WRITTEN STATEMENT OF

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Thank you for the opportunity to provide my perspectives on the RFS2 and the impacts it has already had on a broad range of different groups in our country. In these written comments I will provide some background on the struggles of U.S agriculture related to historic boom/bust cycles. Then a review of the role of the RFS2 as a driver of the recent boom period for crop producers and land owners will be provided. This is followed by highlighting some of the impacts of the RFS2 on crop versus animal industries and on food consumers. Finally I look at some of the concerns related to the continued implementation of RFS2 for the agricultural sector between 2013 and 2022.

Background on U.S. Agriculture Sector

The single greatest problem for U.S. agricultural in the past 100 years has been the tremendous production capacity of farmers and agribusinesses. Blessed with natural resources of land and climate. Driven by significant public and private investments in agricultural research and education; farmer productivity has been able to produce more food than U.S. and foreign customers could buy at prices that were profitable to farmers. Since 1929, much of U.S. agricultural policy has been directed to finding ways to increase demand for U.S. farm products, or to reduce supply.

Only during a few brief periods over this past 100 years has demand for farm products exceeded supply such that farm commodity prices were high leading to farm incomes rising above those of non-farm families. Those periods were a result of demand surges for U.S. farm products during World War I, again during World War II, during the 1970's farm commodity export surge, and now during the biofuels era.

Historically speaking farm commodity prices have tended to follow a cycle. Unexpected demand surges have been the reason for periods of higher prices that may last for roughly 5 to 10 years. The higher commodity prices begin to push up farm costs of production and land values. After a few years

the term “new era” becomes the refrain and those higher farm commodity prices and incomes result in supply expansion which eventually leads to lower prices and sometimes a total collapse in prices and farm incomes. Low prices and incomes can then persist for 20 years, especially if some of the demand base goes away.

Of the three completed commodity prices cycle over the past 100 years, two of them ended in financial bust for U.S. agriculture. The price and income surge around increased U.S. exports to feed Europe during World War I resulted eventually in massive new lands coming into production by “plowing up the Plains” and seeding wheat. Agricultural depression followed with U.S. farm land dropping each year from 1918 into the early 1930’s. The Great Depression took over from there with the farm economy in deep recession for 20 plus years through the 1920s and 1930s.

In a similar fashion the 1970s export boom, beginning with the Russian wheat deal in the fall of 1972, was followed by the farm sector financial collapse of the 1980s. In each of these bust, the U.S. government was a significant player in stabilizing the farm sector declines. In each of these boom/bust cycles the demand surge went on long enough to stimulate additional supply, but the new demands did not last. High supply with reduced demand means low prices and bankruptcy for some who locked in high costs of production during the height of the boom. Boom eras of 5 to 10 years tend to be followed by 20 or more years of weak prices and low farm incomes. This historical sketch gives foundation for concerns in agriculture. Will the current economic surge end as a boom/bust cycle or as a boom and then moderation cycle? Biofuels policy will likely be an important determinate in that outcome.

