The oilseed industry ten years from now . . .

Like oracles of old trying to use available omens to divine the future, eight specialists have provided estimates of where they think the world's oilseed and fats and oils industries are headed during the next ten years based on currently available data.

The occasion was a one-day symposium entitled "Ten-Year Forecast: Trends in Global Oilseed Utilization and Processing" held May 9, 1998, at the Chicago Hilton and Towers hotel, where the AOCS annual conference began the next day.

Most of the talks came with a caveat that it is much more difficult to predict the future than it is to assess the present or to review the past.

But if the omens, primarily supply-and-demand statistical data fortified by extensive international travel and experience, were read correctly, here's some of what can be expected during the final years of the current century and the opening of a new one:

• Integrated operations will increase in number, with packaging being added to current complexes that have both extraction and refining operations. The trend of extraction facilities adding refineries is mirrored by refineries that are adding extraction plants to ensure an oil supply.

• Genetically modified oilseeds will gain acceptance slowly.

• Southeast Asia will overcome its currency turmoil relatively quickly and become even more important as a supplier of edible oils to the world's increasing population.

• U.S. facilities will gradually adopt physical refining for soybean oil, which already is being done in Latin America.

• Fish oil supplies for food purposes in Latin America will become more scarce as the oil is diverted for use in salmon aquaculture feed.

• Where utility costs allow, nitrogen could replace steam in deodorization applications; some Spanish and Portuguese plants are doing so now to minimize the free fatty acid content in their oils.

Six of the eight speakers dealt with specific geographic areas; two discussed general economic and business factors that will affect the oilseed sector.

United States

Robert Hastert of Hastech International began with a brief look at historical technological developments, then focused primarily on the U.S. industry.

There is more aversion toward genetically modified foodstuffs in Europe than in the United States and Canada, where a bountiful supply of relatively inexpensive soybean and canola oils is paired with a prejudice against saturated fats, Hastert said.

Environmental concerns will prompt stringent purity standards for hexane, he forecast.

The trend to higher-quality feedstocks eventually will lead to large-scale physical refining of soybean oil in the United States, he said, and there will be increased use of silica and similar products in oil purification systems. Thin-film deodorization will increase, with more use of high-pressure steam as well as some substitution of nitrogen for stripping steam where utility costs make such a switch advantageous.

In later discussions, Walter Farr of Owensboro Grain Co. in Owensboro, Kentucky, said his firm had done pilot-plant testing of using nitrogen, but the oil flavor was unacceptable with dry nitrogen. Wet nitrogen did provide an acceptable flavor. Steam ejectors could not be used with nitrogen, he said, so "you have to go with a dry vacuum plant, which means you're exchanging steam costs for electrical costs."

Hastert noted that in 1958 there were 16 firms in the United States operating 42 oil refineries. Forty years later, he noted, only three of these firms are still operating refineries. Fifteen of the 1956 refineries are still in operation. Another 33 have been built or are about to be built, with those 48 refineries operated by a total of 23 companies, he said. He noted it is impossible to predict what the industry will be like 40 years from now.

Hastert also said that within a few years the industry would be using refractive index to monitor hydrogenation. That comment was supported three days later when Photoneutics Inc. of Peabody, Massachusetts, issued a news release saying a test of its Metri Cor 2000 fiber-optic refracto- system at Owensboro Grain Edible Oils "has successfully proven that end-point control of the hydrogenation process for soybean oil is possible" with the system. Initial testing was done at Bunge Foods in Fort Worth, Texas, followed by the Owensboro trial.

During the discussion period, it was noted that Latin American refineries have physical refining capability because of the increasing regional production of palm oil. As a result, they are carrying out physical refining for soybean oil as well.

ASEAN region

T. Thiagarajan from the Washington, D.C., office of the Palm Oil Research Institute of Malaysia (PORIM) read a paper prepared by PORIM Director-General Yusof Basiron on the ASEAN region, which includes the Southeast Asian nations of Malaysia, Indonesia, The Philippines, Thailand, Singapore, Brunei, Vietnam, Laos, and Myanmar.

