to remain low in coming months as demand for gas weakens heading into the shoulder season. In fact, prices are likely to trade between \$2.50-2.75/MMBtu until the second half of 2015 when the declining rig counts are reflected in slower production growth. Once production growth wanes and demand picks up in late 2015, natural gas prices will reach more sustainable levels above \$3/MMBtu. Higher natural gas prices later in the year will also help reverse some of the coal-to-gas switching that is currently taking place.

The competitiveness of coal-fired generation will continue to be pressured by low natural gas prices. Generators burning Central and Northern Appalachia coal are the most at risk to fuel switching; but even low-cost, highly efficient coal from the Illinois, Uintah and Powder River Basins will struggle to compete in the current low natural gas price environment. (See Exhibit 11.) Coal-to-gas switching is likely to accelerate through the second

quarter, in response to the depressed gas prices. This trend in fuel switching will likely begin to reverse slightly as demand for electricity increases through the summer.

In addition to temporary coal-to-gas switching, numerous coal-fired units – as much as 13 gigawatts (GW), according to the Energy Information Administration (EIA) – are slated for retirement in 2015. The majority of this capacity, or slightly more than 8 GW, is located in the Appalachia region including Ohio, West Virginia, Kentucky, Virginia, and Indiana. The large number of coal-fired generator retirements is primarily due to implementation of the Environmental Protection Agency's (EPA) Mercury and Air Toxics Standards (MATS)

this year. Additional future coal retirements will likely be realized once the rules for the Clean Power Plan are finalized this summer for both new and existing fossil fuel generating units.

To offset retirements, the EIA expects power generators to add more than 20 GW of utility scale generating capacity to the grid in 2015. The additions will be dominated by wind (9.8 GW), natural gas (6.3 GW), and solar (2.2 GW).

Wind additions will be concentrated in the Plains states. Nearly 8.4 GW, or 85 percent of the total wind additions, are situated between North Dakota and Minnesota in the north, to Texas and New Mexico in the south. The strong growth in wind generation through 2015 reflects the expiration of the production tax credit (PTC) at year-end 2014. The PTC awards a tax credit of 2.3 cents per kilowatt-hour (kWh) to electricity generated by a newly built wind farm, provided (a) that construction was started before, or that at least 5 percent of total project costs were incurred before, the end of 2014; and (b) that the wind project was operational by the end of 2015. However, on March 11, the Internal Revenue Service extended this operational requirement to the end of 2016.

Utility-scale solar additions will be the strongest in states with Renewable Portfolio Standards (RPS) that contain solar-specific targets, such as California and North Carolina. Natural gas additions are spread throughout the country, but Texas is adding more than twice as much as any other state (1.7 GW, or 27 percent of total natural gas additions). There are also many additions in the Mid-Atlantic region, with more than 1.6 GW, or 26 percent of total natural gas additions, expected in New Jersey, Pennsylvania, Delaware, and Maryland.

The remaining three quarters of 2015 will prove to be volatile and transformative for the power and energy sectors. Expected announcements from the EPA on carbon dioxide emissions have introduced greater uncertainty in the power sector over the near term, delaying investment decisions. Record crude oil volumes will likely keep prices low throughout 2015. This will exert greater pressure on U.S. shale producers, resulting in continued rig cuts and slower production growth in the first half of the year, followed by a possible decline in production during the second half of 2015. Declining oil production from U.S. shale basins will result in less associated gas being produced, helping balance the market as gas demand picks up in late 2015. Competitive gas prices will diminish the attractiveness of some wind and solar projects, placing a minor constraint on what would otherwise be untethered growth through 2015.

Water Utility Industry

With California entering its fourth year of drought, water conservation has become a paramount concern among the state's water utilities. Rate structures that encourage less use from retail consumers remain a pillar of water conservation. However, it is all too common for a water utility to achieve progress in implementing cost-effective water conservation with its customers and then subsequently experience a revenue shortfall. Drought conditions are influencing water rate structures in California, and it is important to understand the implications of these demand management policies. As other regions experience similar drought conditions, local water agencies will likely adopt rate structures and other demand management policies similar to those being developed in California.

“*With California entering its fourth year of drought, water conservation has become a paramount concern among the state's water utilities.*”

Many counties in California have already moved towards rate structures that incentivize conservation via price signals to consumers. Inclining block structures are the most prevalent, which impose an increasing unit charge as water consumption increases. In 2003, 39 percent of counties in California had inclining block structures; in 2013, that percentage was up to 65 percent. Although increasing block structures do promote conservation, customers' lower water usage typically translates into lower revenues for the utility.

Furthermore, the majority of a consumer's total water bill, approximately 70 percent, consists of a variable charge, i.e. based on the amount of water consumed. This is problematic because the majority of a utility's costs are fixed. The lack of alignment between fixed and variable costs and revenues becomes an issue when there is a sudden and significant decrease in water demand. In a drought, demand typically falls in response to higher prices. Drought tends to increase the cost of imported water because of market forces and the resultant competition for the now scarce resource. Any utility that relies on recovering a large portion of its fixed costs through volumetric rates can quickly find itself in the red during drought.

Water utilities are struggling to design new water rate structures that simultaneously provide revenue stability while encouraging water conservation – a balancing act often referred to as the “new normal.” At the core of these new rate structures are three key principles. First, rate structures should be designed to fully collect the costs of providing service to customers. Second, they should be built on forecasts that incorporate the effects of efficiency expected from product replacements

and conservation programs. Third, more innovative rate models have emerged that are adapted to today's challenges and can create more reliable revenue streams without sacrificing the pricing signal for conservation. One such rate structure is the so-called consumption-based fixed rates (CBFR) model.

The CBFR model resolves the "new normal" by allowing a utility to maintain revenue stability while sending a strong conservation price signal. The CBFR achieves this by splitting a utility's revenue requirements into three distinct components: fixed, fixed-volumetric, and variable. The innovation of CBFR lies within the fixed-volumetric revenue requirement, which provides fixed revenue based on a user's volumetric water use relative to total water consumption within a service territory. Consumers pay a demand charge based exactly on their volumetric proportion of total water usage, as

calculated over a set period, such as the previous year or a particular season. Including the fixed-volumetric revenue requirement allows utilities to cover their fixed costs, even when an unanticipated decline in demand occurs. Furthermore, a reduction in water use leads to proportional savings on the customers' water bill.

As the drought in California persists, water utility rate structures will continue to evolve to provide price signals that encourage conservation, while simultaneously better aligning fixed and variable costs with fixed and variable revenues so as to ensure more stable financials for the utilities. Moving forward, it is critical for water agencies across the nation to study the lessons learned in California so they can implement robust demand management practices that include innovative rate structures that keep the utility solvent through prolonged periods of volatile weather and climate conditions. ■

This quarterly update is prepared by the Knowledge Exchange Division and covers the key industries served by CoBank, including the agricultural markets and the rural infrastructure industries. Analysts at Plus One Strategic Communications LLC prepared the overview of the communications industry.

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