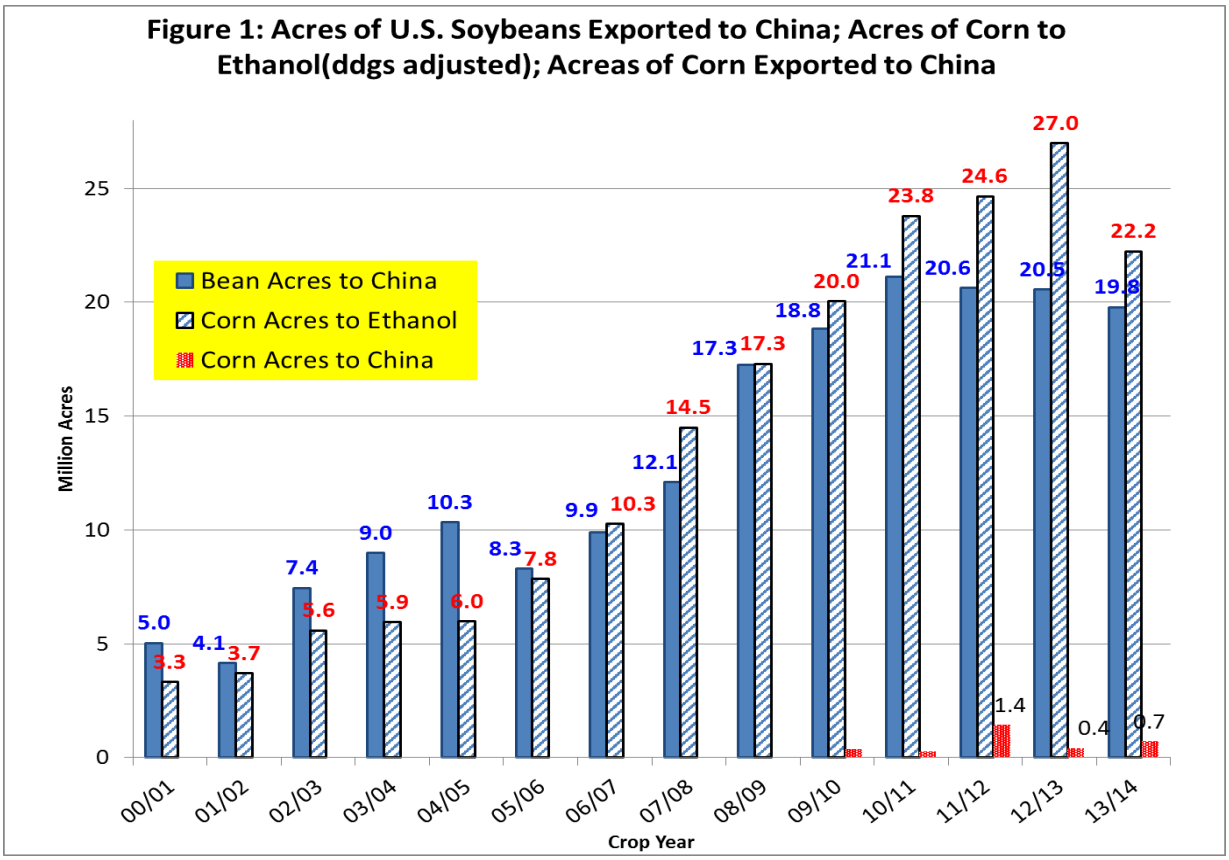
The Drivers of the Current Boom

In three papers for the Farm Foundation, a non-advocacy agricultural policy education organization, I and two Purdue peers outlined the reasons for the current boom. As in previous booms, unexpected demand surges led the way to higher prices. There have been two primary demand surges

since the 2005 crops that have been strong stimulants. The first of these is the RFS2 that has increased the use of corn for ethanol production and to a smaller extent the use of soybean oil for biodiesel. The second is often overlooked in the discussions of the impacts of the RFS and that is the tremendous increase in the exports of soybeans to China.

Figure 1 provides a visual observation on how quickly these demands were growing. From the 2005 corn crop, 7.8 million acres of U.S. production were needed to meet ethanol demands. By the 2010 crop that was nearly 24 million acres (a 16 million acre demand surge). For soybeans headed to China, it took 8.3 million acres of U.S. land from the 2005 crop jumping to 21.1 million by the 2010 crop (a 12.8 million acre demand surge).

