Renewable Energy & Climate Change Newsletter

AgMRC agricultural marketing resource center

August 2012

in this issue...

prices, profitability and supply/demand

The following spreadsheets have been updated on the AgMRC Renewable Energy web site, http://www.agmrc.org/renewable_energy/.

prices
- midwest ethanol prices
- ethanol basis
- fuel vs. grain (annual)
- fuel vs. grain (monthly)

profitability
- ethanol profitability
- corn profitability
- biodiesel profitability

supply/demand
- corn/ethanol balance sheet
- soy oil biodiesel balance sheet
- soybean balance sheet
- distillers grains balance sheet

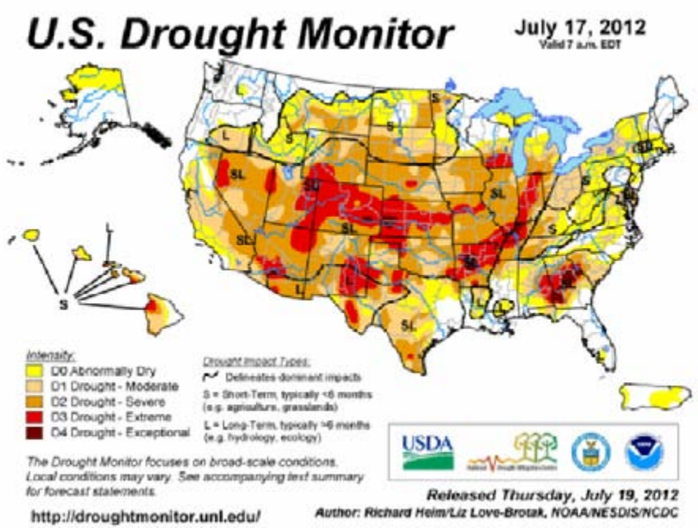
Implications for Ethanol and Other Corn Users of the Shrinking Corn Crop

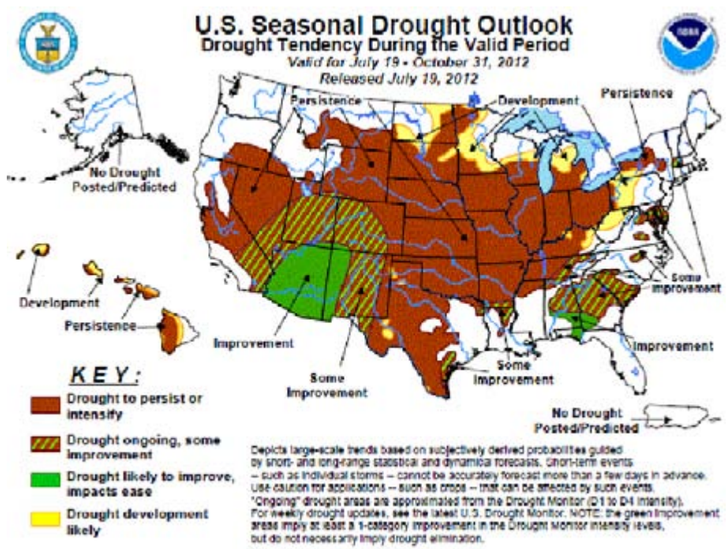
by Dr. Robert Wisner, biofuels economist, rwwisner@iastate.edu

USDA's July 11 World Agricultural Supply and Demand Report (WASDE) verified what virtually all private crop forecasters anticipated, namely that prospective U.S. corn supplies are shrinking. USDA cut its U.S. corn yield projection 20 bushels per acre from last month, to 146 bushels per acre. It should be noted that this yield was not a field-based forecast, but is a judgment of USDA economists of what the potential corn crop may have been as of July 11, assuming weather would be normal for the rest of the growing season. The decline in the potential size of the corn crop reflects severe drought that has affected crops across much of the mid-section of the U.S. It is almost certain that the corn crop has been reduced further since the USDA economists made their projection. The next official indication of the corn crop's size will be on August 12 when NASS, USDA's August field-based crop forecast (the first actual farm-field based forecast of the season) is released. That report will be based on crop conditions at the end of July and the beginning of August. The July 12 projection placed the U.S. corn crop at 12.95 billion bushels, still 4.2% above last year's harvest because of increased planted acreage.

