June 2006

United States Department of Agriculture • Economic Research Service • Volume 4, Issue 3

Amber Waves

The Economics of Food, Farming, Natural Resources, and Rural America

Rural Meat Processing Industry Draws Hispanic Workers

Coming soon…

Agriculture and the Environment

A closer look at the relationship between agriculture and the Nation's land, air, water, and biological resources

A Special Issue from *Amber Waves*

Amber Waves is published five times per year (February, April, June, September, and November) by the U.S. Department of Agriculture, Economic Research Service.

To subscribe, call 1-800-363-2068 or 703-605-6060, weekdays 8:30-5:00 ET. Subscription price is $49.95 per year (to U.S. addresses). Call for prices for subscriptions sent to foreign addresses.

Send questions, requests, and letters to Sheila Sankaran, Editor, *Amber Waves*, USDA/ERS, Rm. N4165, 1800 M St., NW., Washington, DC 20036-5831, or to ssankaran@ers.usda.gov.

ERS is the main source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

Cover photo: Original photo by Tom McDonald, digitally enhanced by Curtia Taylor.

Amber Waves

contents

JUNE 2006 ● VOLUME 4 ● ISSUE 3
Economic Research Service/USDA

FEATURES

FINDINGS

STATISTICS

Maurice R. Landes

India and U.S. Could Gain from Liberalizing Oilseed Trade

India has emerged as one of the world's largest importers of vegetable oils. Imports have grown partly because of sharply reduced vegetable oil tariffs, coupled with rapid economic growth and an expanding middle class. But growth in oil imports is also the result of India's restrictive trade policies on imports of oilseeds (soybeans, peanuts, rapeseed, and sunflower seed), the critical raw materials from which food processors extract vegetable oils and feed proteins. India's oilseed production is insufficient to meet demand from domestic oil producers, who are forced to operate at low rates of capacity utilization (30-40 percent). Without a significant increase in the availability of oilseeds, either through greater domestic production or reduced import barriers, India will likely experience a growing deficit in vegetable oils and an eventual deficit in feed protein.

Stakeholders in the Indian market stand to gain if India follows the example of other developing countries—most notably China—and reduces barriers to oilseed imports. Lower tariff and nontariff barriers on oilseeds would stimulate large-scale soybean imports, particularly if oil tariffs are not altered from their current levels. Processors in India could use imported oilseeds to more fully utilize capacity, resulting in lower processing costs and higher net revenues and employment. Moreover, lower processing costs would allow oil producers to better cope with competition from the influx of cheap palm oil imports.

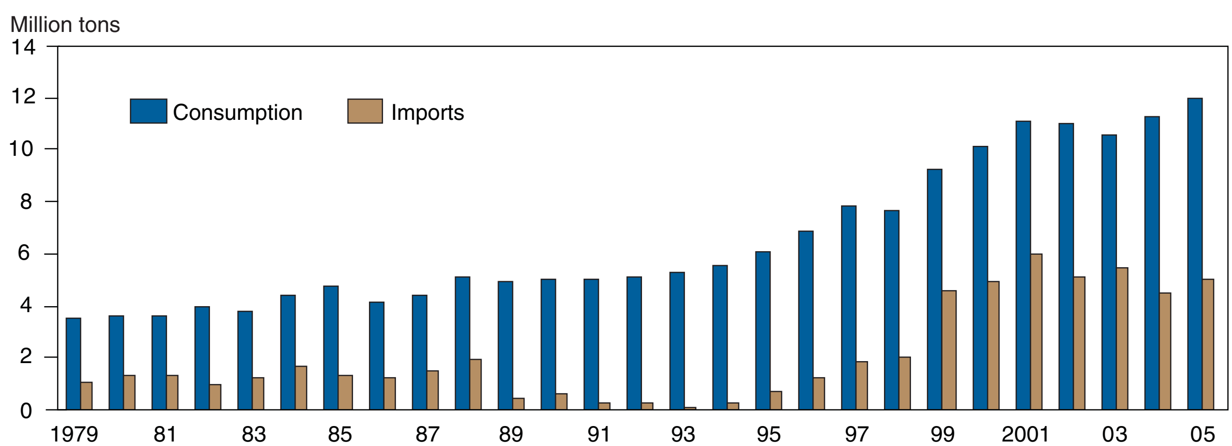
The U.S. could also benefit if India liberalizes its oilseed trade, while keeping in place its tariffs on oils. U.S. exports of soybean oil to India have been limited because Latin American soybean oil and Asian palm oil are cheaper. The U.S. is a competitive soybean supplier, but its soybean exports have been blocked by India's tariff and nontariff barriers. Although U.S. suppliers of soybeans and products would still face considerable competition from Latin American suppliers, U.S. trade prospects would likely improve if India liberalizes trade and substitutes soybean imports for oil imports. AW

Suresh Persaud, spersaud@ers.usda.gov

This finding is drawn from . . .

The Role of Policy and Industry Structure in India's Oilseed Markets, by Suresh Persaud and Maurice Landes, ERR-17, USDA, Economic Research Service, April 2006, available at: www.ers.usda.gov/publications/err17/

Imports fuel rising consumption of edible oils in India



Source: USDA Production, Supply, and Distribution database; Economic Survey, Government of India.