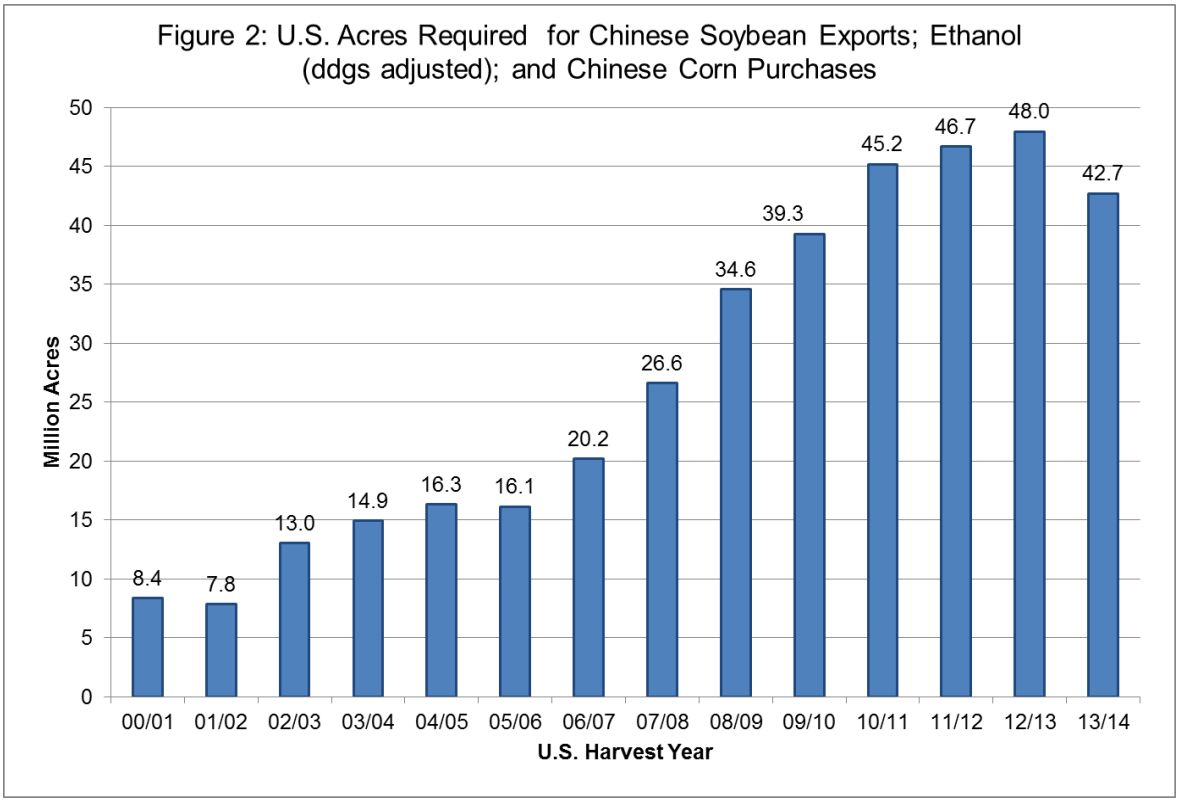
Figure 1: Acres of U.S. Soybeans Exported to China; Acres of Corn to Ethanol(ddgs adjusted); Acreas of Corn Exported to China



Some argue that Chinese purchases of corn have also been driving higher farm commodity prices but that is a small volume compared to the rise in corn for ethanol and soybean exports to China. The

combined impact on the acreage required to meet these three demands is shown in Figure 2. For the 2005 crop acreage needed for these three demands was 16.1 million. That rose to 45.2 million U.S. acres by 2010, nearly six million additional acres per year.

Demand surges of this magnitude were beyond the ability of supply to keep up and prices rose for these high demand crops. Acreage shifted away from other crops and toward these high demand crops. Thus prices for all land based crops rose, including pasture and forage crops.



The RFS2 was a primary contributor to the demand surges shown here representing about 55 percent of the new demand (16 million acres out of 29 million), but it was not the only contributor. In fact the surge of soybean purchases from China represented about 45 percent of the new acreage needed, thus was nearly as large as the growth of corn use for ethanol due to the RFS2. The combination of these new demands occurring at the same time was also a contributor to excessive surges in commodity prices. If only one had occurred in the absence of the other the price impact would have

been considerably smaller. Too many people suggest that the time period since 2005 is a result of the RFS. The RFS has been one of two main contributors, but the impacts of the RFS in the absence of the surging demand by China would have been less pronounced.

Two additional contributors that facilitated the explosion of prices since 2005 were macro policy events and unfavorable weather which reduced U.S. production in 2010, 2011, and especially with the 2012 drought. Weak U.S. economic growth and monetary policy designed to promote low interest rates has tended to also keep the U.S. dollar weak and thus U.S. commodity prices high in dollar terms. That has included crops but also oil prices. In addition, the movement of agriculture into the energy business meant that agricultural markets became linked to energy (oil) markets more closely than in the past.