If achieved, a crop of that size would be expected to produce adequate but still relatively tight corn supplies for the year ahead. However, virtually all private forecasts now anticipate that both the corn acres harvested for grain and the U.S. average yield will be significantly lower than indicated in the July 11, USDA supply-demand report. Current private forecasts appear to center on a potential crop of around 12.1 billion bushels, nearly 900 million bushels below the USDA projection. Even this lower number is a moving target that could be lower if recent weather patterns continue through the end of July and the latest National Weather Service (NWS) 6-to10-day, 30-day, and 90-day forecasts materialize. These forecasts show probable continued well below-normal precipitation and above-normal temperatures for a large part of the Corn Belt. Further complicating the corn supply picture is the increased risk that part of the crop may be contaminated by aflatoxin, as often occurs in times of drought. Ethanol plants avoid aflatoxin-contaminated corn because the contamination is multiplied about three-fold in the DGS. The latest NWS drought map, drought prospect map, and 30-day forecast maps are shown below.

Other dimensions of the feed grain supply picture include expected reductions from last year's bumper crops in parts of the former Soviet Union, central Europe, last winter's drought-reduced corn crop in Argentina, and China's expanding demand for corn. USDA's July 11 world supply-demand report indicated wheat production





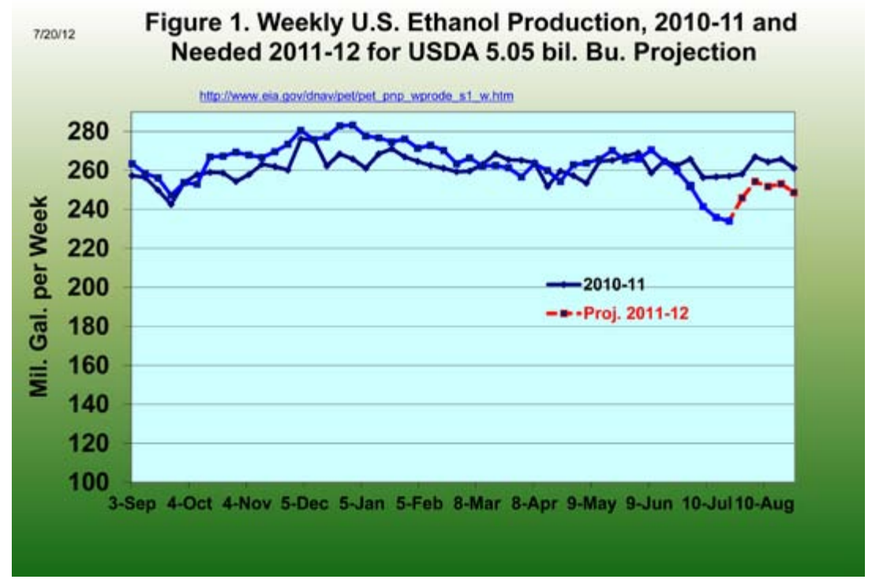
in Russia would be 13% lower than last year, along with declines of 41% in the Ukraine and 43% in Kazakhstan. These countries have been major sources of feed wheat exports to replace U.S. corn in world markets. Grain trade analysts indicate their crops may have declined further since the USDA report was issued. In the current marketing year ending on August 31, China has purchased approximately 200 million bushels of U.S. corn – even though it reportedly harvested a record corn yield and total corn production last year. Rapid expansion in its livestock and feed industries in response to growing consumer demand for higher protein diets has shifted China from the world's second-largest corn exporter a few years ago to a net corn importer.

These developments create a potentially very tight supply of corn and higher input costs for the biofuels industry as well as for the livestock industry and other users of corn in the year ahead. Prospects for near-pipeline corn carryover stocks in the September 1, 2012 –August 31, 2013 marketing year will almost certainly make corn prices more volatile as well as much higher than last fall, winter, and spring. At the same time, crude petroleum and gasoline prices have been gradually declining until very recently. That combination pushed ethanol plant margins sharply into the red in mid-July and has resulted in a number of plant shut-downs.