Of those nine nations, the first three are significant players in global oils and fats trade, with Malaysia and Indonesia being primary suppliers of
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palm oil, while The Philippines is the world’s leading source of coconut oil. The ASEAN region produced about 20% of the global fats and oils supply in 1997, or approximately 100 million metric tons, and is the world’s leader in oils exports.

Although coconut oil production has remained relatively level at approximately 1.5 million metric tons annually in recent years, palm oil production continues to climb. There will be a temporary drop during the next year or so as palm yields diminish as a result of drought and a sun-hiding haze generated by massive tropical fires, Thiagarajan said in response to a question.

Most Malaysian palm oil exports now go to developing nations—Pakistan, China and India take about one-third of Malaysia’s exports, while Indonesia has the European Union as the primary customer for its crude oil exports.

Between 70 and 80% of the region’s lauric oil exports—palm kernel and coconut oils—are shipped to the United States and European Union.

No major processing technology changes are foreseen during the coming decades.

Europe
Vijai K.S. Shukla, director of the International Food Science Center A/S in Lystrup, Denmark, noted that rapeseed, sunflower seed, soybean, and palm oils each provides about 20% of Europe’s edible oil supply.

Shukla focused on the nutritional value of oils, both the triglycerides and the unsaponifiable components of the oil, and how processing can affect oil quality.

Shukla had several suggestions for avoiding rancidity-promoting oxidation, including more extensive use of nitrogen and shifting to low-temperature processing. Physical refining is more benign than caustic refining, he said, but added that the quality of the oil to be refined will determine which technique is to be used.

Constructing processing facilities close to port facilities reduces the possible exposure of oil to air during handling, he said.

European food companies are adopting the hazard analysis critical control point (HACCP) program, which means they want their suppliers—including oil processors—to use that program, Shukla noted. That means customers not only are con-
cerned about the quality of the oil arriving at their facilities but also want to audit/monitor the refining process.

Shukla later was asked if adoption of a single currency would affect the European oil processing industry. He noted that only 11 nations will be part of the initial agreement and that much of Europe’s edible oil-refining capacity is in the United Kingdom, which is not one of those 11 initial participants. But if implementation does occur in 2001, it will ease the situation for Europe as a customer of the rest of the world and reduce internal currency exchange costs, he said.

Japan

Hiroyuki Mori, president and chief executive officer for Fuji Vegetable Oil Inc. in Savannah, Georgia, outlined trends in Japan.

Japan’s fats and oils supply reached about 2.6 million metric tons in 1988 but has leveled off since, he said. Fish oil production has declined, but some specialists have said this may be related to a 15- or 30-year cycle in fish populations.

Food-processing uses of fats and oils (margarine, shortening, noodles, chips) are rising about 5% annually, he said, but household use has shown a slight decline. In 1996, total industrial use was about 590 million metric tons with household use about half that amount.

The trend toward more Japanese women working outside the home is a factor in the increasing food-processing use and decline in home use, he said.

In any case, the increase in fats and oils disappearance during the next 10 years is not expected to exceed the increase in population growth, Mori said. He estimated that one-fourth of Japan’s dietary fats and oils are from visible sources, the rest from invisible sources (meat, eggs, milk, or other foodstuffs). As of 1995, about half of dietary fat in Japan was derived from animal sources and half from vegetable sources.

There is a generational difference in fat consumption, with older persons deriving a lower percentage of total calories from fat. Younger Japanese now get up to 30% of their calories from fat, he said.

Latin America

Latin America’s oils and oilseed processing industry began in the 1930s when the first refineries were built by trading companies around ports. Primary feedstocks were tallow, lard, and some cottonseed oil, said Carlos Bueno, technical director for the main partner for Tirtiaux Latinoamerica in Buga, Valle, Colombia.

Latin America’s first major push in oilseed/oils processing came in the 1950s with the start of oilseed extraction and fish oil processing in Chile and Peru.