All told, a host of factors led to the boom period characterized by high farm commodity prices and shortages of basic food ingredients, but the RFS was one of the primary contributors.

Primary Impacts of the Recent High Crop Prices

High crop prices resulted when demand was growing faster than supply. During the demand surge, prices of grains grew faster than costs rose, thus margins in crop production increased rapidly. Using Purdue budgets, typical Midwestern farm land saw ownership returns move from about $115 an acre per year in 2005 to over $300 an acre in 2010, 2011, and 2012. Higher margins of course meant much higher incomes for crop farm families. U.S. farm income grew from $79 billion in 2005 to an estimate $128 billion estimated by USDA for 2013 (a record high).

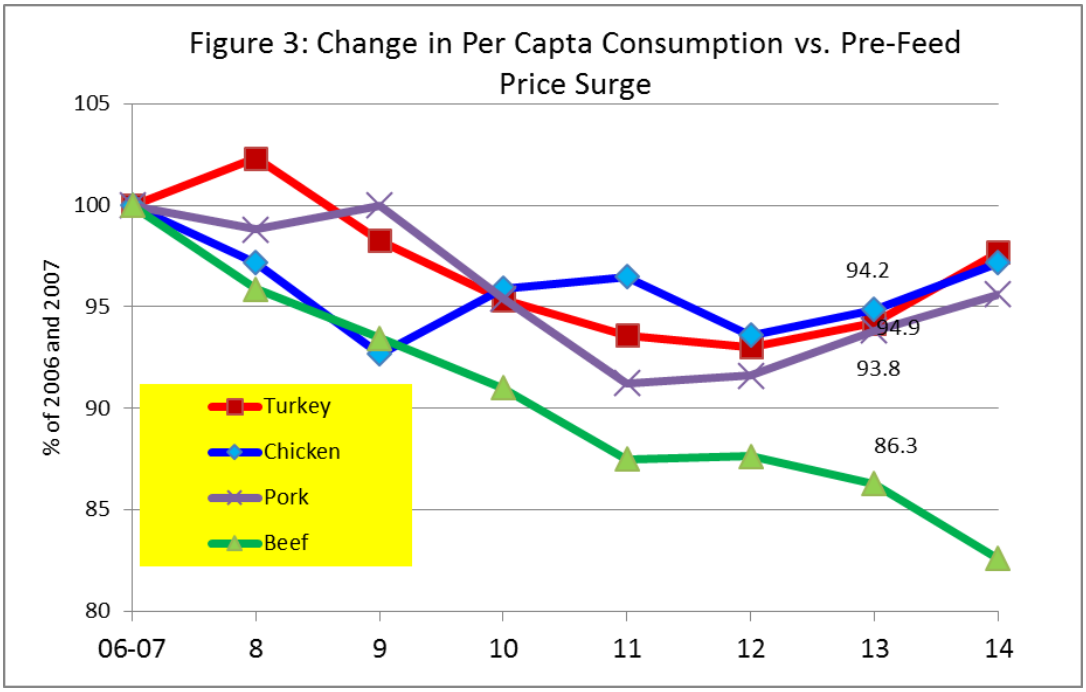
Agricultural land values increased as well. Not only were returns per acre nearly tripling, but interest rates were also falling. This provided not one, but two critical stimulants to much higher land values. The 10 year treasury fell from 5.1 percent in 2006 to about 1.6 percent by May of 2013. Land values increased about 150 percent from 2005 to 2013 for average quality Midwestern farm land, a

compound growth rate of over 12 percent annually. Across the country, the asset value of farm real estate increased by $866 billion during this eight year period (USDA). The monetary benefits of rising land values has been much more important to the growth of farm sector net worth than has higher farm incomes.

