

## **Opportunities for Cottonseed Oil Use**

### **Challenges Facing the Cottonseed Market**

The availability of cottonseed is determined by the supply and demand for the fiber. The total availability of cottonseed in the U.S. is about 6 million tons annually. Cottonseed is utilized by the dairy industry (as a component of feed) and by the oilseed processing industry (to produce oil and meal). Several agronomic and external factors affect how cottonseed is used in the marketplace.

- Small seed size reduces seed yield and exacerbates seed damage during ginning that affects seed quality.
- Dairy industry is a large user of white “fuzzy” cottonseed.
- Seed available for oil extraction is declining due to whole-seed animal feeding.
- At the scale required by large industry, the availability of cottonseed oil is limited.
- Consumer demands for low or zero trans-fat products, reduced saturated fats, and low cost all affect choice of oil used by food processors.
- Partial hydrogenation of cottonseed oil to prevent rancidity causes the occurrence of undesirable trans fatty acids.
- Developmental efforts in other oilseed crops, e.g., NuSun sunflower oil, are reducing markets for more traditional oils, including cottonseed.
- Bio-based fuel production is producing an excess of some protein feed products, and cottonseed meal must compete for market share with these products.
- Gossypol content limits the feeding of cottonseed and cottonseed meal to ruminant animals.

### **ARS Research Accomplishments**

The two most important recent accomplishments of ARS cottonseed research are

- Development of iso-hexane as a replacement solvent for oilseed extraction, including cottonseed oil. Hexane is currently listed as an EPA hazardous air pollutant (HAP). As such the industrial use of hexane is subject to strict limits on its release to the environment, and hexane use requires substantial reporting to state and federal regulatory agencies. Iso-hexane, which is not on the EPA HAP list, can be used for oil extraction without the regulatory concerns.
- Development of a process to separate the two optical forms of gossypol. In the cotton plant, gossypol exists in two forms. The separation of these compounds has allowed researchers to show that one of the forms appears to be more toxic to animals but that both forms are equally inhibitory to insects. As a result, efforts are now underway within ARS to breed cotton lines containing gossypol mostly in the less toxic form. Gossypol also has potential use in the pharmaceutical industry.

### **Current ARS Initiatives**

To improve the marketability of cottonseed-based oil products, SRRC has been involved in research to improve processing technology and reduce processing costs. Also, we are researching new uses for cottonseed oil and meal and are working to develop value-added uses for the novel compounds

found within cottonseed.

Specific current research activities within ARS-Mid-South Area:

- Development of acetone as an oil extraction solvent to address environmental concerns. (P. Wan)
- Development of low (-)-gossypol cotton varieties. (J. Scheffler)
- Improving separation of gossypol forms. (M. Dowd)
- Removal of gossypol from miscella (solvent + extracted oil) via adsorptive techniques. (S. Kuk)
- Development of processes for removal of gossypol from cottonseed glands and soapstock. (M. Dowd)
- Demonstration of gossypol as inhibitor of cancer cells. (M. Dowd, P. Wan)
- Development of expanded markets of cottonseed oil as lubricants and fuel oxygenates. (P. Wan)
- Modification of cottonseed fatty acids for industrial uses. (O. Dailey)
- Synthesis of gossypol derivatives for cancer research and improved analytical methods. (M. Dowd)
- Moisture content of seed cotton. (R. Byler)
- Factors affecting seed damage during ginning. (C. Boykin)

### **Proposed Future Research Areas**

In addition to our current activities, we suggest three areas that potentially could address some of the current problems or improve the marketability of cottonseed products. The industry may want to consider one or more of the following options:

- Undertake a breeding program to tailor the fatty acid distribution of cottonseed oil to meet the needs of specific markets. Cottonseed oil with a composition similar to NuSun oil would be advantageous to the snack food industry; however, other niche applications may be worth considering.
- Develop formulations to tailor cottonseed oil to specific applications. Through a combination of complete hydrogenation, oil blending, and inter-esterification create cottonseed-based oils with targeted properties.
- Use genetic engineering techniques to introduce modified fatty acids into cottonseed oil. Such oils could be rich in hydroxy fatty acids for use as lubricants or rich in conjugated fatty acids to use as drying oils in inks, dyes, coatings and resin formulations. ARS has one ongoing research effort (J. Dyer) on the production of industrial oils in plants through transgenic techniques.

