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A *Amber Waves* magazine covers the full range of the agency's research and analysis, including the economics of agriculture, food, rural America, trade, and the environment. ERS publishes *Amber Waves* five times a year (in February, April, June, September, and November) both in print and on the Internet.

Dynamics of Agricultural Competitiveness: Policy Lessons From Abroad

Whether from the perspective of an individual enterprise, or a broader economic sector such as agriculture, maintaining "competitiveness" is an unceasing concern. To assess competitiveness, observers often refer to changes in market share, exports, and profitability—but ultimately, the competitiveness of a nation's product is rooted not in any single outward measure, but in the quantity and quality of the country's productive resources. These are the factors that determine the relative efficiency of making different goods and, consequently, a country's "comparative advantage" in international trade.

To many, the idea that comparative advantage depends on relative resource endowments conveys the sense that nations have little control over their economic destinies, at least in international trade. This is not entirely true. As ERS research on agriculture in South America, the former Soviet Union, and China reveals, government policies, national institutions, and even cultural values can profoundly affect the overall productivity of a country's existing resources, and have important implications for international agricultural markets. When significant policy changes are made, the result can be rapid changes in the competitiveness of a nation's agricultural products.

The spectacular growth of agricultural sectors in Brazil and Argentina in the past decade, for instance, can be largely attributed to important macroeconomic reforms implemented by the two countries in the early and mid-1990s. In contrast, agricultural production in Russia and Ukraine slumped following the dissolution of the Soviet Union in 1992, largely due to the loss of heavy subsidies and because the poor institutional environment discouraged investment. In China, a slower pace of reform and longstanding self-sufficiency policies have delayed the country's transition from land-intensive grains production to labor-intensive goods, such as vegetables, where it has a comparative advantage. Developments in these three regions highlight the way policies interact with existing resource endowments to reinforce, or undermine, underlying economic strengths. *Eric Dohlman; edohlman@ers.usda.gov; 202-694-5308*

Methyl Bromide Phaseout Proceeds: Users Request Exemptions

Methyl bromide, a widely used fumigant in agriculture, is one of a number of chemicals—including refrigerants such as freon—being phased out of use worldwide under the Montreal Protocol signed by the United States and 182 other countries. The Protocol is an international treaty aimed at reducing or eliminating use of chemicals that contribute to the depletion of the atmosphere's ozone layer, which protects the Earth from ultraviolet (UV) radiation. Higher levels of UV radiation can increase the incidence of skin cancer and cataracts, suppress the immune system, and damage crops. The phaseout of methyl bromide could mitigate some of these harmful effects, but because methyl bromide is so important to agricultural production, the phaseout could also have some negative effects for producers and consumers.

Methyl bromide is a principal product used to fumigate soil before planting many fruit and vegetable crops, for post-harvest storage and facility fumigation, and for government-required quarantine treatments. The product controls many soil insects, diseases, nematodes, and weeds, as well as insects and other organisms present in stored or shipped commodities and storage, shipping, and processing facilities. For many uses, no single alternative to methyl bromide is available that is as effective and economical. Analyses by ERS and cooperators indicate that the phaseout could cause short-term losses until more cost-effective alternatives are developed and made available. Initially, U.S.

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Phone: (202) 694-5139

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U.S. Organic Farming in 2000-2001: Adoption of Certified Systems *(AIB-780)*

www.ers.usda.gov/publications/aib780

Catherine Greene; (202) 694-5541;

cgreene@ers.usda.gov

U.S. farmland managed under organic farming systems expanded rapidly throughout the 1990s and has sustained that momentum, as farmers strive to meet consumer demand in both local and national markets. The U.S. Department of Agriculture (USDA) implemented national organic standards on organic production and processing in October 2002, following more than a decade of development.

The new uniform standards are expected to facilitate further growth in the organic farm sector. USDA's organic standards incorporate an ecological approach to farming—cultural, biological, and mechanical practices that foster cycling of resources, ecological balance, and protection of biodiversity. An increasing number of U.S. farmers are adopting these systems in order to lower input costs, conserve nonrenewable resources, capture high-value markets, and boost farm income.