Figure 1 shows weekly ethanol production through July 20, 2012 and weekly production needed through August to meet the July 11 USDA projections. Plant shut-downs have begun to reduce U.S. ethanol production and 2011-12 corn use at ethanol plants may be modestly below USDA July 11 projections. On July 13, inventories reported by the U.S. Energy Information Agency (EIA) were 821.5 million gallons, 3.5 weeks' production at the July 13 weekly rate . Inventories appear likely to decline in the next several weeks, thus tightening ethanol supplies. In response to prospects for tightening supplies, ethanol prices have increased sharply in the last few weeks as shown in Figure 2. The price increases have narrowed the price spread between nearby ethanol futures and RBOB gasoline futures prices by as much as 78 cents per gallon since early April. At this writing, the spread is about a 22 cents per gallon discount of ethanol to nearby RBOB gasoline futures prices.

Prospective 2012-13 Corn Use for Ethanol

With the rapid tightening of prospective domestic corn supplies, possible increasing Chinese demand for corn, and indica-



tors of shrinking foreign crops, the grain, feed, and ethanol industries are asking themselves what categories of corn use will likely be reduced in the year ahead to adjust to limited supplies. The most likely categories are either domestic corn feeding or ethanol, or some combination of the two. It appears that corn export demand may have some support from reduced feed wheat supplies, although currently projected world wheat supplies still appear large enough to support substantial wheat feeding. Cash wheat prices in much of the U.S. have increased enough to take wheat out of the feed wheat market, at least for now. That may tighten summer quarter corn supplies a little more than currently projected.

For the livestock industry, a key issue will be how much will ethanol plants reduce their corn use? At this writing, that question is a complex one that will likely require several months to clarify. It will depend on:

- The number of outstanding unexpired RINs that are available for petroleum blenders to use as a substitute for their obligations to blend ethanol with gasoline,
- The price of those RINs,
- The value of ethanol as a way of increasing the octane rating of lower-grade gasoline, as reflected in wholesale ethanol-gasoline price differentials,
- The price of distillers grain and solubles (DGS),
- The size of U.S. ethanol exports, and
- The number of RINs that ethanol-petroleum blenders desire to retain for use in 2014, 2015, and later years when 2007 Energy legislation ethanol mandates significantly exceed a 10% average blend with U.S. gasoline.

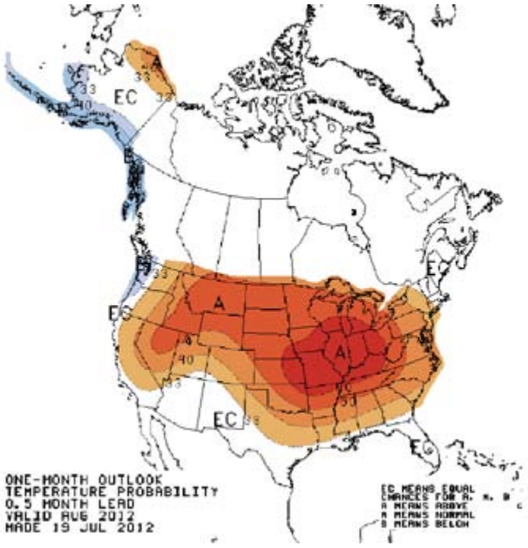
RINs are renewable information numbers issued to each gallon of biofuel produced. One additional variable could possibly impact corn use for ethanol although the probability of its occurrence appears to be low at this writing. That variable is the possibility of a partial waiver of the mandated quantity of conventional (i.e. corn-starch) ethanol mandated to be blended in the nation's gasoline supply. If ethanol production does not remain near recently reduced levels for much of the2012-13 marketing year, more of the adjustment to tight corn supplies is likely to fall on the livestock sector.