About the same time, Colombia and Panama were the first sites of large oil palm plantations as the major international fruit companies started some refineries as ancillary activity to their food operations.

During the 1970s, Latin America’s southern zone (Argentina, Brazil, Uruguay, and Paraguay) began to see rapid expansion of soybean acreage. During the 1980s, the fish oil industry on South America’s Pacific Coast began to experience cyclical shortages due to El Niño phenomena, the soybean expansion slowed, and Argentina began expanding sunflower acreage, Bueno said.

In recent years, the creation and expansion of trade zones have become a factor. These agreements often are complex bilateral and multilateral agreements, and the different trading zones are talking to each other about combining. Within the Andean pact, soy import duties have become an issue, with palm-oil producing countries wanting to maintain the duty, while soy-producing nations want the duty lowered or eliminated.

“We are growing toward one big free-trade zone much faster than had been expected,” Bueno said.

Strong expansion in processing facilities is expected in Argentina during the next 10 years with capacity rising by 80%, he said, with similar expansion expected in Bolivia.

For Central America, palm oil will fuel fats and oils expansion. As the international food companies have left these areas, small growers have formed cooperatives to build integrated processing plants, including units in Honduras, Guatemala, and Costa Rica.

In many nations, traditional operations owned by families are combining or forming alliances, he said.

Palm oil has been perceived as a potential economic catalyst in Mexico’s southernmost state of Chiapas, Bueno said.

India

India, poised to become the world’s most populous nation soon, must find a way to increase its domestic oil production or find a way to pay for annual imports of up to three million metric tons of edible oils, according to Monoj Gupta of MG Edible Oil Consulting in Richardson, Texas.

Gupta noted that India is the world’s fourth-leading producer of oilseeds and grows more types of oilseeds than any other single nation, but its domestic fats and oils consumption is rising faster than is its production, putting the oil industry at a crucial stage.

India consumes its fats and oils as refined oil, vanaspari, industrial hard oils, margarine, and bakery shortenings. An increasingly influential middle class is demanding better and more consumer products, he said, reflected in increasing sales of refined oils, margarines, and bakery shortenings.

Per capita consumption figures can be misleading in India, he noted, because India’s affluent consumers,
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who constitute about 25% of the total population, consume about 50% of the visible edible fats and oils, for an annual per capita consumption of 14–15 kilograms. But the per capita consumption of visible fat for the other 700 million Indians is about 1 kilogram annually.

Overregulation by government stifles technological innovation and construction of larger facilities, but soybean extraction operations are not as tightly regulated as other fats and oils sectors, which may provide a prototype for future deregulation, he said.

India cannot afford to increase oil imports continually and therefore must improve its oilseed crop yields that consistently lag behind global averages, he said. Improving yields will require improvement in irrigation and water management systems.

Larger-scale processing could provide economies of scale in a nation where oil production costs now are above world levels. India also needs to find a way to make use of underutilized oil sources, such as rice bran oil, Gupta urged.

Global economics

Mike Mazzocco, associate professor and director of the Food and Agribusiness Management Program at the University of Illinois, provided some basic information on how macroeconomics will affect what happens to the oilseeds and oils processing industries.

In looking at various regions of the world, Mazzocco said that a big plus for Europe will be the implementation of the single currency, although in the past five years there has been a convergence of national economies to similar interest rates, inflation levels, deficit levels, etc. Intra- and interregional investment flows should strengthen, he said.

In Africa, government debt is minimal, which is a plus to attracting investment, but political risk insurance is recommended for any investors. African nations need to modify capital inflow policies to allow foreign ownership if they want to attract necessary capital to improve standards of living.

In Central/Eastern Europe, there have been large capital investments—$10.6 billion in 1996—lured by positive factors in terms of deficits, debt, population age, and others, he said, but the economies are relatively small.

For South Asia, the major question is whether India will open its economies to allow foreign ownership.

In East Asia, $46 billion in capital investment was routed during 1994 to China, the heart of East Asia, he said. China has a positive current account balance and low external debt, he noted, but one key question is whether the government will allow companies to repatriate any earnings back to their home nations.