This study updates USDA estimates of land farmed with organic practices during 1997 with estimates for 2000 and 2001, and provides new estimates on the number of certified organic operations in each State. Procedures are similar to those used in earlier studies of certified acreage: data from State and private certifiers were collected and analyzed, uncertified production was excluded, and double-certified acreage was excluded whenever possible. Fifty-three organic certification organizations—14 State and 39 private—conducted third-party certification of organic production during 2000 and 2001.

U.S. farmers and ranchers have added another million acres of certified organic cropland and pasture since 1997, bringing the 48-State total to 2.34 million acres in 2001.

Certified organic livestock grew even faster during this period. Most crop/livestock sectors and most States also showed strong growth between 2000 and 2001. Overall, certified organic cropland and pasture accounted for 0.3 percent of U.S.

cropland and pasture in 2001, although the share is much higher in some crops, such as vegetables at over 2 percent.

California was the leading State in certified organic cropland in 2001, with nearly 150,000 acres, mostly used for fruit and vegetable production. North Dakota followed closely with nearly 145,000 acres, mostly for wheat, soybeans, and other field crops. Minnesota, Wisconsin, Iowa, and Montana were other top States. Certified organic pasture and rangeland more than doubled between 1997 and 2001, and was up 28 percent from 2000 to 2001, mirroring the rapid expansion in organic livestock and poultry. Over 40 States had certified pasture and rangeland in 2001, most with under 20,000 acres, although several States had over 100,000 acres and Colorado had over half a million acres. The number of certified organic beef cows, milk cows, hogs, pigs, sheep, and lambs was up nearly four-fold since 1997, and up 27 percent from 2000 to 2001. Dairy has been one of the fastest growing segments of the organic foods industry during this period, and milk cows accounted for over half of certified livestock animals.

Poultry animals raised under certified organic management—including layer hens, broilers, and turkeys—showed even higher rates of growth during this period. California had more certified operations than any other State, with just over 1,000 operations in 2001, up 12 percent from the previous year. Washington, Wisconsin, Minnesota, Iowa, Pennsylvania, Ohio, New York, Vermont, and Maine rounded out the top 10. Many of these States are characterized by a high proportion of small farms that grow fruits and vegetables for direct marketing to consumers. For example, the

Northeastern States have relatively little cropland but a large concentration of market gardeners. Only 3 of the top 10 States in certified operations—California, Minnesota, and Iowa—are also among the top 10 for certified acreage. Nine States, over half in the Southeast (Georgia, Louisiana, South Carolina, Tennessee and West Virginia), showed an overall decline

in certified organic farmland from 1997 to 2001.

The Southeast has had less certified organic farmland than other regions in general, and most of the certification in these States has been by small, local non-profit certifiers. A number of these certifiers chose to drop their certification programs when national rules were implemented, to focus instead on community outreach for sustainable agriculture, and this transition has likely caused some dislocation among certified growers in the region. However, several certifiers—existing organizations that are expanding their range of service, and new certifiers that have recently emerged in that region—are filling in for services that were lost during the transition.

While government intervention in the United States has focused primarily on market facilitation, several States—Minnesota and Iowa in particular—have begun subsidizing conversion to organic farming systems as a way to capture the environmental benefits of these systems. Potential benefits from organic farming systems include improved soil tilth and productivity, lower energy use, and reduced use of pesticides. Most European countries have been providing direct financial support for conversion since the late 1980s, with conversion levels much higher than in the United States.

Obstacles to adoption include high managerial costs and risks of shifting to a new way of farming, limited awareness of organic farming systems, and a lack of marketing and technical infrastructure. State and private certifier fees for inspections, pesticide residue testing, and other services represent an added expense for organic producers. Since the late 1990s, at least nine USDA agencies have started or expanded programs and pilot projects to help organic producers with production and marketing problems and risks, and the 2002 Farm Act for the first time included several small initiatives to assist organic farmers. These initiatives include expanded producer coverage for certification cost-share assistance and new funding for organic farming and marketing systems research.

Regional Trends in Extension System Resources *(AIB-781)*

www.ers.usda.gov/publications/aib781

Mary C. Ahearn; (202) 694-5583;
mahearn@ers.usda.gov

The Extension System's mission, which has been expanded several times since its 1914 founding, is to deliver information to the American public through links among USDA's Cooperative State Research, Education, and Extension Service (CSREES), landgrant universities and colleges, and most of the approximately 3,000 counties in the United States.