Asia Leads World in Reducing Hunger

At the World Food Summit in November 1996, 186 countries pledged to reduce by half the number of undernourished people by 2015. Nearly 10 years later, the number of hungry people (those consuming below the nutritional target of 2,100 calories per day recommended by the United Nations Food and Agriculture Organization) has declined by about 7 percent, on average. Some countries, however, have succeeded in reducing hunger much more, an outcome that appeared unlikely a decade ago. Asia has led the world in reducing hunger (down about 30 percent). Examples of success include Bangladesh and Vietnam, both of which already have met the World Food Summit goal.

Per capita food consumption in Bangladesh has increased roughly 2 percent per year, with the number of hungry people falling by 70 percent between 1992-94 and 2002-04. Grain output has grown by more than 3 percent per year, and a rapidly growing export sector provides foreign exchange to facilitate strong growth in food imports. Textiles account for more than half of the country's export earnings, and quotas protected Bangladeshi textiles from competition with China and India. Most of the gains in domestic agriculture are a result of increased productivity rather than area expansion. Government policy reforms have encouraged private-sector firms to invest in the supply and trade of inputs, such as irrigation equipment, seeds, and fertilizer. Irrigated area, for example, increased by nearly 50 percent over the past decade.

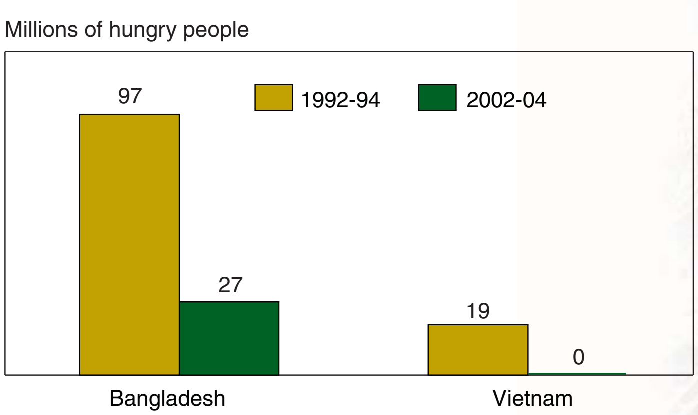
In Vietnam, the number of hungry people fell from an average of nearly 19 million in 1992-94 to close to zero in 2002-04, as per capita consumption grew by 2.5 percent per year. Grain production has expanded more than 4 percent per year since 1990, while population growth has slowed to about 1.5 percent per year. The growth in the agricultural sector occurred at a time when the economy was moving from a centrally planned system to one that was more market oriented. Previously a net food importer, Vietnam has become a major exporter of aquacultural products and other commodities, including rice and cashews. This growth, coupled with gains in exports of oil and textiles, has provided foreign exchange sufficient to enable strong growth in imports, further expanding food supplies. W

Stacey Rosen, slrosen@ers.usda.gov

This finding is drawn from . . .

Food Security Assessment 2005, by Stacey Rosen, Birgit Meade, and Shahla Shapouri, GFA-17, USDA, Economic Research Service, May 2006, available at: www.ers.usda.gov/publications/gfa17/

Bangladesh and Vietnam have made great strides in reducing hunger



FAO

Corbis

Children's Diets and WIC

About a quarter of U.S. children ages 1-4 participate in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). WIC provides low-income women, infants, and children with supplemental foods, along with nutrition education and health care referrals. WIC foods are high in five target nutrients—protein, iron, vitamins A and C, and calcium—that were lacking in the diets of low-income mothers and young children in the early 1970s when the program was created. Included in the children's package of WIC foods are low-sugar cereal, fruit and vegetable juices, eggs, milk, cheese, peanut butter, and dried beans or peas.

WIC food packages have remained basically unchanged since the program's beginning. Meanwhile, food consumption patterns and dietary standards have changed and the prevalence of overweight and obesity have increased. USDA is in the process of redesigning WIC food packages in response to these changes (a proposed rule on the food packages is expected to be published sometime this year). Two recent ERS publications have analyzed the nutrient intakes of children and WIC's effect on food choices to help inform USDA's decisions on possible changes to the packages.

An ERS study found that participating in WIC affects children's consumption of some foods but not of others—an important first step in considering changes to the package. WIC children drank more WIC-approved juice and fewer other nonmilk beverages, such as soft drinks, than did eligible nonparticipating children and children from higher income families. WIC children also ate more WIC-approved cereal. Participation in WIC had little or no association with greater consumption of milk, cheese, peanut butter, and beans. Including these foods in the package may not influence consumption directly, but the value of the foods represents a savings in food spending for low-income households that might allow them to purchase more of other foods. Although WIC children consumed significantly more calories from WIC foods than did eligible nonparticipating children, the difference in total calories consumed was not significant. These results suggest that WIC foods replace non-WIC foods in the diets of participating children rather than adding to their food consumption.

Research sponsored by ERS used Dietary Reference Intakes—the new, revised dietary standards developed by the National Academy of Sciences' Institute of Medicine—to assess the intake of a variety of nutrients by WIC children as well as children not participating in the program. The studies found that protein, calcium, and vitamins A and C are no longer lacking in the diets of preschool children, but iron blood-level indicators are still low for some children. In addition, new concerns have emerged. For example, some children are consuming too many calories but not enough vitamin E and fiber, and some are not getting the recommended balance of fat, carbohydrates, and protein. AW

