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October 15, 2014

Katrina Sideco
Staff Lead
LCFS Reconsideration Team
California Air Resources Board
Submitted via electronic mail to katrina.sideco@arb.ca.gov

Re: Official written comments from the National Biodiesel Board on Low Carbon Fuel Standard Indirect Land Use Change Analysis

Dear Ms. Sideco:

The National Biodiesel Board has developed the following comments on the draft indirect land use change (ILUC) analysis presented at the CARB workshop on September 29, 2014. The NBB appreciates the effort that CARB is undertaking to improve the GTAP ILUC modelling and looks forward to CARB finalizing the new ILUC factors. Incorporating the latest data and modeling techniques that have been vetted publicly and by experts in the field will substantially improve the robustness and integrity of the Low Carbon Fuel Standard (LCFS).

Elasticity of Land Transformation

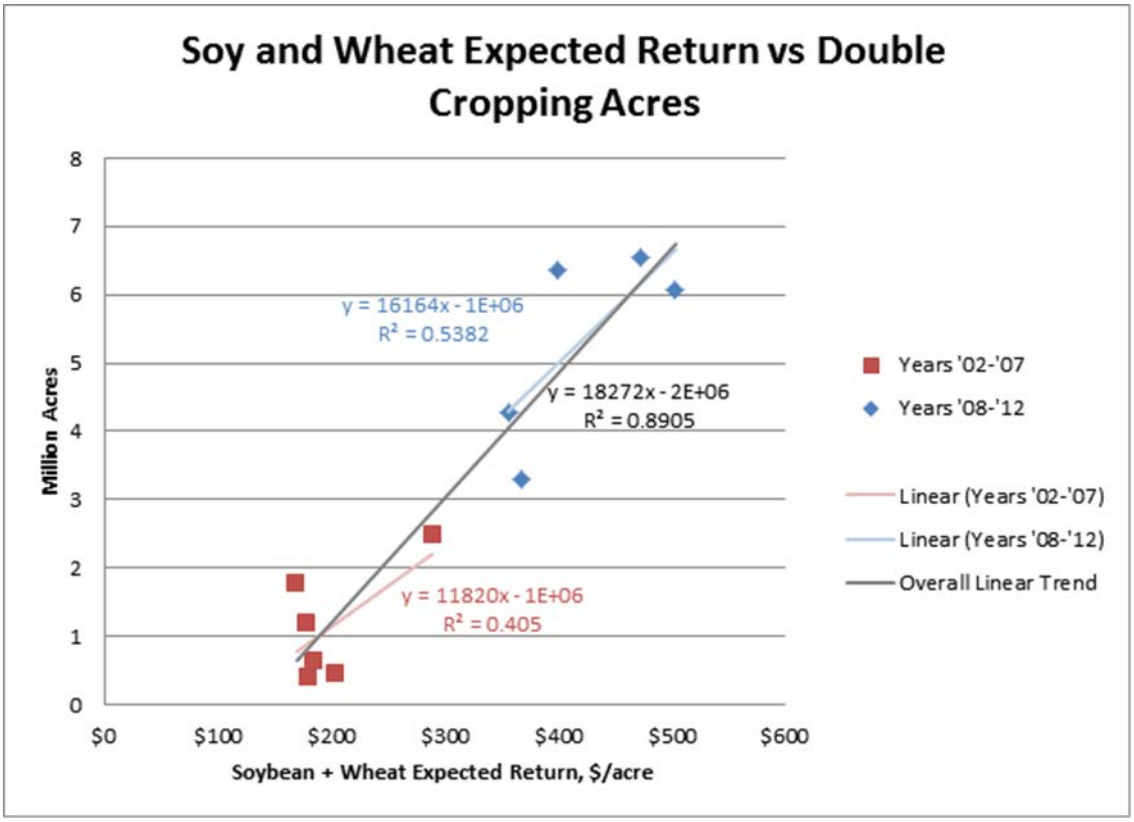
The NBB commends CARB staff for following the recommendation of the Expert Workgroup to address the Elasticity of Land Transformation (ETL). Adopting the land supply structure in the current GTAP model is an appropriate improvement over the former structure, which was quite crude. The NBB strongly supports Approach B as presented by CARB staff at the September 29 workshop. That approach provides the greatest improvement with regard to the elasticity of land transformation. Improving the way that this is done within GTAP was a key recommendation of the Expert Working Group. While the new modeling approach creates opportunities to use better data when it becomes available, the data that currently is available does not support using the Approach A. Approach A fails to realize the economic reality that farmers are more likely to increase crop production by converting existing crop acres, or pasture land at greater frequency than converting forestland. This is why the Expert Workgroup identified ETL as an area of the model that required some improvement. Approach B proposed by CARB is a step in the right direction to improve the model as a more accurate representation of how land managers respond to market prices.