Educational information that benefits the public at large, i.e. enhances environmental quality and food safety, is likely to be undersupplied by the private sector. The nature of such information makes it difficult to place a value on it. Those charged with allocating resources to the Extension System and those with the responsibility to allocate Extension resources among competing program areas face a difficult challenge.

This report describes how Extension resources were allocated across major

program areas and major regions of the country from 1977 to 1997. The number of full-time-equivalent Extension personnel dropped by 12 percent from 1977 to 1997, with the largest declines found in community resource development and 4-H youth programs, two of the four main Extension program areas. (The other two programs are agriculture and natural resources, and home economics and human nutrition.) Regional personnel FTE allocation patterns were mostly similar to the national ones.

The Effects of Information on Consumer Demand for Biotech Foods: Evidence from Experimental Auctions *(TB-1903)*

www.ers.usda.gov/publications/tb1903

Abebayehu Tegene; (202) 694-5527;
ategene@ers.usda.gov

Biotech food labeling has become a contentious issue in the United States and between the United States and some of its trading partners. The Economic Research Service has released a technical bulletin, *The Effects of Information on Consumer Demand for Biotech Foods: Evidence from Experimental Auctions*, that provides new evidence on the power of science-based information to affect consumer response to agricultural biotechnology. Agricultural biotechnology is a collection of scientific techniques, including conventional hybridization that are used to modify or improve plants, animals, and microorganisms. Recently, the term biotechnology has been used to refer more specifically to products that have been genetically engineered (biochemical manipulation of genes or DNA). This is the meaning of the terms "biotech" and "genetically engineered" used in this report.

What is the Issue?

Proponents of mandatory biotech-food labeling argue that consumers have a right to know whether their food has been produced using genetic engineering. A number of countries, including Australia, China, Japan, and the members of the

European Union have adopted mandatory biotech-food labeling provisions.

Opponents of mandatory labeling argue that such labeling will confuse, and in many cases, unnecessarily alarm consumers. In the United States, only biotech foods that differ substantially from their conventional counterparts require special labeling (FDA, 2001). Thus far, no biotech foods on the market have required labeling. Numerous producers in the United States are voluntarily producing and marketing non-biotech foods. In January 2001, the U.S. Food and Drug Administration issued voluntary guidelines for non-biotech labeling (FDA, 2001).

Whether mandatory biotech labeling or voluntary non-biotech labeling is the best policy for providing information and expanding consumer choice depends to a great extent on how consumers interpret and react to labeled information. Do labels have a significant effect on consumers' purchasing behavior? How does information about agricultural biotechnology influence consumers' purchases?

How Was the Study Conducted?

Market data - data on price and quantities actually purchased - would provide the best indication of consumer attitudes towards labeled biotech foods. Unfortunately, such data do not exist because, to our knowledge, no biotech

labeled foods are currently marketed in the United States. In the absence of market data, analysts must rely on other sources of information to gauge consumer preferences, such as surveys of consumer attitudes or experimental market studies.

Experimental economics can generate consistent high quality data for testing hypotheses when other options for data collection are unavailable. Although a relatively young field, experimental economics helps us to understand consumer choices by allowing economists to test alternative hypotheses in a systematic manner. In the experiment reported here, real consumers facing real choices create data on economic choices and incentives. As in other fields, experimental economics has limitations in its assumptions and hypotheses. A key challenge is designing an experimental environment where the researcher can be certain that the results mean what they think they mean.

In 2001, an experimental auction was conducted to elicit consumers' willingness

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is now available on the web:

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Waves

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producers could experience lower yields, higher costs, or lost market share to imports, while U.S. consumers could face higher prices and reduced supply, depending on the commodity.

Under the Protocol, the United States and other developed countries will be prohibited from producing or importing methyl bromide for domestic use after 2004, except for quarantine and preshipment uses and for temporary "Critical Use Exemptions" granted for approved uses. The international phaseout is already reducing the supply of methyl bromide. Supplies for the United States and other developed countries were first reduced in 1999 by 25 percent from a 1991 baseline. The reduction reached 50 percent in 2001 and is scheduled to reach 70 percent in 2003. Developing countries are on a slower timetable, with complete phaseout scheduled for 2015. *Craig Osteen; costeen@ers.usda.gov; 202-694-5547*

Consumer-Driven Agriculture: Changing U.S. Demographics Influence Eating Habits

Beyond our bustling cities, America's farmlands are ostensibly a Norman Rockwell picture of calm and stability. Red barns, majestic silos, rustic farmhouses, and pastures of grazing livestock are reassuring images that recall a seemingly simpler age. Yet just beyond the old-fashioned barn door are the products of a

telecommunications age that have transformed farming into a modern and global business. We find tractors equipped with global positioning systems for precision preparation and management of fields, Internet access to keep farmers abreast of current events and minute-by-minute changes in commodity prices, and sophisticated systems to manage risk, finances, and decisionmaking in a dynamic global marketplace. Today's commercial farmer can be as connected to the modern world as the urban entrepreneur.