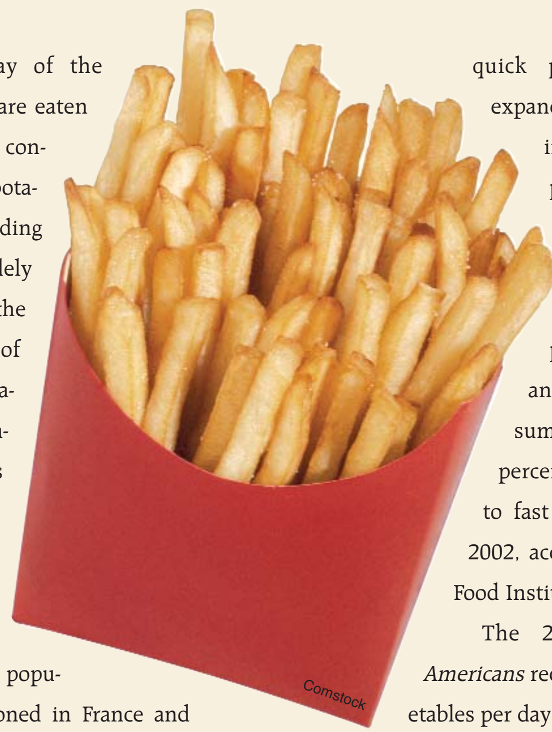
Victor Oliveira, victoro@ers.usda.gov
Katherine Ralston, kralston@ers.usda.gov

This finding is drawn from . . .

Children's Consumption of WIC-Approved Foods, by Victor Oliveira and Ram Chandran, FANRR-44, USDA, Economic Research Service, February 2005, available at www.ers.usda.gov/publications/fanrr44/

Nutrient Adequacy of Children Participating in WIC, by Katherine Ralston, EB-8, USDA, Economic Research Service, April 2006, available at www.ers.usda.gov/publications/eb8/

Americans Switch From Fresh to Frozen Potatoes



While potatoes have been a mainstay of the American diet for generations, how potatoes are eaten has changed dramatically. In 1960, Americans consumed a yearly average of 81 pounds of fresh potatoes and 7.6 pounds of frozen potatoes, according to ERS's per capita food availability data, a widely used proxy for actual food intake. In 2004, the average American consumed 46.5 pounds of fresh potatoes and 56.4 pounds of frozen potatoes, mostly french fries. Consumption of potato chips and canned and dehydrated potatoes has remained fairly constant at lower levels.

What has caused the switch from fresh to frozen potatoes? Taste, convenience, technology, and the growing food-away-from-home market all play a role. French fries first became popular in the U.S. when American soldiers stationed in France and Belgium during World War I wanted to continue eating them once they returned home. At first, fresh potatoes were hand peeled, cut into strips, and fried or baked at home or in restaurants.

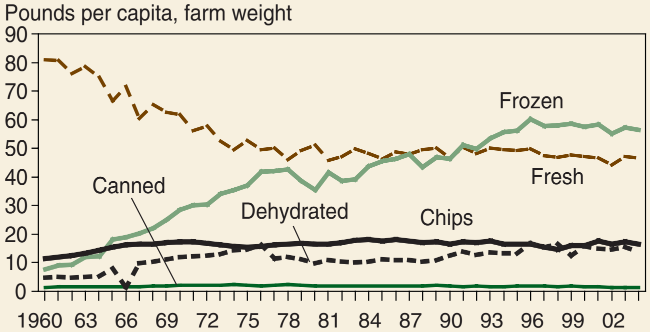
In the early 1950s, the J.R. Simplot Company developed the frozen french fry—a product that was perfectly suited for the quick preparation needed for the expanding fast food industry. Other innovations, such as curing the potatoes for 3 weeks before frying, improved french fry consistency and quality. Since then, consumption of frozen potatoes has continued to rise, and in 1993, frozen potato consumption exceeded fresh. Almost 90 percent of U.S. french fries were sold to fast food and other restaurants in 2002, according to the American Frozen Food Institute.

The 2005 *Dietary Guidelines for Americans* recommend eating 2½ cups of vegetables per day for a 2,000-calorie diet, choosing a variety of types of vegetables. In 2004, Americans ate an average of 2 cups of vegetables per day, about 20 percent below recommendations. Variety may be even more of an issue. Potatoes accounted for roughly one-fourth of this amount.

The shift from fresh potatoes to frozen fries poses a dietary challenge for Americans trying to keep their daily intake of calories and fat within dietary recommendations. A 100-gram baked Russet potato with skin has 97 calories and almost no fat, while 100 grams of french fries has over 300 calories and 16 grams of fat. Of course, the dietary impacts of adding sour cream, cheese, bacon, and other condiments need to be considered as well.

Frozen potatoes replacing fresh in the U.S. diet

Pounds per capita, farm weight



Note: Most frozen potatoes are french fries; the remainder include Tater Tots, homefries, spiral fries, wedges, and frozen whole potatoes.
Source: USDA, Economic Research Service.

