



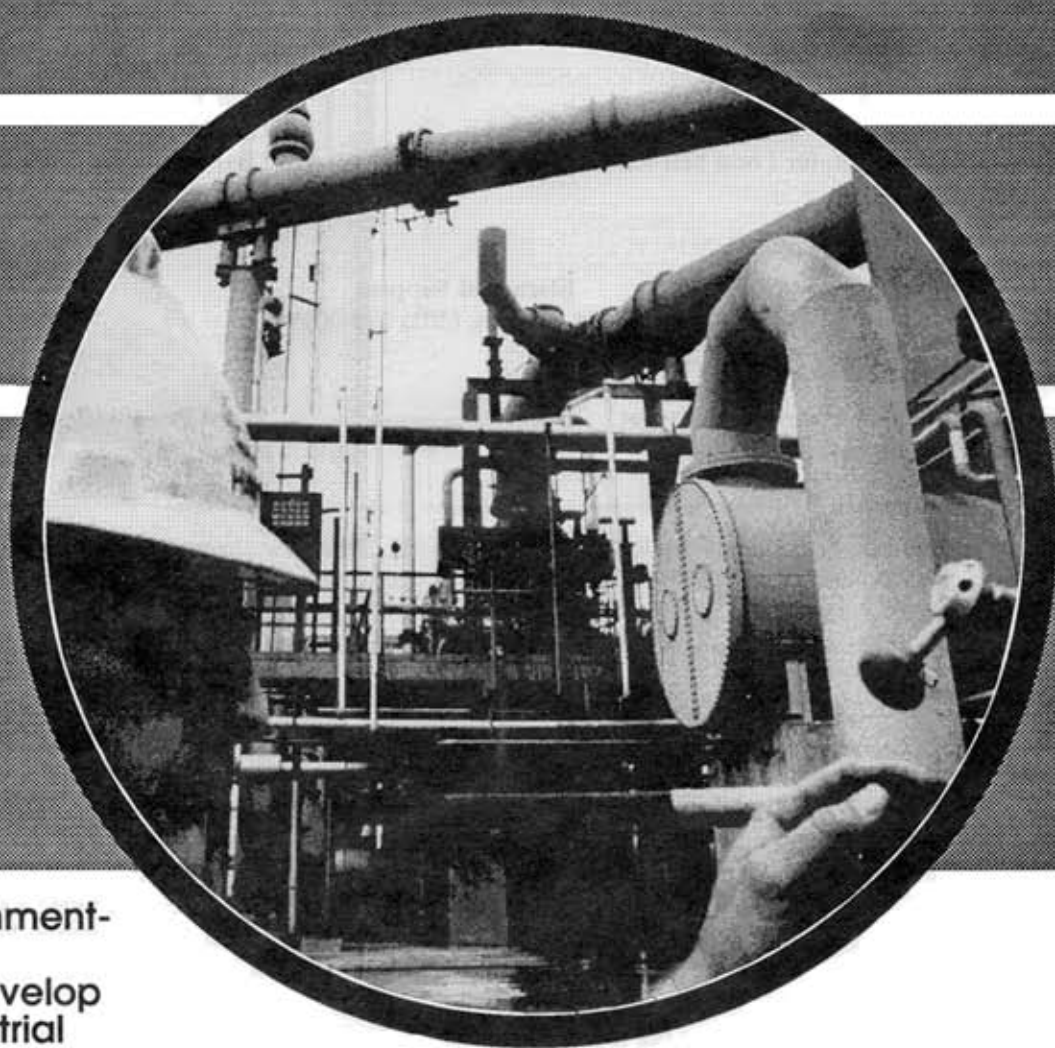
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Industrial Uses Of Agricultural Materials

Situation and Outlook Report



Federal Government-
Private Sector
Partnerships Develop
Biobased Industrial
Products

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Mention of private firm or products does not indicate endorsement by USDA.

Summary

U.S. agriculture likely will have substantial excess capacity for the foreseeable future. However, technological breakthroughs, heightened environmental awareness, and tougher environmental regulations are creating opportunities to use this capacity to produce industrial products.