**ARS Research Scientists** (Stoneville and New Orleans): C. Boykin, R. Byler, O. Dailey, M. Dowd, J. Dyer, J. Scheffler, P. Wan.

**Agenda**  
**Ginning and Cotton Quality Improvement Committee**  
**Thursday, July 27, 2006**  
**9:30 a.m.**

**B. F. Smith Administration Building Auditorium**  
**Stoneville, MS**

*Bill Kennedy, Chairman, Presiding*

- I. Opening and Welcoming Remarks  
Bill Kennedy, Chairman  
Ginning and Cotton Quality Improvement Committee  
Delta Council
  
- II. Overview and Outcomes of Cotton Flow Issues: Federal Register Notice  
Craig Brown, VP Producer Affairs  
National Cotton Council
  
- III. Cotton Quality Management: Enhancing Markets and Reducing Discounts  
Frederick Barrier, Senior Director of North American Sales  
Stap!Cotn  
  
What to Expect and How to Manage to the '06 Finish Line  
Dr. Bill Meredith, ARS-USDA
  
- IV. Improved and Enhanced Markets for Cottonseed Through Research  
Dr. Ed King, Director  
Mid-South Area  
USDA-ARS
  
- V. Cottonseed Issues/Outlook  
Harrison Ashley, National Cotton Council
  
- VI. Report from U.S. Department of Labor  
Eric Nash, U.S. Department of Labor
  
- VII. Report from Southern Cotton Ginners  
Tim Price, Executive Vice President  
Southern Cotton Ginners
  
- VIII. Discussion, Questions, and Considerations  
Bill Kennedy, Presiding
  
- IX. Adjournment

**Lunch immediately following adjournment**  
**USDA Cotton Ginning Laboratory, Stoneville, MS**  
*Sponsored by Southern Cotton Ginners Association*

***Industry Accord on Cotton Flow Issues Related to USDA's  
May 26 Proposed Rule***

With reference to the flow related provisions of the proposed rule published by USDA on May 26 and other cotton flow issues, the National Cotton Council's Performance and Standards Task Force recommends and the National Cotton Council's Executive Committee unanimously approves the following:

**Uniform Storage Credit Rate**

A uniform maximum storage credit forgiveness rate should be established for Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, Missouri, Mississippi, Arkansas, Louisiana, Oklahoma, Texas, Kansas and New Mexico and any other cotton-producing state, except for California and Arizona, equal to their weighted average tariff rate. Further, a uniform maximum storage credit forgiveness rate should be established for Arizona and California based on their weighted average reduced by the average cottonbelt receiving charge. The task force recognizes that California and Arizona operate in an environment where bale storage costs are substantially higher than those same costs in the other cotton producing areas.

The task force also recognizes that regional trade practices often determine how certain costs are stated in the tariffs. Bale receiving charges are included in the west in the monthly storage charges and this results in the need for a regional adjustment in the storage credit.

Currently, Western storage charges average approximately \$4.50 per bale per month with no associated receiving charge. Outside the West, the average receiving charge is approximately \$3.00 per

bale. Assuming cotton bales are stored an average of four months before they are shipped, the prorated receiving charge would be 75 cents per month or \$3.00 per bale during the four month storage period. Therefore, to determine an equitable storage credit for the West, the monthly storage credit would be \$3.75, which is determined by subtracting the average receiving charge outside the West (\$3.00 divided by 4) from the West's current average storage credit (\$4.50).