In Southeast Asia, Vietnam is where there is the most immediate opportunity, with an improving climate for capital flow. On the negative side, inflation recently has been 100% annually and the existing parastatal institutions pose a major dilemma for potential investors.

In Latin America, there may be increasing capital flow in the near term by investors frightened away from Southeast Asia by economic problems there. Gross domestic production in Latin America is showing increases of 4.5–8% annually, but poverty is prevalent with 25% of the area's population earning less than $1 a day. Chile and Argentina are showing stable growth; Peru is fighting inflation.

Steve Sonka, director of the National Soybean Research Laboratory and a professor of agricultural management at the University of Illinois, provided insights as to the static nature of industry.

Information technology is a major driver of change at present, with its use enabling industry to be innovative in responding to customers' diverse needs.

Serving as moderators during the program were Neil Widlak of Archer Daniels Midland Co., William Artz of the University of Illinois, Tim Kemper of French Oil Mill Machinery Co., and Walter Farr of Owensboro Grain Co.
China oil, seed imports: up, and up, and up

This article is based on the annual oilseeds and products report from U.S. Department of Agriculture observers in Beijing, China. The original report was prepared in early March 1998.

Given the relative inefficiency of growing oilseeds relative to horticultural and grain crops, Chinese oilseed production cannot keep pace with demand. Imports of soybeans are expected to increase from 3 million metric tons (MMT) in marketing year 1997-98 to 3.5 MMT in 1998-99. Steadily rising edible-oil imports are estimated to reach 3.3 MMT in 1997-98 and 3.6 MMT in 1998-99.

Oil overview
Spurred by rising incomes and increased utilization in processed foods such as noodles, Chinese consumption of edible oils is rising rapidly, and imports can be expected to increase. Total domestic oil production in the 1997-98 marketing year is estimated to drop by 154,000 metric tons to just under 7 MMT, due to a decline in peanut, cottonseed, and sunflower seed production. In addition, oil stocks are low and need to be replenished. Oil imports should increase in 1997-98 by 429,000 metric tons to a total of 3.291 MMT.

Despite higher domestic production in 1998-99 of 7.2 MMT, imports for that year are forecast to exceed 3.6 MMT. Total domestic disappearance of soybean, peanut, rapeseed, cottonseed, sunflower, palm and coconut oils is forecast at 10.6 MMT. [Editor’s note: Oil World’s estimate of Chinese total domestic edible and nonedible fats and oils consumption is 14.5 MMT, but the Oil World total includes sesame, corn, olive, palm kernel, fish, linseed and castor oils, as well as lard, butter, and tallow and grease (Figure 1.)]

It is widely presumed that most of China’s edible-oil exports do not actually leave China, or if they do, they return to China via unofficial channels and are not counted in official import statistics. Therefore, official Chinese government data on exports frequently overstate the amount of Chinese-produced oil that leaves the country permanently.

The main reason so much edible oil is coming in through unofficial channels is that China, in an effort to protect inefficient domestic crushers and refiners, restricts oil imports through quotas. As a result, domestically produced oil is priced higher than that on the world market. A 13% duty and 13% value-added tax (VAT) are added to the price of imported oil. Because they are unable to obtain oil through the quota system, many importers bring oil in through other channels, thereby avoiding the tariff and VAT as well. Cheaper imports have driven down the price of domestic oil and many producers complain that they cannot recover their production costs. The impact of smuggling is much greater in the south, where much of the smuggling occurs. Recently, however, there has been gray market trade in the north as well. Although the total import quota is far beneath actual demand, some of it usually remains unused for two reasons: first, importers are concerned that shipments may not arrive before a quota allotment expires each March 31, and second, allotments are distributed in such small amounts (e.g., 100 metric tons per company) to China.