Jean C. Buzby, jbuzby@ers.usda.gov
Hodan A. Farah, hfarah@ers.usda.gov

For more information . . .
Visit the ERS Food Consumption (Per Capita) Data System, available at: www.ers.usda.gov/data/foodconsumption/

Growing More With Less Cropland

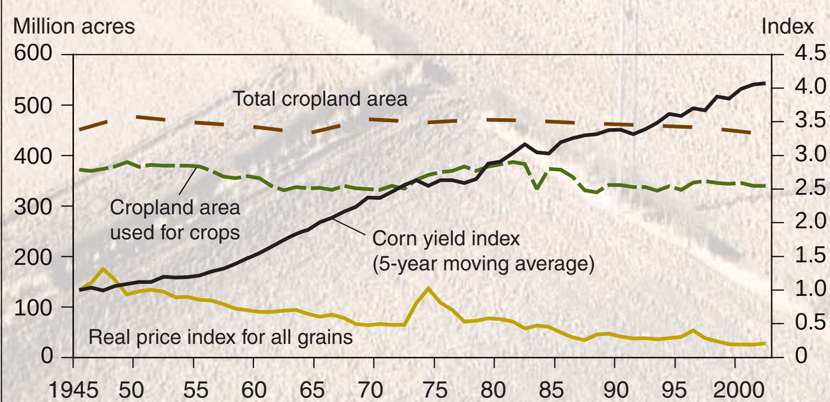
Despite long-term declines in crop prices and widespread concerns over urban encroachment on farmlands, cropland area has dipped only slightly since the 1940s while technological advances have boosted agricultural output. Between 1997 and 2002, U.S. total cropland area declined about 3 percent to 442 million acres, the lowest level since USDA began compiling this statistic in 1945. Although this decline marks a milestone in terms of land use, it does not mean a reduction in agricultural production. In fact, the opposite is true: Increasing productivity is allowing U.S. farmers to produce more crops with less land.

The value of U.S. crop output in 2002, measured in real (inflation-adjusted) terms, was 2.6 times higher than in 1948, although the value of aggregate input use declined over this period. Thus, farmers are extracting more output—and greater dollar value—out of fewer resources. Greater use of nonland capital and materials like energy and agricultural chemicals has substituted for land and labor. Increases in yields, due to improved seeds and other technological changes, have also raised output. From 1945 to 2002, average corn yields quadrupled while real prices received for grains fell by 80 percent. As a result of rising productivity, despite a smaller land area devoted to crops, U.S. agricultural output continues to grow and consumers continue to pay lower real prices.

Total cropland includes land planted for crops, land used for pasture as part of a crop rotation, and cropland idled under government programs, such as USDA's Conservation Reserve Program, which pays farmers to voluntarily retire environmentally sensitive cropland under 10- to 15-year contracts. Since World War II, total cropland area has ranged between 442 and 478 million acres and only decreased by 9 million acres (2 percent) between 1945 and 2002. The decline in total cropland from 1945 was due to a 23-million-acre (6 percent) reduction in the area planted for crops, which was offset by an increase in cropland pasture. Cropland used for crops peaked at 387 million acres in 1949, reached a 57-year low of 327 million acres in 1988, and has since held steady at around 340 million acres.

The long-term changes in national cropland acreage mask greater land-use redistribution occurring at regional and State levels. From 1945 to 2002, total cropland in the Southeast, Northeast, Appalachia, Lakes States, Delta States, and Far West declined by about 37 million acres (24 percent), but increased by 28 million acres (10 percent) in the remaining regions. This further concentrated acreage of cropland in the major crop-producing regions. W

U.S. cropland area has dipped in recent years, but output keeps growing



Sources: USDA, Economic Research Service analysis of cropland acreage, ERS Major Land Uses Database; crop yields, USDA, National Agricultural Statistics Service; real producer grain prices (deflated by the Consumer Price Index for all urban consumers), U.S. Department of Labor, Bureau of Labor Statistics.

Ruben N. Lubowski, rlubowski@ers.usda.gov

This finding is drawn from . . .

Major Uses of Land in the United States, 2002, by Ruben N. Lubowski, Marlow Vesterby, Shawn Bucholtz, Alba Baez, and Michael Roberts, EIB-14, USDA, Economic Research Service, May 2006, available at: www.ers.usda.gov/publications/eib14/

The ERS Major Land Uses data set, www.ers.usda.gov/data/majorlanduses/

The ERS Agricultural Productivity in the United States data set, www.ers.usda.gov/data/agproductivity/

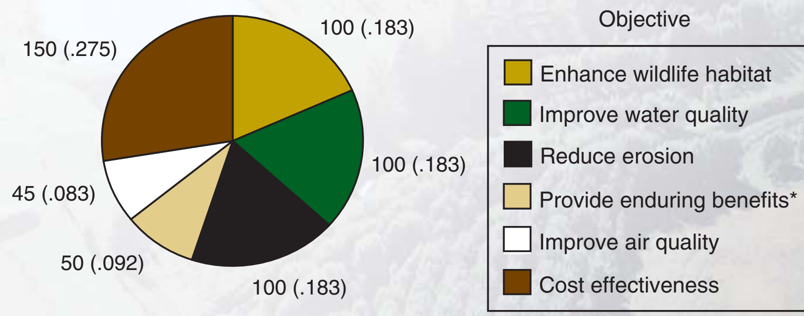
ImageSource

Conservation Programs: Balancing Outcomes With a Selection Index

Many of the Nation's conservation programs help to offset the negative effects of agricultural production by enhancing water quality, reducing soil erosion, and protecting wildlife habitats. One tool many conservation program managers use to balance multiple objectives is a "selection index," which allows them to rank and select applicants based on how well the offered land provides environmental improvements in a cost-effective manner. In this index, different environmental and cost objectives are weighted by program managers' perceptions of their relative importance (see "Behind the Data," page 41). However, gauging which environmental objectives should have the highest priority in these programs is tricky because price tags are generally not available to signal how much people value improving wildlife nesting grounds, for example, or making a stream clean enough for swimming. If new information about environmental preferences becomes available, program managers can, in theory, adjust the weights to align future program outcomes with the new preferences. In practice, little is known about the actual effects of such changes.