Yield Price Elasticity

The NBB is pleased to see that the Yield Price Elasticity (YPE) can now be set independently for each crop by region. This new flexibility, combined with the new ETL structure should make it easier to update the model in the future to include cropland pasture in countries other than the United States and Brazil and to include the impact of double cropping for the crops and regions where that is a common practice.

Until such time that crop-specific and regionally–specific data are available to support different yield price elasticities within the model, the value of 0.25 should be used for general crops. 0.25 is the value recommended by the CARB Expert Workgroup. 0.25 is the default price yield elasticity in the GTAP model as maintained by Purdue and as used by the global network of GTAP users worldwide. CARB has suggested a range of price yield elasticities. The central value of the elasticities used by CARB strays from the value of 0.25, which is supported by the majority of evidence in literature and qualified expert opinion. Sound scientific rationale has not been presented for lowering the central value of YPE or suggesting that 0.25 is not correct for general crops. Simply scanning the literature for other values without taking into context for how the values are used is not appropriate. A key factor influencing the YPE value is the time period. The 0.25 value in GTAP was chosen to be the medium term value, which is right for the model.

Beyond using the correct default YPE, there is a strong scientific rationale for using a higher YPE specifically for soybeans in the United States as a means of including the double cropping impact that has been happening. We have previously supplied you some analyses that documents the relationship between the double cropped area and the expected return of wheat and soybeans. That is shown in the following figure.



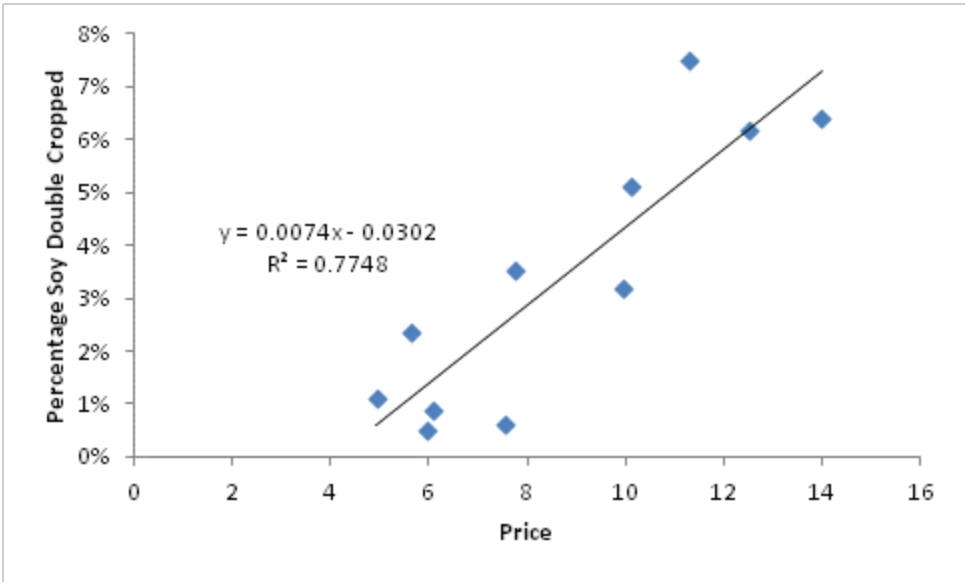
There has been an increase in the double cropped area in the United States of over 6 million acres between 2004 and 2012. Most of this double cropping involved wheat and soybeans. Using a higher value of YPE for US soybeans is therefore entirely appropriate and one way for the model to be able incorporate this important ILUC mitigation strategy.