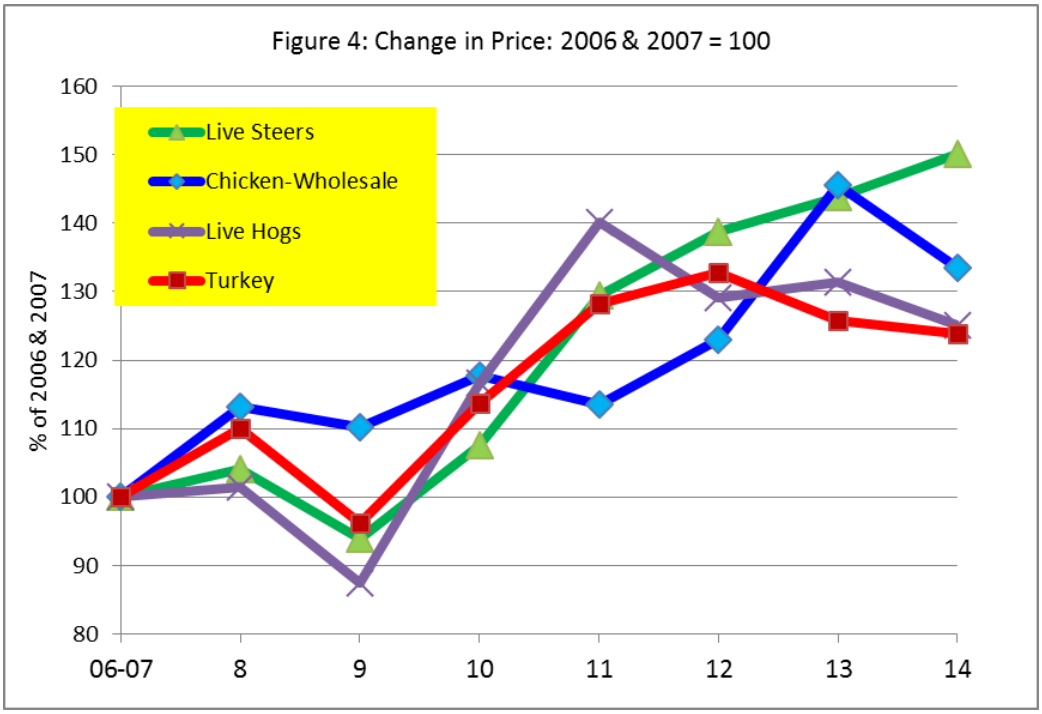
Higher farm incomes on crop farms benefited rural communities as that higher income spread through local purchases of farm and consumer goods and services. In addition, expansion of the ethanol industry in rural communities added some employment and related economic activity.

While a “golden era” was underway for crop farmers, the opposite tended to be true for the animals sector. Higher crop prices meant higher feed costs for animal producers. In the short-run they were unable to pass those higher costs on to food consumers, but rather had to absorb the higher feed costs as compressed margins (they lost money). After sufficient financial discouragement, some producers reduced production or got out of business. Eventually smaller supplies led to higher consumer prices that will eventually be sufficiently high to cover the higher feed costs.

Higher feed costs eventually are transmitted to food consumers as less available food and higher cost food. Figure 3 shows how U.S. per capita consumption of meats has decreased since feed prices began to move upward. It uses 2006 and 2007 as the base period set equal to 100. By 2013, per capita consumption of chicken and turkey has fallen about five percent from the base period. Pork consumption per capita has fallen about six percent, and beef production by 14 percent. USDA’s estimates for 2014 begin to show a recovery of consumption as lower feed prices for the 2013 crop begin to lower feed costs and chicken, turkey, and pork producers begin expansion that will increase meat supplies in 2014. This may well be the beginning of a recovery phase for the animal industries.