Technology brings the varied needs and evolving wants of modern consumers living thousands of miles away to the attention of farmers. Successful producers know that consumers are key to economic viability and growth and that consumers' preferences drive the evolution of the industry. Closer business ties and stricter quality controls throughout the food supply chain are hallmarks of consumer-driven agriculture.

Recent ERS research has identified three broad demographic trends that will shape future U.S. food markets: more mature consumers, more diversity, and more people to feed. These trends were translated into projections of growth in food expenditures and in demand for specific commodities between 2000 and 2020. The ERS models do not capture some of the subtler changes in our food system; they do, however, allow us to compare the importance of the different demographic

trends to specific food and commodity market segments. Moreover, we may posit whether the character of America's farmlands and farm businesses will change as much as the profile of our population 20 years from now. *Nicole Ballenger; nicole@ers.usda.gov; 202-694-5460*

Weighing Incentives for Food Safety in Meat and Poultry

Two massive recalls of ground beef and turkey luncheon meats linked to food-borne illnesses in the Midwest and Northeast in the fall of 2002 put food safety concerns back in the headlines. These unusually large recalls are part of an increasing number of meat and poultry recalls over the past several years.

Despite these troubling signs about the safety of meat and poultry products, industry and government regulators have been taking steps to improve food safety and, in fact, the increase in recalls signals more diligence and better detection technology. Market mechanisms, such as product branding and stricter food safety requirements imposed on suppliers by large buyers, are bolstering the levels of food safety in some cases above those required under regulation. *Michael Ollinger; ollinger@ers.usda.gov; 202-694-5454*

Foodborne Illness Cost Calculator

A New Tool for Food and Public Health Policymakers and Analysts

Foodborne illness strikes 76 million Americans every year, according to the Centers for Disease Control and Prevention. Researchers at ERS have estimated the costs of illness and premature death for a number of foodborne illnesses. For example, ERS estimates that the annual economic costs due to foodborne Salmonella infections are \$2.4 billion. The ERS cost estimates, like all foodborne illness cost estimates, include assumptions about disease incidence, outcome severity, and the level of medical, productivity, and other costs. Changes to any of these assumptions could change the cost estimates and, as a result, could change risk rankings, spending priorities, and food safety policies. The ERS *Foodborne Illness Cost Calculator* unveils the assumptions behind the cost estimates.

For more information, go to www.ers.usda.gov/data/foodborneillness/

Auctions *Continued from page 4*

to pay for food items with and without biotech labels. A total of 172 consumers participated in 12 separate auctions conducted in two Midwestern U.S. cities. Participants were given the opportunity to bid for and purchase three different food products - a 5-pound bag of potatoes, a 32-ounce bottle of vegetable oil, and a 1-pound bag of corn tortilla chips - with and without biotech labels. None of the food products had biotech-enhanced consumer attributes (such as better taste or nutrition) or biotech traits that could be detected without sophisticated testing technologies, if at all.

Prior to the bidding, each participant received one of six information packets containing statements about biotechnology gathered from a variety of sources. Pro-biotech statements were provided by a group of leading biotech companies. Greenpeace provided anti-biotech statements. Scientific verifiable statements were provided by a group of individuals knowledgeable about biotechnology, including scientists, professionals, religious leaders, and academics, none of whom had a financial stake in agricultural biotechnology. The six information packets varied by the type of statements they contained. One packet contained only

pro-biotech statements; one contained only anti-biotech statements; one contained pro- and anti-biotech statements; one contained pro-biotech and scientific statements; one contained anti-biotech and scientific statements; and one contained scientific and pro- and anti-biotech statements. The source of each statement was identified.