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**China’s edible-oil production (000 metric tons)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Soybean</th>
<th>Peanut</th>
<th>Rapeseed</th>
<th>Cottonseed</th>
<th>Sunflower</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996-97</td>
<td>1,434</td>
<td>1,792</td>
<td>2,734</td>
<td>1,020</td>
<td>129</td>
<td>7,109</td>
</tr>
<tr>
<td>1997-98</td>
<td>1,626</td>
<td>1,367</td>
<td>2,872</td>
<td>972</td>
<td>118</td>
<td>6,955</td>
</tr>
<tr>
<td>1998-99</td>
<td>1,716</td>
<td>1,624</td>
<td>2,792</td>
<td>948</td>
<td>123</td>
<td>7,203</td>
</tr>
</tbody>
</table>

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**Figure 1. Total fats and oils disappearance, 1985-1997**

Source: Oil World Annual
nese end users that they are impractical. Joint venture and wholly foreign-owned refineries were assigned quotas of 1,500 to 3,000 metric tons, which, in most cases, would provide enough raw material for only two to three days' production. Having been encouraged to invest high sums of money in new crushing and refining facilities, these enterprises are reluctant to take the risk of unofficial imports. They must therefore resort to crushing in order to obtain crude oil for refining. In addition, legal imports cannot compete with unofficial imports that have entered the market free of duty and VAT.

Prior to Jan. 1, 1998, refineries were permitted to import oil VAT-free for processing and re-export. Most or all of this oil, however, actually ended up on the domestic market. There have been rumors that as of Jan. 1, 1998, the Chinese government implemented policies to curb such practices.

**Soy oil**
Soy oil production for 1996–97 is estimated at 1.43 MMT and for 1997–98 at 1.63 MMT. Extraction rates for those years are estimated at 16.5%, reflecting an increased proportion of imported (U.S.) beans that have a higher oil content, as well as improved crushing machinery.

Soy oil imports for 1997–98 were about 1.45 MMT; exports for the same year probably were about 80,000 metric tons. Domestic consumption for 1997–98 should reach nearly 3 MMT.

Soy oil production for 1998–99 is forecast at 1.716 MMT, while imports are expected to reach 1.5 MMT. U.S. market share should remain approximately the same for all three marketing years.

**Palm oil**
Palm oil imports and exports are much higher than officially reported. It is widely believed that much of what is officially claimed as exports is diverted back into China. Imports for 1997–98 are expected to total 1.3 MMT, with exports of 75,000 metric tons. This assumes consumption of 1.23 MMT.

The demand for palm oil, which is used predominantly in food manufacturing of snack foods and noodles, is high and growing. Domestic consumption in 1998–99 is forecast at 1.43 MMT, based on 1.5 MMT of imports and 74,000 metric tons of exports.

**Rapeseed oil**
Rapeseed oil production should increase in 1997–98 by 150,000 metric tons over the previous year owing to more imports of rapeseed for crushing. Rapeseed crushers have complained for the past two years that there is insufficient rapeseed available for crushing. To make up the shortfall, it is estimated that imports will reach 500,000 metric tons in 1997–98.

Rapeseed oil production in 1998–99 is forecast to decline due to a drop in domestic rapeseed production. Oil imports should be at least 600,000 metric tons. As with soy oil and palm oil, it is believed that much of the exported rapeseed oil returns to China through unofficial channels to avoid the VAT and import quota.

**Peanut oil**
Peanut oil production in 1997–98 is estimated to be 400,000 metric tons lower than the previous year due to lower crush numbers resulting from drought.

Peanut oil production should rebound somewhat during 1998–99 to 1.624 MMT. Imports should reach 15,000 metric tons, while exports essentially cease.

**Other oils**
Cottonseed oil production was 1.02 MMT for 1996–97 and is estimated at 972,000 metric tons for 1997–98, the decline reflecting lower cottonseed production. Cottonseed oil production is forecast to decline further in 1998–99 due to reductions in cotton production.

Sunflower seed oil production, which was about 118,000 metric tons in 1997–98, is forecast to increase slightly to 123,000 metric tons in 1998–99 based on a projected increase in sunflower-seed production.