Using data from USDA's Conservation Reserve Program (CRP), the Nation's largest land retirement program, ERS researchers found that small changes in index weights did not markedly affect environmental outcomes at the national level. But doubling the index weight on any one objective (such as improving wildlife habitat) could result in a 15-percent improvement in that outcome. These findings suggest that if a conservation program generates environmental improvements that approximately match society's preferences, little would be gained by fine-tuning the index weights. But if new information suggests that an alternative mix of environmental improvements is preferred, program outcomes can be affected by larger changes in weights. Changes in weights may not induce proportional changes in environmental improvements because some factors, such as which land will be offered for enrollment and which set of environmental problems will be addressed in a voluntary program, cannot be controlled.

The CRP assigns equal weights to wildlife, water quality, and erosion objectives in its 2003 selection index



Note: Numerical values are the points associated with each objective. Implicit weights are in parentheses.
*Points awarded for "enduring benefits" are based on the likelihood that certain practices (such as tree planting) will remain in place beyond the CRP contract period.
Source: CRP's Environmental Benefits Index, 26th signup (2003), USDA, Farm Service Agency.

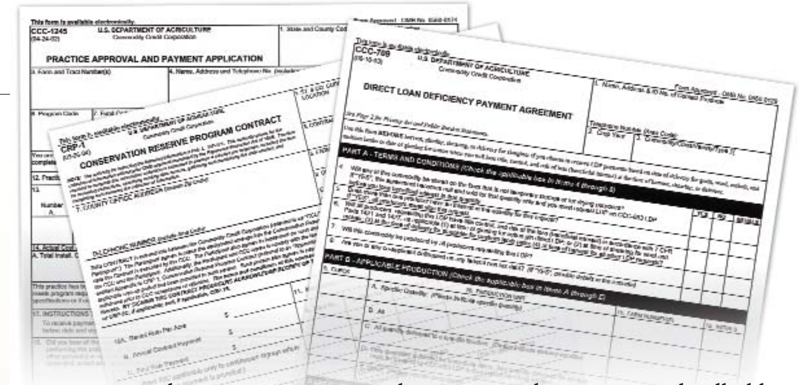
Policymakers and program managers may find that varying the index weights by region or adjusting other program features, such as eligibility criteria or the mix of allowable land management practices, may also help bring about desired changes in CRP outcomes. AW

Cynthia Nickerson, cnickerson@ers.usda.gov
Daniel Hellerstein, danielh@ers.usda.gov

This finding is drawn from . . .

Balancing the Multiple Objectives of Conservation Programs, by Andrea Cattaneo, Daniel Hellerstein, Cynthia Nickerson, and Christina Myers, ERR-19, USDA, Economic Research Service, May 2006, available at: www.ers.usda.gov/publications/err19/

Lynn Betts, USDA/NRCS



Who Gets Farm Program Payments?

There are two main types of farm program payments—commodity-related and conservation. Most commodity program payments (77 percent) go to family farms with sales of $100,000 or more, while most conservation payments (71 percent) go to smaller family farms. Commodity-related payments in total are much larger than conservation payments, accounting for more than four-fifths of all payments. Government payments fluctuate widely from year to year (see "In the Long Run," page 43), due mostly to changes in commodity-related payments.

Commodity programs target specific field crops, largely feed and food grains, cotton, and oilseeds. Payments are tied to the amount of cropland enrolled in programs and yield histories. Specialty crops and livestock are not supported by traditional commodity programs, but may be covered by disaster assistance and occasional ad hoc payments. Farms producing nonprogram commodities may receive substantial payments, however, if they also produce program commodities or did in the past.

Commodity program payments to farms are made roughly in proportion to their share of harvested acreage of traditional program crops. Medium-sales, large, and very large farms accounted for 13 percent of all farms in 2003, but they together received 77 percent of commodity-related payments, reflecting a similar share of program crop acreage.

USDA's Conservation Reserve Program (CRP), which accounts for most conservation payments, targets environmentally sensitive land, not specific commodities. Retirement farms and residential/lifestyle farms received 46 percent of conservation payments in 2003. Low-sales farms received another 18 percent. This distribution reflects the large numbers of these three groups, their extensive landholdings, and their tendency to enroll large shares of cropland when they participate in CRP.

Residential/lifestyle farm operators spend most of their work time off the farm. The low labor requirements of the CRP also appeals to many retired farmers (average age of 69 years) and some low-sales farmers—56 percent are 55 or older. A substantial share of all three farmer groups find the CRP financially attractive and have cropland available to enroll in conservation land retirement programs.