Work by Ploughman (2014) quantifying price yield elasticity has demonstrated that when prices are high, there is a significant increase in double cropped soybean acres. One of the challenges within the current GTAP framework is that there is no way to directly account for production that does not require land, which is what happens when double cropping occurs. However, a modified YPE could be used to account for double cropping in the existing model structure.

To facilitate the calculation of a modified YPE, the price of soybeans (USDA, quickstats) was plotted versus the percentage of soybeans that were double cropped for the years 2000 - 2012. The result can be seen in the as follows:

Summary of Soybean Double Cropping Data

YEAR	USDA Avg Price, $	Ploughman Double Cropped Soybeans, Acres	USDA TotalSoy Acres	% soybean acres double cropped
2002	4.93	815,589	72,497,000	1.12%
2003	6.08	646,020	72,476,000	0.89%
2004	7.56	450,212	73,958,000	0.61%
2005	5.95	358,423	71,251,000	0.50%
2006	5.65	1,771,710	74,602,000	2.37%
2007	7.74	2,269,176	64,146,000	3.54%
2008	11.3	5,594,801	74,681,000	7.49%
2009	10.1	3,913,689	76,372,000	5.12%
2010	9.97	2,433,277	76,610,000	3.18%
2011	12.5	4,565,514	73,776,000	6.19%
2012	14	4,884,086	76,164,000	6.41%



Price elasticity is calculated by the following equation:

Elasticity = slope * Price / Quantity

Because 2009 was on the trend line, it was chosen as a base year. The implied elasticity, therefore, is .0074 * 10.1 / .0512 = 1.46

These results demonstrate that double cropped soybeans are very responsive to price. Comparing 2012 to 2004, over 4.4 million additional acres of soybeans were double cropped, resulting in over 2.1 billion pounds of soybean oil. In 2012, the total soybean feedstock for biodiesel production was 4.04 billion pounds. The large increase in double cropping relative to biodiesel demonstrates why the effective yield price elasticity of these acres is so high. While this effective yield price elasticity is higher than the default YPE of 0.25 that should be used for crops in general, it is important to note that this method is capturing a very real effect that is quantified here specifically for soybeans. Previous work to quantify YPE has not included double cropping, which in 2012 accounted for 6.4% of the soybean acres. Adopting a YPE of at least 0.25 + 0.064 *(1.46) = 0.34344 for soybean is an appropriate way to include double cropping in addition to other tools that farmers use to increase productivity during periods of high return.

Canola

Consistent with the significant improvements that CARB staff have made with regard to other fuels and feedstocks, NBB supports the revisions to the ILUC analysis for Canola when using Approach B and when using a demand shock consistent with biofuel policies of North America. The attempt to include European market demand on canola suggests additional problems within the modeling that have not

been adequately vetted or reviewed. If CARB is to consider switching the basic demand shock assumptions placed on North American feedstocks, CARB should consider combined and dynamic shocks for ethanol and biodiesel feedstocks. CARB should also consider reducing biodiesel feedstock shocks for vegetable oil biodiesel consistent with the availability of new feedstock, such as distiller's corn oil and waste grease. Successful growth of the biodiesel industry based on the success of vegetable oils is driving innovation to bring other fats and oils to market as biodiesel feedstock. To the extent that new feedstocks come from innovation other than areal expansion of crop acres, they decrease the ILUC effect of veg oil biodiesel. CARB indicated a desire to investigate dynamic GTAP, which could address some of these issues. CARB also suggested that time and resource constraints would necessitate these changes be considered in future efforts rather than the pending round of rulemaking. Considering these constraints, it would be advisable to treat canola consistently with the evaluations previously conducted for other fuels and feedstocks.

We look forward to improving the accuracy of all biodiesel pathway assessments. We welcome any question you have about these comments or requests for further clarifying data.

Sincerely,

Don Scott
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