Biofuel Feedstock in a Diverse Agricultural Geography

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Issue
Consider the likely availability of feedstock for a corn based ethanol plant in Northern California. We hypothesize a plant in Dixon, Solano County, CA drawing in feedstock from a 30 mile radius in Solano and Yolo Counties.

Initial Conditions
Plant Size: Economies of scale implies producing at least 50 million gallons of ethanol per year and 155,000 tons of dried distiller's grains, requiring 16.667 million bushels of corn per year or 95,000 acres (at 175 bu/acre).

Plant Location
The analysis was limited to a 30 mile radius in Yolo and Solano Counties. A 30 mile circle contains 1.8 million acres. The Vaca Mountains limit access to Solano and Yolo from Napa and Lake Counties to the west. The Sacramento River and the Sacramento metropolitan area form an eastern barrier. To the south lies San Pablo Bay and the Suisun Marsh. Limiting our analysis to the portion of Yolo and Solano County within a 30 mile radius decreased our focus to 1.1 million acres.

Map Description
Within the 30 mile radius, 54 thousand acres are urban, 135 thousand are wetland, marsh or riparian areas, and 33 thousand acres are not used for agricultural production. The remaining 838 thousand acres are divided into 361 thousand acres of pasture and rangeland, 61 thousand acres of tree, vine and nursery crops, 60 thousand acres of high value vegetable crops, 43 thousand acres of rice, 12 thousand acres of dryland row crops and 242 thousand acres of irrigated field crops. The field specific data leave 59 thousand acres unaccounted for.

Local Feedstock Production
Expanding to 95,000 acres of corn would require more than one-third of all other field crop land to be converted to corn. For example, satisfying demands of the ethanol plant would require converting 95 percent of the wheat and irrigated pasture land into corn production.

Corn is part of a crop rotation to prepare land for processing tomato production and the expected price of other commodities. Corn acreage also varies with the expected price of corn and other commodities.

Over the last four years a 61 percent increase in the price of corn has triggered corn acreage to return to its original 2004 acreage levels.

This change is similar to the statewide reaction to the recent increase in corn prices which has been an increase in corn grain acreage from a 2004-2006 average of 130,000 acres to 200,000 acres in 2007.

The diverse agricultural geography in California limits corn production.

Would corn acreage expand to supply a new source of demand?
California ethanol plants must compete with midwestern ethanol plants in the global ethanol market and California feedstock must compete with corn from the midwest. California corn prices have adjusted along with national corn prices and producers have incorporated the expected increase in corn prices into their planting decisions. No ethanol plant could pay more than a 10 percent premium in price and recent history tells us that this cannot be sufficient to attract the needed crop acreage shifts from the other field crops.

A Dixon, CA based ethanol plant would not be able to increase local price by a large enough margin to generate the additional acreage for local corn acreage to supply the ethanol plant.