While recommending these two regional maximum storage credit forgiveness rates, the Task Force recognizes the right of warehouses that have current storage tariff rates below the maximum credit rate to request an increase in their tariff rate not to exceed the maximum credit rate.

### Warehouse Reporting

Beginning September 1, 2006 a mandatory reporting system should be established as a provision of the Cotton Storage Agreement (CSA) that --

- requires warehouses to report Bales Made Available for Shipment (BMAS) on a weekly basis to EWR, Inc., which in turn will make the reports available to USDA
- establishes a complaint driven system, with prompt response by USDA
- requires a warehouse to be notified by electronic means when a complaint is filed
- requires CCC to use reported information in routine audits of warehouses or in response to complaints of non-compliance

Urge CCC to enforce the requirement that warehouse receipts for delivered cotton be cancelled by the end of the next business day after shipment of the cotton.

Reviews to determine if receipts are cancelled in a timely manner should be a part of routine CCC inspections.

## Pilot Reporting Program

The US cotton industry will institute a voluntary, private sector pilot reporting program that makes more detailed information, relevant to flow and performance, available to all users in a manner that does not disclose proprietary data.

## Shipping Standard

Compliance with the 4.5% minimum shipping standard should be based on the higher of the maximum licensed warehouse capacity or the maximum number of bales stored at any time during the marketing year. Once the warehouse has established its maximum licensed capacity or stored its maximum number of bales, the higher number will be used to determine compliance for the balance of that marketing year.

## Reconcentration

Agree to allow reconcentration, with a revised 605 that clearly states the authority granted to the agent and provided that all costs associated with reconcentration are paid by the requester, under the following criteria:

- anytime provided that the maximum storage credit from CCC is limited to 75 days from the date of reconcentration: to be reviewed on an annual basis
- from a warehouse which has been issued a form WA-125 for non-performance with the shipping standard-for the remainder of the marketing year in which the WA-125 is issued- with no limit on CCC storage credit after reconcentration
- if a warehouse is issued a form WA-125 for nonperformance with the shipping standard, for the remainder of the marketing year with no limit on CCC storage credit after reconcentration
- yard stored cotton (defined as cotton stored outside for more than 15 days from the date of loan entry) may be reconcentrated beginning on day 16 with no limit on CCC storage credit
- anytime between warehouses under common ownership with no limit on CCC storage credit

The procedures established by CCC to govern reconcentration should preserve the sanctity of the warehouse receipt.

### Outside storage

Support the provisions of the proposed rule, which establish criteria under which outside stored cotton retains loan eligibility provided:

- outside storage is defined as being outside 15 days after loan entry
- eligibility for storage credit will be denied on a bale-by-bale basis during the period cotton is stored outside- but when moved back inside eligibility for the storage credit will be restored; the denial of storage credit eligibility shall apply only to individual bales in a CCC loan that are stored outside
- the warehouse receipt will denote the dates the bale was stored outside

**SEC. 3015. COTTONSEED.**

*(a) In General- The Secretary shall use \$15,000,000 of the funds of the Commodity Credit Corporation to provide assistance to producers and first-handlers of the 2005 crop of cottonseed in hurricane-affected counties.*

*(b) Distribution of Funds- The Secretary shall provide disaster assistance under subsection (a) under the same terms and conditions as assistance provided under section 206 of the Agricultural Assistance Act of 2003 (Public Law 108-7; 117 Stat. 543), except that assistance shall be--*

*(1) distributed to producers and first handlers of cottonseed; and*

*(2) based on cottonseed production during the most recent year for which a disaster payment specifically for cottonseed was not authorized*

# **Implications of 2005 Energy Policy for Cottonseed & Cottonseed Products**

## **NCC Analysis – Draft**

### **May 2005**

#### **Summary**

There are concerns that the renewable fuels mandate in the Energy Policy Act of 2005 (Energy Bill) will exert pressure on cottonseed prices by increasing the availability of feed by-products that result from the ethanol production process such as dried distiller grains (DDGs) and corn gluten. To address those concerns, National Cotton Council (NCC) staff has investigated the potential causes of recent cottonseed price declines and estimated the extent to which the renewable fuels mandate may impact cottonseed and cottonseed product values.