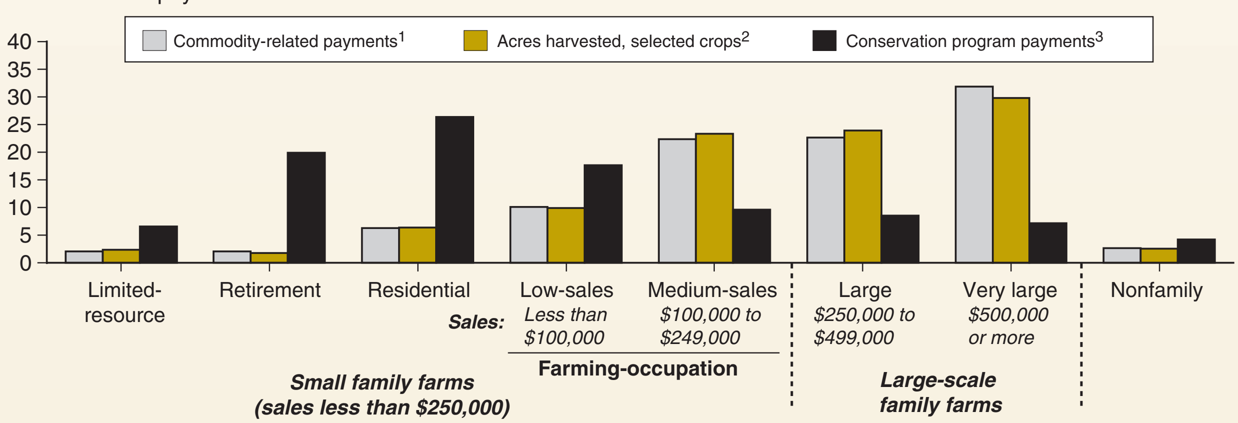
Robert A. Hoppe, rhoppe@ers.usda.gov
David E. Banker, dbanker@ers.usda.gov

This finding is drawn from . . .

Structure and Finances of U.S. Farms: 2005 Family Farm Report, by Robert A. Hoppe and David E. Banker, EIB-12, USDA, Economic Research Service, May 2006, available at: www.ers.usda.gov/publications/eib12

Most commodity program payments go to larger farms; most conservation payments go to smaller farms

Percent of U.S. payments or harvested acres



[1]Direct payments, countercyclical payments, loan deficiency payments, marketing loan gains, net value of commodity certificates, peanut quota buyout, milk income loss contract payments, etc.

[2]Food and feed grains, soybeans, other oilseeds, cotton, and peanuts.

[3]Payments from the Conservation Reserve Program, Wetlands Reserve Program, and Environmental Quality Incentives Program. Smaller conservation programs are included in a miscellaneous category under commodity-related payments.

Source: USDA, Economic Research Service, 2003 Agricultural Resource Management Survey, Phase III.

Do Food Industry Mergers and Acquisitions Affect Wages and Employment?

Headlines announcing a major merger or acquisition are often followed by an opening paragraph outlining planned job cuts, plant closings, and possible cuts in salaries and wages. The merger or acquisition is often blamed for the cuts and closings, but other structural changes come into play.

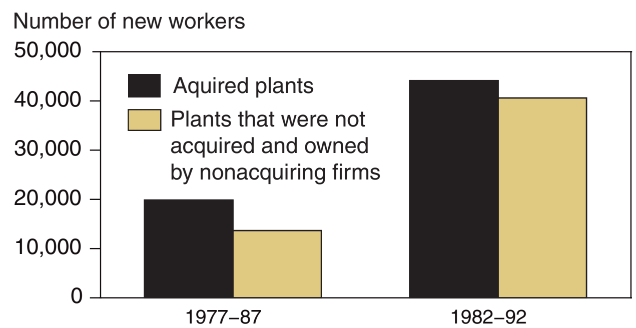
The late 1970s and 1980s were times of major mergers and acquisitions in the food industry. In beef packing, Conagra acquired Monfort, and Cargill bought the operations of MBPXL and Spencer Beef, renaming them EXCEL. In fluid milk processing, Borden bought Meadowgold in 1987 before Borden itself exited the industry. During this time period, eight food industries—meat packing, meat processing, cheese making, fluid milk processing, flour milling, corn milling, and feed and soybean processing—underwent structural transformation. The number of plants declined by about one-third, the number of employees dropped 20 percent (more than 100,000 workers), and wages stagnated. Poultry slaughtering and processing, by contrast, added workers, mainly due to a shift from producing whole roasters to more labor-intensive boneless and processed products.

Untangling the causes of structural change and its effect on wages and employment is difficult. Many economic forces underlie decisions to shut down plants and purchase others, most importantly, changes in demand and technology. For example, technological change has led to larger beef packing plants. At the same time, declining beef consumption has lowered production across the industry. Larger plants and declining production lead to a reduction in the number of plants, a need for fewer workers, and downward pressure on wages. Such "shrinking" pains are often accompanied by a wave of mergers.

ERS and the Census Bureau used statistical techniques to isolate the effects of mergers and acquisitions on wages and employment during two merger waves. The research found that mergers and acquisitions were no more likely to lead to job cuts than other causes of restructuring. After controlling for plant size, capital investment, initial wage levels, and other plant characteristics, analyses of Census of Manufacturers data show that mergers and acquisitions had a positive effect on employment in six of the nine industries during the first study period (1977-87), but no effect during the second study period (1982-92). Mergers and acquisitions had a positive, but small, effect on wages in seven of the nine food industries in the first study period, and no discernible effect in the second study period. WA

© John A Rizzo/Getty Images

Acquired plants post larger job increases than nonacquired plants



Source: Estimates by USDA, Economic Research Service, based on Census of Manufacturers data.

Michael Ollinger, ollinger@ers.usda.gov

This finding is drawn from . . .

Effect of Food Industry Mergers and Acquisitions on Employment and Wages, by Michael Ollinger, Sang V. Nguyen, Donald Blayney, Bill Chambers, and Ken Nelson, ERR-13, USDA, Economic Research Service, December 2005, available at: www.ers.usda.gov/publications/err13/

Joe Valbuena, USDA

FEATURE

Meat-Processing Firms Attract Hispanic Workers to Rural America

William Kandel
wkandel@ers.usda.gov

- The meat-processing industry is switching to lower skilled labor and increasingly relocating plants to rural areas.
- Hispanics are moving into the meat-processing labor force and helping to meet demand for low-skill workers.
- Hispanic inmigration mitigates rural population decline and stimulates local economies.