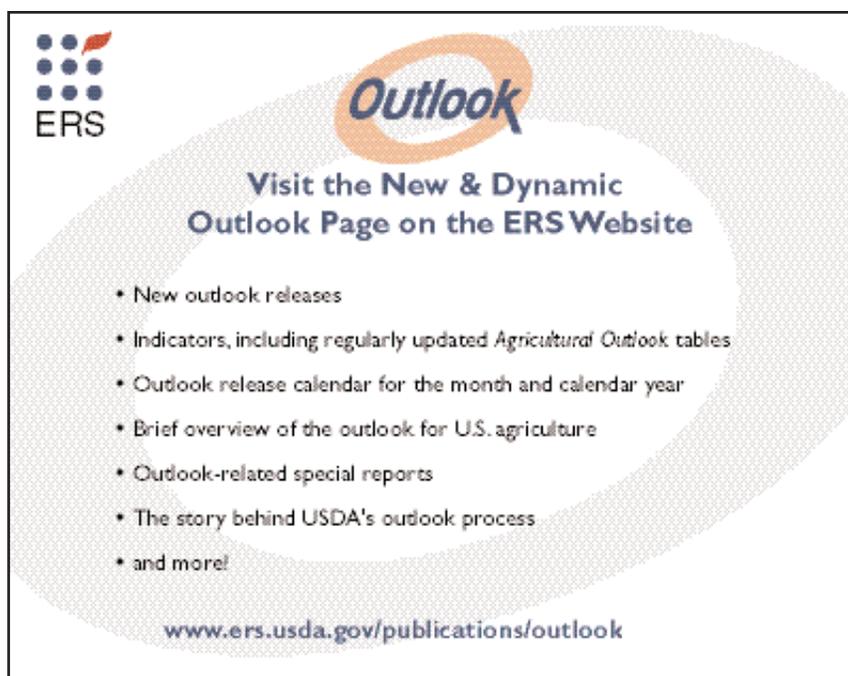
What Did the Study Find?

Participants' bids, or the amount they were willing to pay, for biotech-labeled and plain-labeled foods were affected by the information packets they received. Participants who received only pro-biotech information bid slightly more on the biotech-labeled food for two of the three products. Participants who received only anti-biotech information bid less for the biotech-labeled foods by an average of 35 percent. Those who received both pro- and anti-biotech information bid less for the biotech-labeled foods by an average of 16, 24 and 29 percent, depending on the food product. These results are consistent with other studies that show individuals place a greater weight on negative information than on positive information.

Interestingly, scientific information had a greater affect on consumers' behavior than pro-biotech provided by leading biotech companies. Participants who received information packets including anti-biotech

from Greenpeace and pro-biotech from biotech companies discounted the biotech-labeled foods on average between 16 to 29 percent, depending on the food product. When participants received science-based information, in addition to both pro- and anti-biotech information, the average price discount dropped to between 0 and 11 percent. Science-based pro-biotech information strongly offset anti-biotech information.

This study provides new evidence on the powerful role of information in shaping consumer response to agricultural biotechnology - and reveals that consumers react not just to the content of information, but also to the source. Scientific, verifiable information had a larger moderating effect on consumers' reaction to anti-biotech statements than pro-biotech statements from biotech companies. The results also highlight the erratic effect of biotech labeling in the absence of unbiased scientific information. Without scientific information, the bid-price for biotech-labeled foods varied from slightly above that of plain labeled foods to 35 percent below. With scientific information and pro- and anti-biotech information, the price consumers bid for biotech-labeled foods was only slightly below that for plain-labeled foods.



The graphic features the ERS logo (a grid of dots with a red leaf) in the top left. The word "Outlook" is written in a stylized blue font with an orange swoosh underneath. Below this, the text reads "Visit the New & Dynamic Outlook Page on the ERS Website". A bulleted list of features is provided, and the URL www.ers.usda.gov/publications/outlook is at the bottom.

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In addition to the reports fully summarized in this issue of ERS Information, the following reports were recently released.

Vegetables and Melons Outlook (4/17)

Spring potato production for 2003 is forecast at 23.7 million hundredweight (cwt), up 2 percent from last year. Including asparagus and onions, selected fresh-market vegetable area for harvest was forecast to decline 1 percent to 309,600 acres this spring season (largely April-June). U.S. per capita use of melons totaled 27.5 pounds in 2002, down 3 percent from a year earlier.