The decline in cottonseed prices between 2003 and 2005 can be attributed to three primary factors: increased supplies of cottonseed due to record crops of cotton; lower prices of cottonseed meal and cottonseed oil; and lower prices of competing feeds.

The analysis concludes that increased use of grain and vegetable oils for the production of renewable fuels can impact the value of cottonseed products and cottonseed prices. However, impacts vary depending on the feedstock and type of renewable fuel production. Increased availability of DDGs and corn gluten resulting from corn-based ethanol production was found to have a negative effect on cottonseed prices. In contrast, biodiesel production from vegetable oils can be supportive of cottonseed oil prices, and subsequently support the price of cottonseed.

#### **Developing Economic Models for Cottonseed**

Economic models have been estimated to quantify the major factors affecting the prices of cottonseed and cottonseed products. Cottonseed meal prices are primarily impacted by prices of the dominant protein meal, soybean meal. DDG prices and cottonseed meal production levels have also proven to influence cottonseed meal prices. Cottonseed oil prices are impacted by cottonseed oil production levels and price levels of primary substitutes, soybean oil and corn oil. Whole cottonseed prices are influenced by the available supplies of cottonseed, the value of cottonseed products (cottonseed meal and oil), and prices of feed substitutes such as DDGs and alfalfa hay. Aforesaid price relationships, estimated using data from 1991 through 2004, explained over 90% of the variation in cottonseed and product prices over the estimation period.

#### **Key Results from Price Analysis**

Cottonseed price equations suggest that the decline of \$55 per ton between 2003 and 2005 can be disaggregated as follows:

- \$23.83 of the decline due to increased cottonseed supplies
- \$24.70 of the decline due to lower cottonseed product prices
- \$6.43 of the decline due to lower feed prices (\$10.95 of the decline due to lower DDG prices is offset by a positive contribution of \$4.52 due to higher alfalfa prices)

The models suggest the following economic relationships:

Every \$1.00/ton decrease in DDG prices causes

- \$0.26/ton decrease in cottonseed meal prices

- \$0.36/ton decrease in whole cottonseed prices
- Every \$1.00/ton decrease in soybean meal prices causes
- \$0.66/ton decrease in cottonseed meal prices
  - Subsequent \$0.22/ton decrease in whole cottonseed prices
- Every \$1.00/pound increase in soybean oil causes
- \$0.73/pound increase in cottonseed oil prices
  - Subsequent \$0.02/ton increase in whole cottonseed prices
- Each million tons added to cottonseed supply causes an \$11.43/ton decrease in whole cottonseed prices

### **Market Analysis**

While two consecutive years of record cotton and cottonseed crops are the primary factor depressing cottonseed prices, the potential for increased supplies of DDGs to directly and indirectly impact prices of cottonseed and cottonseed products is very real. To quantify any potential impacts, staff 1) researched the role of cottonseed and cottonseed meal in today's dairy and livestock rations, 2) investigated the statistical relationships between cottonseed and other feed ingredients, and 3) modeled cottonseed and cottonseed product demands and prices. In addition, results of a Food and Agricultural Policy Research Institute (FAPRI) ethanol study<sup>1</sup> were applied to the NCC cottonseed model.

