

October 15, 2014

VIA ELECTRONIC MAIL

John Curtis  
Manager, Alternative Fuels Section  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

**RE: UNICA's Comments on the Updated Indirect Land Use Change Analysis of the Low Carbon Fuel Standard.**

Dear Mr. Curtis:

The Brazilian Sugarcane Industry Association ("UNICA") appreciates the opportunity to provide comments on the California Air Resources Board's (CARB) Low Carbon Fuel Standard's (LCFS) update on indirect land use change (ILUC) analysis. UNICA's comments are based on the information provided during the September 29<sup>th</sup> ILUC workshop as well as on the simulations of the Global Trade Analysis Project (GTAP) model, available online at Purdue University's website<sup>1</sup>. With the help of Dr. Angelo Gurgel of Fundação Getúlio Vargas and Dr. André Nassar of Agroicone, UNICA was able to replicate the results running GTAP models for the shocks applied on sugarcane ethanol. UNICA concentrated its analysis on GTAP results and, therefore, no comments are provided on Purdue's Agro-ecological Zone Emission Factor (AEZ-EF) model. We understand CARB will give stakeholders an opportunity to provide comments on AEZ-EF in the near future.

As we have done in previous letters, we would like to provide specific comments for CARB staff to consider in its evaluation. Our comments are focused on three topics: (1) GTAP land supply structure; (2) magnitude of constant elasticities of transformation (ETL) in GTAP regions; and, (3) yield price elasticity (YPE) for corn and soybean in Brazil. We are including an item (4) to present the results of our simulations.

### **1. GTAP Land Supply Structure**

We endorse CARB's decision to present iLUC results using the new structure of land supply (called "Approach B" by CARB) in accordance with Taheripour and Tyner's (2013)<sup>2</sup>

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<sup>1</sup> <https://www.gtap.agecon.purdue.edu/>

<sup>2</sup> Taheripour, F; Tyner, W. E. 2013. Biofuels and Land Use Change: Applying Recent Evidence to Model Estimates. *Appl. Sci.* 2013, 3, 14-38; doi:10.3390/app3010014.

paper. This issue was addressed in our last letter<sup>3</sup> and we applaud CARB's decision to incorporate this important improvement in GTAP in its iLUC analysis.

The new land supply structure allows us to identify, with much more accuracy, how pastures and forests respond to cropland expansion. It also represents more realistically the dynamics of crop expansion in regions with large stocks of pastureland and forests, as in the case of Brazil and others in South America and Sub-Saharan Africa.

Historical data shows the competition between cropland and pasture is more intense than the competition of agricultural land and forests. Placing cropland and pasture in one nest with a specific ETL, and pasture-cropland and forest in another nest with a lower ETL, as defined in the new land supply structure, theoretically captured these differences in competition dynamics. Therefore UNICA strongly encourages CARB to adopt the Approach B as default for iLUC calculations.

## **2. Magnitude Constant Elasticities of Transformation (ETL) in GTAP Regions**

The direct consequence of using the new land supply structure is the definition of ETL 11 and ETL 12. In order to support our comments on the ETLs, we ran several simulations in GTAP to understand the sensitivity of results according to different levels of ETLs 11 and ETLs 12. We decided to run several simulations because we noticed that CARB set ETLs 11 and ETLs 12 values using different criteria than suggested by Taheripour and Tyner (2013). CARB decided to use lower differences between ETL 11 and ETL 12. We also noticed the differences between ETLs 11 and ETLs 12 were set at 9% for all regions, except Brazil, where this difference was set at 4.8%. Given these differences in values, we would like to suggest CARB give us more opportunity to collaborate with the Agency by providing more time to further analyze the ETLs values magnitude.

Taheripour and Tyner (2013) have suggested 20% difference between ETL 11 and ETL 12 indicating the authors were inclined to allow more competition between cropland and pasture, and less competition between pasture-cropland and forest. Making ETL 11 lower and ETL 12 higher (using a higher difference than the one used by CARB), less forest should be converted and more pasture intensification should take place. Although we recognize more studies are necessary in order to calibrate the difference between ETL 11 and ETL 12, we understand the Taheripour and Tyner paper provides enough evidence for higher differences than the ones adopted by CARB.

Given our knowledge about Brazilian agriculture and the impacts of cropland expansion on pasture intensification and native vegetation conversion we believe CARB is being too conservative using differences around 9%, and not the 20% as suggested by Taheripour and Tyner. Therefore, we would like to suggest CARB to set the difference between ETL 11 and ETL 12 in 20% as suggested by Taheripour and Tyner (2013).

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<sup>3</sup> [http://www.arb.ca.gov/fuels/lcfs/regamend14/unica\\_09152014.pdf](http://www.arb.ca.gov/fuels/lcfs/regamend14/unica_09152014.pdf)

During the September 29th workshop, we also raised our concerns on forest land conversion outside Brazil. Based on Taheripour and Tyner paper's conclusions, GTAP new land supply structure produced relevant changes in the allocation of forest conversion among GTAP regions. The most important change is the increasing share of Sub-Saharan Africa (SSA) in cropland response, leading to more forest and pasture conversion in this region. Intuitively this effect makes sense because it is expected regions with higher stocks of arable land should have higher supply response (SSA and Brazil, for instance). However, due to the higher ETLs in SSA than the ones for Brazil, more forest conversion and less pasture intensification is observed in SSA than Brazil in order to compensate one additional hectare for cropland. This means a large share of the iLUC of any biofuel results from forest conversion in SSA. We believe that, having in mind that SSA is becoming more important on iLUC effects, CARB should pay more attention in this region in order to find evidences of the competition among cropland and pasture and forest, as well as the potential for pasture intensification in the region.