Tobacco Outlook (4/16)

On March 1, 2003, tobacco growers indicated intentions to harvest 417,510 acres, nearly 13,000 acres below last year's actual acreage. Lower flue-cured and burley quotas are behind most of the decline. U.S. leaf production in 2002/03 is estimated at 889.6 million pounds, about 102 million pounds below 2001. Production was the lowest since 1908. Yields in 2002 were 2,068 pounds per acre, down due to drought and extreme heat.

Livestock, Dairy, & Poultry Outlook

(4/16) Total meat production in 2003 is expected to drop 1-2 percent from last year with all species registering declines. With weekly chick placements averaging lower than a year earlier, broiler production forecasts are lower than last month. Total expected production in 2003 is nearly 32.2 billion pounds, marginally lower than in 2002.

Wheat Outlook (4/14)

Projected U.S. 2002/03 ending stocks of wheat are down 20 million bushels from last month as higher domestic use more-than-offsets a 5-million-bushel increase in prospective imports. Feed and residual use is 25 million bushels above last month's projection because March 1 stocks implied larger-than-expected use in the December-February quarter. The projected price range is unchanged at \$3.55 to \$3.65 per bushel. World wheat stocks were revised down more than 5 million tons this month, mostly because of a downward revision in estimated stocks by the Government of India.

Factors Affecting U.S. Mushroom Consumption (3/31)

The analysis indicates that per capita mushroom consumption is greatest in the West and Midwest. A little more than half of fresh-market mushrooms are purchased at retail and consumed at home, while three-fourths of processed mushrooms are consumed at home. Per capita mushroom use is highest among men and women aged 20-39, and lowest for children under the age of 12.

Agricultural Income and Finance Situation and Outlook (3/31)

Net cash farm income is forecast to rise 10.8 percent in 2003. Despite lower farm income in 2002 and weather problems in some regions, widespread effects on farm lenders have yet to materialize. All major lender groups, including the FSA, the government lender with a portfolio of higher-risk loans, continue to show low levels of delinquencies and other loan problems.

Wheat Yearbook (3/27)

U.S. wheat supplies for 2001/02 are expected to drop 343 million bushels from a year ago to 2,929 million bushels. Total disappearance is forecast to drop 168 million bushels from 2000/01, the result of lower exports and feed and residual. Use will exceed production, and stocks are forecast down 175 million bushels from 2000/01. The season-average farm price is projected to range between \$2.75 and \$2.85 per bushel, up from \$2.62 a year earlier.

Pork Policies in Japan (3/27)

Japan's policies in the pork sector attempt to support producers' incomes while keeping market prices stable. Pork producer prices in Japan are roughly twice the U.S. level, partly because of the gate price system. Consumer prices are also significantly higher than in the United States.

Fruit and Tree Nuts Outlook (3/25)

The grower price index for January 2003 averaged 2 percent lower than last January and the lowest since 1975. All the major citrus crops produced during January

experienced lower prices, except fresh grapefruit. Despite lower grower prices, the January Consumer Price Index for fresh fruit averaged 2 percent above last January. Consumers paid higher retail prices for citrus fruit, except navel oranges, Red Delicious apples, and bananas.

Rice Sector Policies in Japan (3/19)

Japan freed its wholesale and retail rice markets from government control in the late 1990s, and market prices have been gradually falling. Nevertheless, producer prices are 10 or more times higher than prices in other japonica rice-growing countries, and consumer prices are 2-3 times higher.

Livestock, Dairy and Poultry Outlook (3/17)

Milk production in 2003 is expected to increase about 1 percent, compared with 2.6 percent in 2002. However, demand for dairy products weakened substantially in 2002 and now large commercial stocks overhang the market, pressuring prices. Total red meat and poultry production is expected to be down over 1 percent in 2003, compared with a more than 3-percent increase in 2002.

Aquaculture Outlook (3/14)

The percentage of total U.S. seafood consumption coming from aquaculture has continued to rise over the last several years, but the bulk of the increase has come from higher imports of farm-raised products. In most cases, the rising level of imports has also been accompanied by declining prices.

Feed Outlook (3/13)

The corn export estimate for 2002/03 was lowered 75 million bushels to 1,750 million, the lowest export level since 1997/98, because of the slow pace of U.S. sales and shipments and increased export prospects for major competitors. This raised ending stocks and led to reductions in both the corn and sorghum price estimates.

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