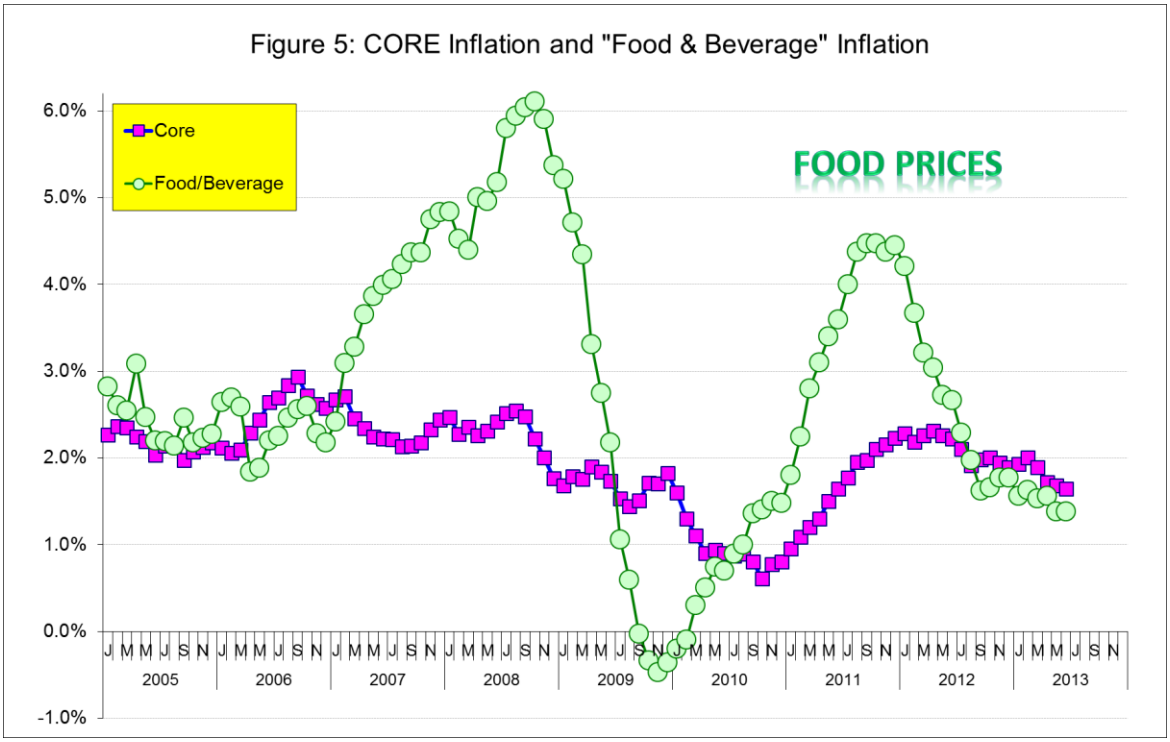
Higher meat prices were likely a primary factor in causing consumers to reduce their per capita consumption of these meat products. Figure 4 demonstrates how farm level prices have moved upward since the 2006 & 2007 base period, prices for turkeys and hogs are up by 25 to 30 percent by 2013 and up about 45 percent for chicken and cattle prices.



The animal sector was clearly harmed by the higher feed prices which were partially a result of the RFS. Bankruptcies and reduced production has meant large financial losses for the sector and reduced employment and local economic activity in the sector. In 2005 the animal sector of U.S. agriculture represented 53 percent of farm receipts and crops were 47 percent, by 2012, animals had fallen to 44 percent of receipts and crops moved up to 56 percent. Food consumers were also negatively impacted. They had less product available and had to pay higher prices.

Retail food prices have risen faster than the general inflation rate as measured by the Consumer Price Index (CPI) without energy commonly called the core inflation rate. Starting in 2006 through June 2013, the core rate has risen by an average annual increase of 2.2 percent while the CPI for food and beverages has risen by 3.2 percent per year on average. The one percent higher average annual inflation rate for food and beverage is related to the higher farm commodity prices and to higher energy prices especially in 2008 and again 2011.

Figure 5 shows monthly inflation rates for the CPI core and the food and beverage inflation category. The more rapid increases in food prices are reflected in 2007-2008 and again in 2011-2012. The impact of the RFS is primarily related to the commodity costs of the raw ingredients that go into the foundation of our food system. The commodity or farm component of food varies sharply from less than 10 percent for highly processed products like cereals to over 50 percent for some less processed products like eggs. On average the commodity portion might be something like 20 percent of the retail food dollar, although those estimates vary (Ferris estimates 19% of total food inflation during this period was due to higher commodity prices). Using that 20 percent level of an average food inflation of 3.2 percent suggest perhaps .5 to .6 percent of the annual inflation in retail food prices was related to higher commodity prices of our food. Food is a $1.4 trillion dollar industry so one-half of one percent represents about $7 billion of higher food costs per year related to the higher commodity prices.