### **3. Yield Price Elasticity (YPE)**

UNICA recognizes and appreciates CARB staff's strong efforts to estimate YPEs or, at least, to have support from scientific studies to set the order of magnitude of this parameter. A recurrent topic addressed in our previous letters is crop production expansion based on double-crop systems (soy-corn and soy-cotton in the case of Brazil). We raised this issue during the September 29<sup>th</sup> workshop and given CARB's reaction to our comments, we decided to run GTAP with higher values for YPE for soy and corn in Brazil.

CARB has been running scenarios with values of YPE between 0.05 and 0.35, which lead us to run GTAP with 0.35 value for soy and corn in Brazil aiming to capture the double-crop effect. As we mentioned in the case of the ETLs, we believe that more analysis is necessary in order to understand if an YPE of 0.35 effectively represents the double-crop effect in terms of area saved due to higher yields. However, this higher YPE has produced results in the direction we were expecting: less area allocated to crops (due to higher yields) and higher share of Brazil on cropland expansion (the cropland expansion is a consequence of the shock on ethanol production). Therefore, we recommend CARB to set YPE for soy and corn in Brazil in the upper value (0.35) as an attempt to capture the double-crop effect.

Available evidence in Brazil shows the relevance of the soy-corn double-crop system, and the table below contains consolidated information about first and second crops of corn. The first crop follows the traditional planting calendar, being planted in the spring and harvested in the summer. The second crop is planted just after soybean is harvested and, therefore, does not generate changes in land use. Considering the second crop of corn uses almost 9 million hectares, this is the amount of land saved in 2013 due to the double-crop system.

### Corn production in Brazil (1<sup>st</sup> and 2<sup>nd</sup> crops)

Variable	Corn harvest	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Area (1000ha)	1st crop	9.690	9.381	8.581	9.280	9.686	9.422	8.511	6.864	7.508	6.895	6.749
	2nd crop	3.276	3.030	2.968	3.333	4.082	5.022	4.381	5.043	5.711	7.304	8.967
Production (1000 t)	1st crop	35.028	31.349	27.161	31.485	37.658	39.829	30.705	29.852	33.488	32.819	34.157
	2nd crop	13.299	10.439	7.952	11.177	14.455	19.105	16.367	21.568	22.172	38.254	46.381

Source: IBGE

#### 4. Scenarios Results

The table at the end of the document presents detailed results simulating the improvements we suggested in items 2 (higher differences for ETL 11 and ETL 12) and 3 (higher YPE due to double-crop). The table below summarizes the share of forest and pasture conversion as result of cropland expansion for the four scenarios (original, 20% difference between ETL 11 and 12, 30% difference between ETL 11 and ETL 12 and 0.35 YPE for soy and corn in Brazil).

In the case of Brazil it is clear that GTAP is capturing accurately the dynamics in the country, given that only 4-6% of the land use change is taking place in forest. However, results are very different for SSA, where forest represents around 50% of the land use change. Increasing the difference between ETL 11 and ETL 12 leads to reductions in the share of forest on total land use change (from 49% to 36% or 23%). UNICA believes that 50% forest conversion in SSA is overstating land use changes and, therefore, that result should be revised.

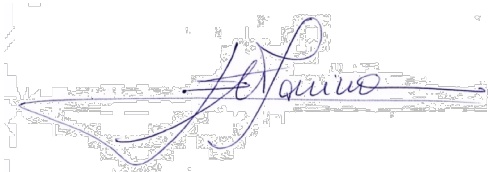
#### Share of Forest and Pasture on Land Use Change

Scenario (Approach B)	Share on Total Land Use Changes					
	Forest			Pasture		
	Total	3 BRAZIL	18 S_S_AFR	Total	3 BRAZIL	18 S_S_AFR
Original (presented in the September workshop)	21%	5%	49%	79%	95%	51%
20% between ETL 11 and ETL 12 (except for Brazil)	15%	6%	36%	84%	94%	61%
30% between ETL 11 and ETL 12 (except for Brazil)	8%	5%	23%	91%	95%	72%
0.35 YPE for soy and corn in Brazil	21%	4%	49%	78%	95%	50%

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UNICA appreciates the opportunity to submit these comments at this time. We understand CARB is working on a tight schedule in order to conclude its analysis, but we would welcome more opportunities to discuss these issues in greater detail. UNICA members and staff look forward to the opportunity of continuing to work with CARB to fully achieve the economically and environmentally beneficial goals of the LCFS in California. UNICA is ready to provide further information or answer any questions CARB may have about the substance of these comments or the Brazilian sugarcane ethanol industry.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read "E. Farina", is written over a faint, light-colored background that looks like a map or technical drawing.

Elizabeth Farina  
President and CEO

A handwritten signature in grey ink, appearing to read "Leticia Phillips", is written in a cursive style.

Leticia Phillips  
Representative – North America