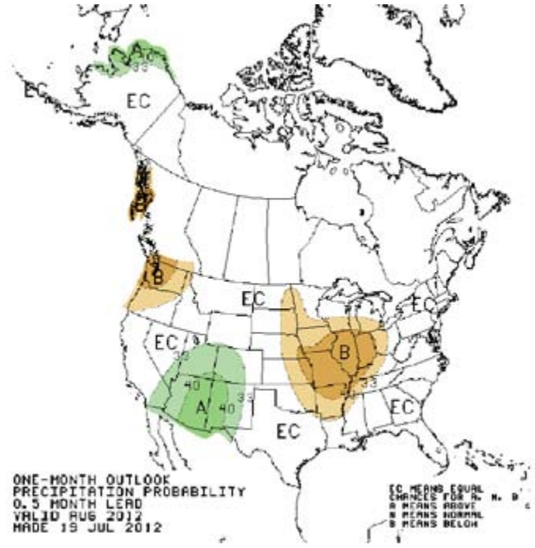
How Many Excess RINs are Available?

The ethanol industry has produced more ethanol than mandated in the last several calendar years and has operated at an average annual rate above the mandated level earlier in the current marketing year. That in turn has generated excess RINs that can be used as substitutes for actual ethanol blending. The exact amount of excess RINs currently available is uncertain because precise data either are unavailable or are not easily assessable from EPA web sites. EPA is the agency that enforces the mandates.

Part of the excess production has been exported. Ethanol exports in most cases may not count toward the mandates, but they do require RINs. Thus, exports absorb some of the ethanol and RIN production that exceeded domestic mandates. Numbers being circulated in the grain and ethanol trade indicate there are around 2.5 billion gallons of excess RINs. These numbers appear to be the RIN inventory at the beginning of the 2012 calendar year.

RINs needed in 2012 include the mandated 13.2 billion gallons of conventional (i.e. corn starch) ethanol plus U.S. ethanol exports. There is a substantial time lag in release of ethanol export data. First quarter 2012 exports were at an annual rate of roughly 800 million gallons. Using 825 million gallon exports for the 2012 calendar year (down 31% from 2011) gives total RINs needed in 2012 of 14.025





billion gallons. Ethanol production so far this year has been about 7.4 billion gallons. The latest weekly production was 234 million gallons, reflecting recent plant idlings. Using an average of 230 million gallons of ethanol production per week for the rest of 2012 would push this year's total production to about 13.2 billion gallons of ethanol and RINs production. This would be about 850 million gallons below potential 2012 calendar year RIN needs. This shortfall could be offset by unexpired RINs carried over from previous years and/or carrying part of the shortfall into 2013.

Excess RINs may become more of an influence on ethanol production and corn used in ethanol plants in 2013 because of expected very tight old-crop supplies and 2007 Energy legislation that raises the 2013 mandates by 600 million gallons, along with another 950 million gallons in 2014. In deciding the amount of excess RINs to use next year, ethanol blenders will need to assess the potential need for RINs in 2014 and 2015 vs. 2013. Needs in those years will depend on (1) the speed with which E-15 is adopted at retail fueling stations, which is the main potential mechanism for raising the blend wall, (2) whether U.S. gasoline continues its recent downward trend (thus shrinking the available gasoline pool for blending with ethanol), and (3) whether EPA establishes required 2013, 2014, and 2015 required ethanol-gasoline percentage blends based on the 2007 energy legislation, without regard to the blend wall.

Recent Ethanol Returns

Returns for processing corn into ethanol and DGS have fluctuated in a wide range during the last 10 months, from very profitable levels in late 2011 to strongly negative returns in the last several weeks with the rapid increase in corn prices. The very negative returns have been followed by a modest recovery in the last several days as ethanol prices increased. Weekly costs and returns from the summer of 2008 through July 13, 2012 are available in chart form at http://www.card.iastate.edu/research/bio/tools/hist_eth_gm.aspx These returns are based on spot market prices. Actual returns will vary depending on conditions at individual plants, the local basis for corn and ethanol, how much forward pricing of inputs and outputs the ethanol plant has done, whether it removes corn oil, and other factors. Several ethanol firms have recently announced plant shut-downs because of large negative returns.