A host of Federal programs are working in partnership with the private sector to develop these opportunities. For example, scientists from USDA's Agricultural Research Service (ARS) have entered into Cooperative Research and Development Agreements with private firms to commercialize ARS research. The newly created USDA Alternative Agricultural Research and Commercialization Center provides seed capital to help private firms bridge the gap between research and commercialization. USDA's Cooperative State Research Service, Office of Agricultural Materials, helps develop and commercialize agriculturally based industrial products and processes by funding university research teams and forming product-oriented consortia designed to leverage Federal investments in biobased technologies. Biomass conversion and utilization efforts within the Department of Energy focus on the production of biofuels and related chemicals.

An accelerating but moderate recovery means solid U.S. economic growth in 1994. Most analysts expect that inflation-adjusted Gross Domestic Product will grow about 3 percent next year. Business spending on plant and equipment and, recently, consumer spending on housing and durable goods have led overall GDP growth. Economic growth in 1994 will give a lift to many agricultural producers selling to the industrial sector. Inflation and interest rates are expected to remain low, although picking up slightly.

The carbon monoxide provisions of the 1990 Clean Air Act Amendments were implemented last winter and the resulting demand for oxygenates, primarily corn-based fuel ethanol and natural gas-based methyl tertiary butyl ether, was much lower than expected. Nevertheless, oxygenate demand increased dramatically. Although cornstarch dominates the industrial starch market, wheat starch is also used to manufacture industrial products. Roughly 2 to 3 percent of the 2.5-billion-bushel domestic wheat crop will be used industrially.

The United States has imported castor oil since domestic production ceased in 1972. Because of widely fluctuating world supplies, major castor oil buyers have expressed an interest in U.S. production. In response, Browning Seed, Inc., and National Sun Industries are working with scientists and farmers to reestablish castor as a domestic crop. In addition, a consortium of industrial, university, and government organizations has come together to commercialize lesquerella, an experimental crop. Castor and lesquerella are sources of hydroxy fatty acids used by industry in a variety of applications, including cosmetics, waxes, nylons, plastics, coatings, and lubricants.

Glycerine is a byproduct of producing soaps, fatty acids, and fatty alcohols from vegetable oils and animal fats. It has over 1,500 commercial applications, including drugs, cosmetics, resins, polymers, and explosives. The world market for glycerine has fluctuated in recent years. In 1993, expected supplies did not develop while demand remained strong, causing producers to raise their prices. The outlook for the glycerine market is uncertain. Future supply increases may be met by an equally large growth in demand.

The 1993 kenaf harvest has been completed in Louisiana and is underway in California, Mississippi, and Texas. Harvested acreage is estimated at about 3,800 acres. Kenaf processors continue their search for new markets--promising areas include seeding mats and oil-absorbent materials.

In the United States, flax is the most extensively used nonwood fiber employed in papermaking, except for cotton. Because of its long slender fibers, flax pulp is ideal for the production of thin strong papers, such as cigarette, airmail, bible, and light-weight bond papers.

Animal byproducts are used to manufacture pharmaceuticals with a wide range of applications. Advances in biotechnology have resulted in the development of transgenic animals, which may be used as future sources of drugs and organs for human transplants. Chitin--whose most common source is the tough outer shell of shellfish--is used to treat sewage effluent and remove metals from waste water.

U.S. pulp manufacturing is dominated by the kraft process, which uses chemicals in production and bleaching. However, chlorine use has come under scrutiny by the Environmental Protection Agency. Improvements in mechanical pulping, increased wastepaper utilization, and alternative pulping methods are options available to meet changing market and regulatory conditions.

Over 300 medical devices and more than 40,000 products contain hevea latex. Since the mid-1980's, many people have developed allergic reactions to hevea products. Guayule rubber latex has the potential to be a hypoallergenic alternative.

Biodiesel blended with petroleum diesel is being examined as a potential fuel in urban areas to meet Clean Air Act standards. But what about using biodiesel on the farm? The special article examines a simulation model that evaluates the feasibility of a community-based 500,000-gallon biodiesel plant in the United States. Soybeans were found to be the most cost-effective feedstock, mainly because the meal is a useful coproduct. Biodiesel costs are heavily dependent upon both the prices paid for the beans and received for the meal. At present, the resulting biodiesel is not competitive with the price farmers pay for conventional diesel fuel.