**Oilseeds overview**
Barring another drought, 1998 oilseed production should nearly recover to 1996 levels. Spurred by growth of the livestock sector and increasing domestic oil consumption, China will continue to import oilseeds over the long run. Given the low yields of oilseeds and government policies that favor grain production, significant increases in area planted to oilseeds are unlikely. Per-hectare returns for soybeans and peanuts, for example, are much lower than returns for corn, wheat, and rice.

Given its lack of comparative advantage in producing oilseeds, and the fact that oilseeds are freely importable, China will continue to be a net importer, with total imports climbing to 3,309 MMT in 1997–98 and 3,905 MMT in 1998–99, 90% of which will be soybeans. Despite the rising oilseed imports, China's crushing capacity is grossly underutilized, operating at 45% of capacity. This is due in large part to the unavailability of oilseeds as well as a lack of operating funds. The oilseed crushing industry is slowly being modernized with the recent construction of several large joint-venture and wholly foreign-owned crushing mills, the restructuring of some existing state-owned crushing mills,
and the closing of other, less efficient mills. In an attempt to protect the existing crushing industry, the government issued regulations in 1996 restricting investment in new crushing capacity. The regulations do permit the expansion of existing mills.

Rapeseed
China's 1998 rapeseed production should be no more than 9 MMT, down slightly from the previous year, with imports during the 1998–99 marketing year expected to rise to 400,000 metric tons.

Exports for the current marketing year are estimated at 300,000 metric tons.

Soybeans
Despite a significant shift in planted area from corn to soybeans in northeastern China during calendar year 1997, total production was limited to 13.8 MMT due to severe drought during planting, which delayed the growing season. Given the poor 1997 soybean yields, some of last year's soybean area will be used to produce corn and other grain crops in 1998. The 1998 soybean area is estimated at 8.2 million hectares, which should boost production to 14 MMT, barring a repeat of last year's drought. Water tables are still low, however, so the potential for reduced yields due to a lack of irrigation exists.

Given low domestic production, the absence of quantitative restrictions, and a low tariff of 3%, soybean imports will continue at a high level. In addition, joint-venture and foreign-owned refineries have to crush beans because import quota allocations for crude oil are nearly impossible to obtain.

Crushers have said that they are willing to pay a premium for imported beans because of their consistent quality and the dependability of supply. Large crushers are reluctant to use domestic beans because of lower quality, higher moisture content, and the presence of a great deal of dirt and foreign matter. Crushers in southern China also complain that the delivery of domestic beans is unreliable. U.S. soybeans frequently are criticized as containing too much foreign matter.

Higher incomes have been spurring demand for meat, but demand for soy foods has remained fairly constant. As a result of this and the increased import estimate, crush numbers have been estimated at 9.9 MMT for 1997–98 and forecast at 10.4 MMT for 1998–99.

Peanuts
Given the current short supply caused by the 1997 drought and this year's peanut oil deficit, prices are up. As a result, 1998 peanut acreage should total 3.8 million hectares. If rainfall is adequate this year, 1998 peanut production should reach 7.16 MMT.

Peanut consumption is increasing rapidly due to increased popularity as a snack food and increased use in food processing. Estimated crush for 1997–98 is down 944,000 metric tons from the previous year to 3.04 MMT and forecast for 1998–99 at 3.61 MMT. Although production was low in 1997, China continued to export raw peanuts, mainly to The Netherlands and Russia, and processed peanuts, mainly to Japan, because the price is attractive.

Cottonseed
Cottonseed production in 1997 is estimated at 7.2 MMT, about 360,000 metric tons lower than 1996 production. Despite an increase in planted area to 4.4 million hectares in 1998, total production will decline due to slightly lower yields.

Crush in 1996 was 6.8 MMT and is estimated at 6.47 MMT for 1997. The forecast for the 1998–99 crush is 6.32 MMT.

Sunflower seed
Sunflower-seed planted area and production in 1998 are forecast to be slightly higher than the previous year at 700,000 hectares and 1.25 MMT, respectively.

Sunflowers are grown predominantly on the edge of fields and in narrow strips between field crops. They are consumed mainly as a snack food.