Over the past 40 years, the U.S. meat-processing industry has been transformed by changing consumer preferences for meat products, which helped trigger a consolidation within the industry and a geographic shift in the location of meat-processing plants to rural areas. Technological innovations have also enabled processing plants to make substantial gains in efficiency. Despite these and other changes, employment across the industry has risen during the period, bucking trends in the manufacturing sector. Increasingly, the demand for workers in rural meat-processing plants has been met by the Nation's growing Hispanic population.

Between 1980 and 2000, the Hispanic share of meat-processing workers increased from under 10 percent to almost 30 percent, while the Hispanic workforce itself became mostly foreign born. While the rapid population growth and geographic dispersion of Hispanics since the 1990s has helped meet the labor needs of rural-based meat-processing plants, Hispanic settlement has also had social and economic implications for rural communities.


Ken Hammond, USDA

Americans Change Their Eating Habits

Consumption trends have influenced labor demand in the meat-processing industry. Throughout the 1950s, Americans consumed about three times as much beef and twice as much pork, per capita, as poultry. Since then, technological innovations in poultry production, such as the integration of chicken breeding and slaughtering operations and increased use of specialized processing technology, have increased plant efficiency and enabled firms to reduce poultry prices. From 1960 to 1997, the retail price of whole chickens steadily declined in real dollars from $1.38 to $0.62, which bolstered demand. In contrast, the real price of beef increased from $2.70 in 1960 to $4.86 in 1982 before falling to $1.74 by 1997.

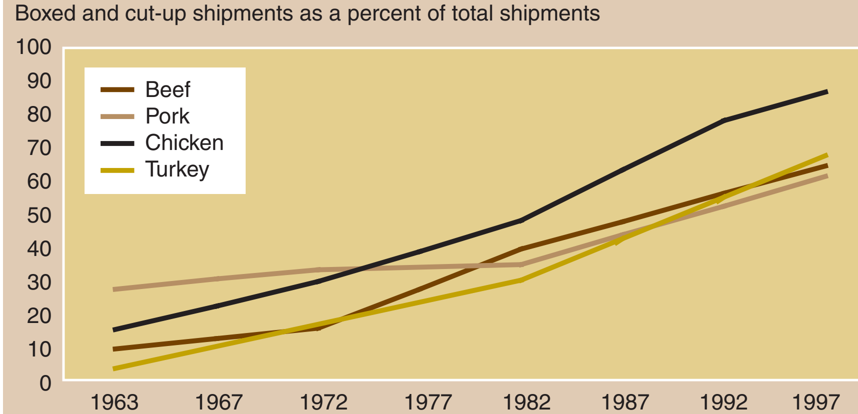
Poultry consumption received an additional boost from fast food marketing, growing consumer awareness of health considerations, and the popularity of low-fat diets. Consequently, between 1970 and 2000, per capita annual consumption of beef declined (from 80 to 65 pounds), while that of chicken almost doubled (from 28 to 53 pounds). After the mid-1980s, the beef sector implemented production strategies and technologies similar to those of the poultry sector and beef prices fell significantly. But changes in consumption behavior and relative prices of meat products over the previous two decades had helped to permanently alter Americans' eating habits. Thus, by the end of the 1990s, Americans were consuming less beef, the same quantity of pork, and twice as much chicken and turkey as in 1970.

Another trend affecting the meat-processing industry was the growing domestic demand for pre-cut and further-processed products. As more women entered the labor force in the 1960s, American consumers increasingly demanded convenient-to-prepare food. Beef, pork, and poultry firms responded by supplementing their slaughtering plants with production facilities that further processed meat. Cut-up meat products increased from a relatively minor share of all meat production in the early 1960s to the dominant output by the 1990s. In 1963, for example, the poultry product mix sold in American supermarkets consisted of 85 percent whole birds and 15 percent cut-up products; by 1997, that proportion had reversed completely. In addition to cutting up meat products for different markets, many large pork and poultry plants also season, cook, sort, and/or package meat prior to shipment.

Changing consumer preferences and the meat industry's increased emphasis on pre-cut and pre-packaged meat have also helped to expand meat exports. The predominance of packaged meat products facilitated the export of beef and pork products. Changing preferences among U.S. consumers led to a segmentation of products targeted to domestic and international poultry markets. For example, chicken breasts and other white meat are mainly shipped to domestic markets, and

Americans are buying more pre-processed meat products

Boxed and cut-up shipments as a percent of total shipments

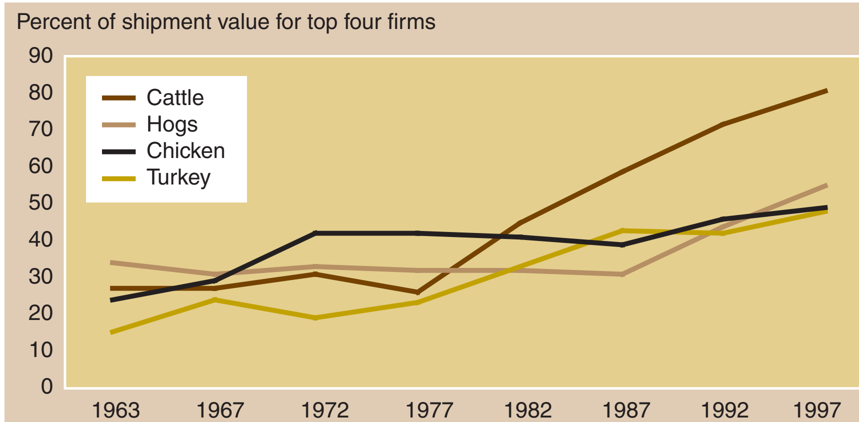


Note: 1997 figures for beef, pork, and turkey are extrapolations based on 1982-92 trend.
Source: Tables 4.1, 4.2 of MacDonald et al., and table 2.2 of Ollinger et al. See complete citations at the end of the article.