The Current Agricultural Outlook and Implementation Issues for RFS2

Several of the drivers of high food commodity prices are expected to moderate in coming months and years. In addition, much of the sector adjustments to higher crop and animal prices has been made. However, biofuels policy could still be an influential factor in how the agricultural and food sectors evolve in coming years.

First, overall crop supplies in the U.S. and world are coming into better balance with heightened demand and this will allow farm commodity prices to moderate. The 2013 U.S. crops are expected to be closer to normal after three short production crops. In addition, reductions in the Conservation Reserve Program has brought more U.S. land into production, dropping from 35 million acres in 2005 to about 27 million today. In addition contracts on about 7 million additional acres will be expiring in the next three years. Some of which will go back to crop production if returns are favorable.

World production capacity has been increasing as well. Since the 2005/06 marketing year, world harvested acres of 13 major crops has expanded by 147 million acres, an expansion area roughly equal to one-half of the U.S. principle crop area. The largest expansions have been in South America and the Former Soviet Union but are widespread. Continued acreage expansion globally can be expected if crop returns remain favorable.

Demand growth may slow as well. Chinese demand for soybeans from the U.S. is expected to grow but at a slower rate than in recent years due to slowing income growth rates in China and due to greater competition from foreign countries for that business. Improving U.S. economic activity and higher interest rates in the U.S. in coming years may also strengthen the value of the dollar which could reduce commodity prices in dollar terms.

Corn demand growth for ethanol may be limited due to constraints from the blending wall. If those continue, it means that the period of rapid growth in corn use for ethanol is over and will tend to level off. A leveling off of this primary demand would give supply an opportunity to "catch up" and therefore provide a period of moderating crop prices. Those lower crop prices would provide increased margins for the animal sector and result in some expansion in animal production in the next few years and also provide a moderating influence on retail meat prices. Food inflation could drop back below the core inflation rate as it has already done this year (see Figure 5).

Meeting the 16.55 billion gallon RFS2 in 2013 is becoming increasingly difficult. Let alone the 18.15 in 2014 and 20.5 billion gallons in 2015, and so forth to 36 billion gallons in 2022, just 9 years away. The problems arise from the blend wall, from the inability of a cellulosic industry to develop, and from a slow-start toward E15 or E85.

Given the consumption of gasoline around 133 billion gallons this maximizes the E10 conventional ethanol around 13.3 billion gallons, even though conventional ethanol plant capacity is near the 15 billion gallon RFS maximum to be reached in 2015. Unless breakthroughs are seen in the movement to greater acceptance of E15 among gasoline retailers, or corn and ethanol prices drop sufficiently to make E85 more costs competitive, then corn use is capped at about the E10 use level plus ethanol exports. This puts annual corn use for ethanol near 5.0 billion bushels (as measured by USDA), a level that U.S. farmers can currently supply and still allow some growth for animal feed, exports, and other industrial uses.

Cellulosic ethanol mandates in RFS2 are now beginning to grow sharply with little production capacity. For 2013, the cellulosic mandate is for 1.0 billion gallons, but EPA has waived that to a tiny 14 million gallons, in line with production volumes. While, EPA has greatly reduced the cellulosic mandate since its start in 2012, they have not been reducing the overall mandate, requiring the full 16.55 billion gallons for 2013, and moving up to 20.5 billion gallons in just two more years in 2015. Greatly reducing the cellulosic mandate sends clear signals to investors that cellulosic ethanol probably will not happen as designed under RFS2.