Conclusions

This year's severe and widespread drought is already creating major challenges for all users of U.S. corn. Current weather forecasts and declining crop condition reports suggest that the challenges may be intensified in the weeks and months ahead. The 2012-13 corn marketing year appears likely to be a major test of the conventional ethanol mandate and excess RIN mechanisms and their impacts on corn use. Excess RINs almost certainly will bring a reduction in corn use by the ethanol industry in the year ahead, although there are differing opinions on the probable amount of reduction. Some in the grain trade note the recent sharp increase in ethanol prices as production has declined as a possible indicator that ethanol has considerable value for increasing the octane content of lower grade gasoline. Others expect most of the excess RINs to be used in 2013 to substitute for the required ethanol blending with gasoline. Still others anticipate that ethanol blenders will be reluctant to use all of their excess RINs in 2013 because of another potentially large increase in the ethanol mandate in 2014 that may push required ethanol blending moderately above what the fuel market can absorb. If the ethanol industry is unable to moderately reduce its corn use in 2013 because of these factors, a larger reduction in corn use for feed and possibly in exports would be likely.

References

1 U.S. Energy Information Agency, Petroleum and other Liquids, Total Stocks. The EIA defines these stocks as follows: "Stocks include those domestic and Customs-cleared foreign stocks held at, or in transit to, refineries and bulk terminals, and stocks in pipelines".

2 R. N. Wisner, "Renewable Identification Numbers (RINs) and Government Biofuels Blending Mandates", Renewable Energy Newsletter, Ag Marketing Resource Center, April 2009 and W. Thompson, S. Meyer, and P. Westoff, "Renewable Information Numbers are the tracking instrument and bellweather of U.S. biofuels mandates," Euro Choices, Vol. 8, Issue 3, June 15, 2009.

3 EPA "Questions and answers on the renewable fuels program", (includes regulations showing the need for RINs for ethanol exports), EPA420-F08-006, April 2008.

4 EIA, Petroleum and other liquids, weekly Ethanol Plant Production, July 13, 2012.

New Report on the Future of Grains, Biofuels and Livestock and Poultry Feeding Just Released

by Don Hofstrand, retired extension agricultural economist, dhof@iastate.edu

Regular newsletter contributors Bob Wisner and Don Hofstrand teamed up with agricultural economists Ron Plain of the University of Missouri, Dan O'Brien of Kansas State University and David Anderson of Texas A & M University to peer into the future and author a report titled Future Patterns of U.S. Grains, Biofuels, and Livestock and Poultry Feeding. The project was financed by the Institute for Feed Education & Research (IFEEDER) on behalf of the American Feed Industry Association (AFIA) and The Council on Food, Agricultural and Resource Economics (C-FARE). It was completed in June of 2012 and is available at http://www.cfare.org/future/.

This article provides a summary of the report and identifies areas of interest where you may want to turn to the report for more information.

A basic premise of the report is that the future of the nation's livestock and poultry industries depends heavily on feed availability and cost. In the first decade of the 21st century, the U.S. livestock, dairy, and poultry sectors and the feed industry faced major challenges brought on by sharply higher and more volatile feed costs. The situation is exacerbated by the current drought conditions that grip the grain and livestock producing regions of the U.S. This new feed cost environment has negatively impacted the entire feed, livestock, poultry and dairy industries. The availability and cost of grain and protein meal in the next several years will, to a large extent, determine the future patterns and direction of these industries.

A major driver of the changing feed cost environment is a rapid increase in corn used for ethanol, and fats and oil used for biodiesel production. This has shifted corn and soybeans from their traditional dual role of food and feed production to a three-way role of food, feed and fuel production. The emergence of the fuel component as a major corn user has reduced the corn available for other uses. Domestic livestock feeding was the largest source of the decrease, although U.S. corn exports also declined. Part of the lower feed use was offset by increased feeding of distiller's grains with solubles (DGS), the major co-product of the ethanol industry.