#### *Role of Cottonseed in Today's Dairy Rations*

DDGs are fed to dairy cows primarily as a source of energy. However, unlike cottonseed, the energy obtained from DDGs is akin to eating high carbohydrate foods such as candy (quick boost in energy). This, along with other nutritional deficiencies, limits the amount which DDGs – regardless of price – will be fed. Whole cottonseed is primarily fed in dairy rations for its ability to contribute digestible fiber, energy and protein to lactating cow diets. The particular combination of these attributes in cottonseed is very attractive to dairymen, especially given cottonseed's relatively cheap price. In addition to the fiber content, the release of energy from cottonseed is slower and more suited for lactating cows. Like DDGs, the whole cottonseed share of dairy rations is limited (less than 8 pounds per-head per-day) for nutritional reasons. According to a leading dairy nutritionist, dairymen currently feeding cottonseed will keep it in the dairy ration, so long as cottonseed remains below \$180/ton, regardless of the DDG price. This is not to say that DDGs will not directly or indirectly impact the price of cottonseed.

#### *Energy Bill Analysis*

FAPRI estimated potential impacts of implementing the renewable energy section of the Energy Policy Act of 2005. FAPRI estimated changes in baseline acreage, production and prices of major U.S. crops that result from mandating the production of 7.5 billion gallons of renewable fuels by 2014. FAPRI analysis estimated that:

- DDGs production would increase from 9.2 to 16.0 million tons (74%).
- DDG prices fall by 6.87%.
- Corn prices would increase on average of 4.86% annually.
- Other grain price increases would be more modest.

---

<sup>1</sup> "Implications of Increased Ethanol Production for U.S. Agriculture." University of Missouri-Columbia, Food and Agricultural Policy Research Institute, FAPRI-UMC Report # 10-05, August 2005.

- Soybean prices would decrease on average 0.38% annually.
- Soybean oil prices would increase on average 0.51% annually.
- Soybean meal prices would decrease on average 8.67% annually.
- Some soybean and cotton acreage is replaced by corn.

While the FAPRI study estimates impacts for U.S. cotton acreage and price, it did not report the impacts on cottonseed or cottonseed products. NCC staff, using FAPRI's baseline and energy bill prices, estimated price impacts for cottonseed and cottonseed products.

Preliminary analysis by staff indicates that:

#### *Cottonseed and Cottonseed Product Prices*

- Estimated whole cottonseed prices in 2014 were \$3.78/ton lower than baseline prices.
- Cottonseed meal prices fell \$13.15/ton below baseline levels by 2014.
- Prices of cottonseed oil rose 2.3 cents/pound by 2014 due to higher soybean oil prices.

#### *Factors Impacting Whole Cottonseed Prices*

- Lower cottonseed meal prices were the primary force pulling whole cottonseed prices downward.
- Lower DDG prices also had a downward effect on whole cottonseed prices.
- The impacts of lower cottonseed meal and DDG prices were partially offset by higher cottonseed oil prices and lower cottonseed supplies that helped support whole cottonseed prices.

#### *Factors Impacting Cottonseed Oil Prices*

- Cottonseed oil prices were pulled upward by soybean oil prices.

#### *Factors Impacting Cottonseed Meal Prices*

- Cottonseed meal prices fell as soybean meal prices fell (indirect price effect of DDGs via soybean meal).
- Direct price effect of DDGs significantly less than indirect effect.

#### *Changes in Value of Cottonseed and Cottonseed Products*

- Whole cottonseed values fell \$104.4 million below the baseline over the 2005-14 period.
- Cottonseed meal values were \$115.6 million lower than baseline values in the 2005-14 period.
- The value of cottonseed oil during the 2005-14 period was \$106.8 million above baseline values.

There are numerous issues that should be considered when interpreting these results. First, it is assumed that FAPRI properly applied current biofuel technologies and production efficiencies. Second, while ethanol derived from corn is currently considered to be the most feasible renewable fuel, biodiesel has the potential to capture larger market shares than assumed in the FAPRI study. Also, other feedstocks (sugarcane, switchgrass, hybrid poplar trees, etc.) may likely take market share away from corn ethanol in future years. In either case, if corn ethanol

were to yield market share, less DDGs would enter the market. Third, current expansion of ethanol production capacity stems from relatively small-scale dry mills. Since dry mills primarily create DDGs, a change in this trend could affect future DDG supplies. Finally, this analysis characterizes the cottonseed market and estimates the impacts of the 2005 Energy Policy at the national level despite there being significant regional differences in cottonseed prices.

