What Are the Food/Fuel Issues for Aviation Biofuel Production?

There are a number of alternative feedstocks that can be used for aviation biofuel production each with their technical strengths and weaknesses. Based on experience from 2008 and the food and feed versus fuel debate that raged in the U.S. and around the world, it is clear that the use of food/feed crops such as soybean oil, cottonseed oil, canola oil, and sunflower seed oil to name a few will elicit strong objections if/when food supplies become tighter generally leading to higher food prices.

Recent interest in non-food oilseeds such as jatropha, camelina, castor bean, and microalgae has been driven by the desire to develop biofuel feedstocks that are noncompetitive with food/feed crops. What most casual observers don't realize is that there is a finite and declining amount of tillable land in the United States. Even crops such as jatropha that can be grown on marginal lands reduces the available usage for existing crops that are grown on those lands—even if those marginal lands are currently in native pasture that is grazed by cattle.

For the last few years, my center, the Agricultural and Food Policy Center (AFPC) has been warning livestock producers that second general biofuels will also have a negative effect on their feed costs in the form of higher forage costs. Marginal cropland that may be converted to feedstock production may be pastureland but more likely it will be land devoted to hay production and/or other relatively low valued crops. Why, because this land is cleared and marginal for row crop purposes.

The most promising of all of the alternative feedstocks identified to-date, microalgae, is not without the potential to have food versus fuel issues. Microalage has no equal when it comes to production of oil and bi-products per acre of land. However,

depending on climatic and process (water depth, etc) conditions microalgae production for biofuel feedstocks will likely be called into question as more of the arid United States has water supply issues. In terms of bi-products, microalgae, along with corn based ethanol can supply a significant amount of the protein in livestock diets. However, if one thinks this will not be an issue, recall the lack of support for ethanol production in 2008 when many factors unrelated to corn-based ethanol production came together to result in very high food prices. The amount of bi-products generated from corn-based ethanol production did not matter at the time nor will it carry much weight in the future if food prices rise.

Microalgae may have the same problem. As long as water supplies are ample even though limited in some areas, microalgae production will not likely be scrutinized but… when water supplies are short, much like ethanol, public perception will likely change. The good news for microalgae is that this situation will likely occur (if at all) many years in the future.

So what does this mean for biofuels for aviation? There are several very good candidates that may have a role in biofuel production. However, there is no silver bullet in terms of the perfect feedstock. Of all the current feedstock possibilities, microalgae appears to be very close but, even it has it limitations.