A number of developments contributed to the explosive growth of biofuels demand. These included the September 11, 2001 crisis and the policy shift towards increased U.S. energy independence. New government initiatives supporting this policy included mandated volumes of ethanol and biodiesel blending with motor fuels, the phase out of Methyl Tertiary Bu¬tyl Ether (MTBE) as an oxygen-enhancing agent for gasoline, a blenders' tax credit (that expired in 2011), efforts to reduce greenhouse gas emissions, and financial assistance for smaller ethanol plants.

Before the emergence of the corn ethanol

industry, corn supplies frequently exceeded market demand. This pushed prices down in response to government programs that encouraged corn use and discouraged stocks buildups. The re¬sult was low-cost feed for the nation's livestock producers. However, as ethanol processing capacity expanded, demand for corn steadily increased and grain supplies tightened substantially. Corn prices rose to reflect the crop's value as a motor fuel. At the same time, fuel prices rose, thus further increasing the motor-fuel equivalent value of corn.

Prices of other crops also rose as higher corn prices led to increased world corn plantings and competition for crop acreage. At the same time, Chinese imports of soybeans for feed increased rapidly. China's expanded feedstuffs demand required additional South American cropland for soybeans at the same time that more acres were needed for corn ethanol.

U.S. Government biofuel mandates affect both the level and volatility of feed costs. When U.S. corn yield is sharply below trend, as is anticipated this year, the reduced supplies are rationed through the market mechanism of higher price. However, the corn ethanol mandate in times of extreme corn supply tightness gives the ethanol industry a purchasing-power advantage over the livestock industry. The mandates require a specific amount of ethanol to be used in the U.S. motor fuel supply, regardless of the cost of corn. Under those extreme supply tightness conditions, they would allow the ethanol industry to pay whatever corn price is needed to fill the mandates, unless government officials decide emergency conditions call for a partial waiver of the mandated ethanol volumes. So, a significant part of burden of reducing corn usage due to an extremely small U.S. crop would fall on the other uses for corn, namely the livestock feed industry and exports.

Looking Ahead at Corn Supply and Demand

Provided U.S. corn yields return to their longer-term upward trend, corn supplies for the feed and livestock industries appear likely to be more adequate over the next three to seven years than in the past few years.

Government corn-starch ethanol blending mandates will increase annually to 2015. However, the rate of growth will be much slower than in recent years and will be capped at 15 billion gallons in 2015 and future years. This prospect, when combined with the near-saturation of the domestic ethanol market, likely will slow the growth in corn ethanol demand in the next three to five years.

In addition, after three consecutive low-yield years of 2010, 2011 and especially 2012 which could have a substantial negative impact on the livestock industry, resumption of the long-term upward trend in yields would mean more readily available corn supplies for the feed indus¬try in the next three to eight years. However, a number of key longer-term questions remain.

China appears to be an emerging major corn importer in response to the country's rapid growth of consumer incomes and dietary shifts away from grain consumption to more animal-based protein. Earlier this year USDA pro¬jected that China will import 355 million bushels of corn in 2016-17, up from an estimated 197 million bushels in 2011-12. USDA further projects that China's corn imports will double between 2016-17 and 2021-22.

With much slower expected growth in U.S. corn-starch ethanol production through 2022, the long-term upward trend in U.S. corn yields would be expected to result in adequate supplies to meet expanding Chinese demand and increased sup¬plies for the U.S. feed industry. Conversely, if U.S. and/or major foreign grain yields are below normal, the inelastic demand for biofuel likely will lead to sharp spikes in feed costs and reduced utilization. So, the U.S. livestock industry likely would continue to bear the brunt of much of the required cuts in use in the event of short-crop conditions.

Expected Adjustments in the Livestock Sector

When feed costs rise to unprofitable levels, the broiler industry is able to adjust more rapidly than producers of other spe¬cies. A short biological production cycle allows the poultry industry to quickly curtail or expand production. This flexibility, along with greater grain-to-meat conversion efficiency, will help the poultry industry grow more rapidly than the red meat industry in times of tight grain supplies.