Since EPA continues to maintain the overall RFS2, but largely waive cellulosic, and assuming the blend wall for conventional ethanol, this means the total RFS2 must be met with additional use of biodiesel; with advanced biofuels which most likely would be imported Brazilian sugarcane ethanol; or with the use of RINs. Meeting the total RFS2 with large quantities of biodiesel will require more land as the yield of fuel per acre is low compared to corn. As an example, average quality Midwest corn land will produce about 470 gallons of conventional ethanol per acre. So 1 billion gallons of additional ethanol would require the corn from about 2.1 million acres. Soybean oil production is only about 82 gallons per acre. Biodiesel also gets a 1.5 gallon credit for the RFS2, so the production of an additional 1.0 billion

gallons for RFS2 only requires 667 million gallons of physical biofuels. At 82 gallons per acre based on soybeans, this means 8.1 million added acres of soybeans. Using increasing amounts of biodiesel to meet the total RFS2 puts great demands on what has been the scarce resource in recent years, farm land. Reliance on biodiesel to meet RFS2 could also greatly distort fats and oil markets as well as markets for oilseed meals which would be in much greater supply with much lower prices. Meeting the RFS2 is going to require multi-billions of gallons if EPA continues to keep the total RFS in place and cellulosic develops too slowly.

If cellulosic ethanol were to develop it also will be competitive with other food crops at least for the portion that might be produced from dedicated energy crops such as miscanthus and switchgrass. These crops would be grown on marginal soils that today are used for forage crops and for grazing. Thus these crops would compete directly with the animal industries that currently tend to use that class of land. Forest residue and crop residue like corn stalks would not be competitive for land used for food production.

Meeting the EPA enforcement of the total RFS2 with increased imports of sugarcane ethanol from Brazil has positive greenhouse gas advantages versus conventional ethanol. It also reduces dependency on foreign oil imports, but does not stimulate economic activity in rural communities of the U.S. Unfortunately, if the blend wall stays in place, Brazilian ethanol goes into E10 and thus reduces domestic corn ethanol gallon for gallon. The actual impact then is to reduce rural economic activity in the U.S.

RINs are the final way obligated blenders can meet the growing RFS2 when physical supplies of biofuels are smaller than the RFS2. The available excess RINs will not be large enough to keep up with

the growing RFS2 into 2014 and 2015. As a result of this realization the market price for RINs has increased sharply in recent months.

How the RFS2 is implemented in 2014 and beyond can have major impacts on the agricultural sector. Agriculture was asked to generate capacity to produce up to 15 billion gallons of conventional ethanol, and to develop that capacity in a short time frame. U.S. Agriculture has largely completed what Congress asked of them with large positive and negative consequences for various sectors. Most of the adjustments have occurred as supply has finally risen to meet the current level of demand and commodity prices are expected to moderate. Crop farmers want to at least maintain current conventional ethanol levels and can, in a few years, increase production to meet the 15 billion gallon mandate if a way can be found around blend wall constraints. Oilseed production can also increase modestly allowing some modest expansion of biodiesel use, again over time. However, this cannot meet multi-billion gallon mandates without major distortions to segments of food markets. The animals sector and food consumers want to avoid political mandates in an RFS that increase demand for crops at a faster rate than U.S. and world supply can reasonably meet.

References:

Abbott P, Hurt C, Tyner WE. *What's Driving Food Prices?* Farm Foundation Issue Report (2008).

Abbott P, Hurt C, Tyner WE. *What's Driving Food Prices? March 2009 Update.* Farm Foundation Issue Report (2009).

Abbott P, Hurt C, Tyner WE. *What's Driving Food Prices in 2011? July 2011 Update.* Farm Foundation Issue Report (2011).

Ferris, Jake. Impacts of the Federal Energy Acts and Other Influences on Prices of Agricultural Commodities and Food. Staff Paper 2013-02. Department of Agricultural, Food and Resources; Michigan State University, June 2013.

Tyner, W.E. F. Taheripour, and C. Hurt, Potential Impacts of a Partial Waiver of the Ethanol Blending Rules, August 2012, Farm Foundation.

(WASDE) World Agricultural Supply and Demand Estimates. USDA. World Agricultural Outlook Board.

U.S. Congress, energy Policy Act of 2005, Public Law 109-58, 2007: Washington D.C.

U.S. Congress, Energy Independence and Security Act of 2007, in H.R. 6, 110 Congress, 1st session. 2007.