## **RESOLUTION**

### **PLANT HUSBANDRY FOR COTTON QUALITY ASSURANCE**

Cotton quality discounts resulting from inconsistent length, uniformity, short fiber content, and micronaire are especially costly to Delta farming operations. Stoneville scientists should carefully examine all aspects of competing varieties in order to properly characterize the behavior of cotton varieties under the various environmental conditions for growing cotton in the Mississippi Delta. Similar to variety trials which emphasize yield, quality parameters should continue to play a more significant role in the reporting of various variety characteristics.

Mississippi State University and USDA scientists should develop a team approach to establish a blueprint for standards in managing quality control in cotton production, especially during termination of the crop, harvest preparation, harvest, and ginning.

Adopted by: Delta Council Ginning and Cotton Quality Improvement Committee  
July 27, 2006

~~Strikethrough~~ print represents deleted text since the August 18, 2005, Midyear Board of Directors meeting.

Bold and italicized print represents added or modified text since the August 18, 2005, Midyear Board of Directors meeting.

## RESOLUTION

### USDA COTTON GINNING LABORATORY - STONEVILLE

The USDA Cotton Ginning Laboratory at Stoneville has been vitally important to the fiber quality and economics of cotton production and processing in the Mississippi Delta. The advances in technology for cotton ginning that have been produced by the Stoneville-based USDA Cotton Ginning Laboratory have enabled gins to remain compliant with air quality standards of EPA while at the same time, constantly improving the management of fiber quality.

Delta Council urges the USDA Cotton Ginning Laboratory to continue to emphasize the study of all aspects for reducing costs and increasing marketable cotton lint which possesses characteristics that respond to prevailing market signals. Also, special attention should be focused on the behavior and quality of newer and higher-yielding cotton varieties at the point of ginning.

***USDA should focus emphasis on cottonseed research aimed at ensuring the future market share in the oil and meal marketplace.***

Delta Council praises U.S. Senator Thad Cochran for including increased funding for the Mid South Ginning Laboratory in the ~~FY'06~~ ***FY'07*** Senate Appropriations measure and we urge the Congress to provide additional funds to the Stoneville laboratory during the next fiscal year in order to accelerate the capacity of commercial cotton gins to meet the growing demands of cotton quality and competitiveness in the domestic and international marketplace.

Adopted by: Delta Council Ginning and Cotton Quality Improvement Committee  
July 27, 2006

~~Strikethrough~~ print represents deleted text since the August 18, 2005, Midyear Board of Directors meeting.

Bold and italicized print represents added or modified text since the August 18, 2005, Midyear Board of Directors meeting.

## **RESOLUTION**

### **COTTONSEED ASSISTANCE**

Delta Council expresses its appreciation to the Congress for recognizing the importance of price stabilization for cottonseed by providing cottonseed assistance for the 1999, 2000, and 2001 crop season. Without this price stabilization provided by the Congress, the infrastructure of the cotton industry would have been severely jeopardized and huge debt would have been incurred by cotton ginning and cottonseed crushing operations.

Delta Council urges the Congress to establish permanent law which provides income and price stabilization to the cottonseed industry and suggests that the National Cotton Council develop a consensus-based approach to establish policy proposals for the implementation and administration of such a program.

Relative to the future of the bio-energy policies of the federal government, Delta Council requests that an analysis be performed on the market impacts which bio-fuels production and the by-products which it generates, have on the whole seed and crushed market for cottonseed. ***Further, Delta Council encourages the cotton industry to examine the merits and feasibility of including cottonseed in national energy policy.***

Adopted by: Delta Council Ginning and Cotton Quality Improvement Committee  
July 27, 2006