With more adequate grain supplies, the relatively steady decades-long growth in the pork industry is expected to continue. Only minor on-going structural changes in the pork industry are expected in the next three to eight years. Expanding global demand for pork is strengthening hog prices and has helped the pork industry cope with higher feed costs.

The dairy industry experienced severe losses in 2009–2010, triggered by rising feed costs and lower exports. However, it is re¬covering and beginning to expand, although returns were still depressed in early 2012. In the next several years, if current expectations of much slower growth in ethanol demand and increasing U.S. corn yields materialize, the dairy industry will continue its long-term expansion and increased efficiency and productivity.

The beef sector has the advantage of being able to use grass and other roughages to produce meat. It also is able to use DGS

more effectively than monogastric species and may benefit as more ethanol plants remove corn oil from DGS to provide a feedstock for reaching government biodiesel and advanced biofuels mandates.

A large and expanding DGS supply has reduced corn use in the beef industry as well as other livestock sectors and has helped control costs. However, DGS and corn prices are closely related and DGS prices have risen in response to higher corn prices. Thus, the beef industry also has been stressed by higher feed costs and the need for adjustments in rations and production levels. Beef cattle numbers are cyclical, and as beef profitability declined in the past few years, producers reduced their herds. The severe Southern Plains drought of 2010-12 and geographic broadening of the drought in recent months accelerated the process and sets the stage for fewer cattle being grain fed and will reduce beef production in the next few years.

If adequate feed supplies are available at a reasonable cost, a cyclical upturn in beef cow numbers and beef production could occur. However, the cattle industry has a longer biological production cycle and greater grain requirements per pound of meat produced than other species. These aspects of beef production, especially high feed costs, will put additional pressure on the beef industry to increase production efficiency and feed conversion efficiency.

Future of the Biofuels Industry

Several corn ethanol firms are beginning to add biobutanol facilities or transition their plants to biobutanol production. Biobutanol can be made from corn and offers several potential advantages over ethanol as a biofuel. In addition, it has the potential for expanding the biofuels market beyond ethanol's current 10% blend wall (12-15% blend wall if retail sales of E-15 become widespread). If biobutanol production becomes economical, it could create a second-stage biofuels expansion and growth in corn demand that could significantly tighten U.S. feed supplies.

Although cellulosic ethanol technology has not evolved as quickly as expected, the potential for the development of the industry still exists. If the cellulosic feedstock comes from grasses or other sources that are grown on existing cropland, it will compete with the livestock feed industry.

Current indications are that a major growth in biobutanol or cellulosic ethanol, if it occurs, may be several years away. However, it will be important for the livestock and feed industries to monitor these developments (along with other developments in the biofuels industry) over the coming years.

Long-term Implications for the Feed-Livestock Industry

The feed-livestock sector will face a number of important opportunities and challenges during the coming decades. The continued expansion of world population, along with the expected movement of millions of people into the middle class, will create a rapidly growing world demand for meat products. Sourcing adequate quantities and quality of feed for this growing demand will challenge the feed-livestock sector.

It is expected that most of the feed grains increase will come from increasing yields rather than expanding world cropland area. An important approach to increasing yields is improving agricultural productivity (more output per unit of input). Another is closing yield gaps. Yield gaps are areas of the world where yields are below the level that could be achieved with the proper application of current technology. Reducing trade barriers to provide the free flow of feed and livestock products from areas of production to areas of demand are also important.

These factors will be overlaid by the impact of global warming induced climate change. Global warming will challenge the livestock-feed industry to adapt to the changing climate while confronting the issues discussed above.

If you want to investigate any of the topics in this article, visit the report below.

Future Patterns of U.S. Grains, Biofuels, and Livestock and Poultry Feeding -- financed by the Institute for Feed Education & Research (IFEEDER) on behalf of the American Feed Industry Association (AFIA) and The Council on Food, Agricultural and Resource Economics (C-FARE). It was completed in June of 2012 and is available at

http://www.cfare.org/future/.

The Ag Marketing Resource Center Renewable Energy & Climate Change Newsletter is available on-line at: http://www.agmrc.org/renewable_energy/