chicken legs and other dark meat are exported, primarily to China, Mexico, and Russia. U.S. poultry exports, which for decades rarely exceeded 5 percent of all poultry production, increased from roughly 135 million pounds in 1970 to 5.6 billion pounds by 1997, about 17 percent of production.

All of these trends affected employment levels in the meat-processing industry, particularly the poultry industry, where growth in consumption was the highest. Between 1972 and 2001, employment in the poultry processing industry jumped from 106,600 to 258,200, or roughly 150 percent. In the beef and pork processing industry, employment increased modestly from 240,400 to 253,100 over the same period. Despite extensive mechanization, growth in both carcass size and the sheer variety of new and further-processed products, such as boneless cuts and marinated and precooked meat products, required additional cut-up and production operations and workers, which generated considerable demand for low-skilled manual labor in meat-processing facilities.

By 1997, the four largest firms of each commodity were processing nearly half or more of all meat products



Source: Chicken and turkey figures for 1997 are estimates based on correlated data from Census figures. Cattle and hog figures for 1997 come from *Assessment of the Cattle and Hog Industries, 2000*, USDA, Grain Inspection, Packers, and Stockyards Administration, June 2001.

Fewer Firms, Larger Plants

In response to growing competition within the industry, new technological opportunities, and changing consumption patterns, meat processors gradually shifted production to larger, more specialized plants, increasing profitability through economies of scale. In the 1950s, for example, poultry-processing operations began to contract with poultry growers for specific sizes of birds at set prices while providing growers with chicks, feed, vitamins, and other necessary inputs. Although production processes differed from the poultry-processing industry, other meat-processing sectors subsequently initiated similar practices with comparable outcomes. These changes reduced producer costs, which benefited consumers. Between 1960 and 1997, consumer prices declined roughly 55 percent for poultry and 35 percent for beef.

As smaller producers struggled unsuccessfully within this increasingly competitive sector, plant consolidations gradually led to an industry dominated by fewer firms and large processing plants. By the end of the 1990s, plants with more than 400 employees accounted for most U.S. meat production. Since the 1970s, the "four-firm concentration ratio"—the proportion of total production controlled by the four biggest companies—has increased markedly. By the late 1990s, four firms accounted for roughly 50 percent of all U.S. poultry and pork production and 80 percent of all beef production. Both trends—increasing plant sizes and industry consolidation—contributed to the growing demand for low-skilled workers.

More Meat-Processing Plants Are Located in Rural Areas

In addition to industry restructuring, meat-processing firms have increasingly relocated plants to rural areas to reduce livestock transportation and feed costs, ensure more consistent quantities of animals, and thereby use processing plants around the clock and throughout the year because of fewer interruptions in livestock supply. Economic incentives offered by rural communities, along with the greater likelihood that rural-based plants are not unionized, have also induced firms to relocate plants.

Rural relocation varies by sector. Chicken production has for many years been concentrated in the rural Southeast; in 1993, the four leading poultry-producing States were Arkansas, Georgia, Alabama, and North Carolina, all with large proportions of rural residents. In contrast, beef-processing plants have tended to relocate from urban areas to places near large feedlots where cattle are raised, notably in Colorado, Nebraska, Kansas, Oklahoma, and Texas. Hog-processing plants have relocated to nontraditional regions outside the Midwest to take advantage of lower land and labor costs in rural areas of the West, Southwest, and Southeast.

In all regions of the Nation except the Northeast, jobs in meat processing have shifted from metro to nonmetro counties, reflecting an urban-to-rural transition that began in the 1980s. The shift is remarkable in light of the sizable increase in the number of persons employed in the indus-

A growing meat processing workforce is increasingly located in rural areas

U.S. region	Meat processing employees		Share of meat processing employees in nonmetro counties	
	1981	2000	1981	2000
			Percent	
Northeast	31,882	26,745	14	13
Midwest	117,417	162,370	45	58
South	115,856	225,026	66	76
West	9,262	12,207	30	51
Southwest	44,194	63,785	27	35
TOTAL	**319,336**	**490,621**	**46**	**60**

Source: Prepared by USDA, Economic Research Service, using Enhanced County Business Patterns Data, 1981 and 2000.

try. In the South, for example, meat-processing employment doubled between 1981 and 2000 while the nonmetro share increased from 66 to 76 percent. Over the same period, the total number of U.S. meat-processing employees in rural areas doubled from 147,000 (46 percent of U.S. total) to 294,000 (60 percent of U.S. total). Labor demand in meat-processing plants increasingly could not be met in nonmetro counties in the Midwest and Great Plains, regions that have lost population consistently over the past 50 years. In contrast, jobs were filled more easily in the nonmetro South and West, where population has increased during the past 50 years due to growth in the manufacturing, service, retirement, and recreation sectors.

Hispanic Workers Constitute a Growing Share of the Meat-Processing Labor Force

All of these conditions—changing consumer preferences for more convenient foods, industry consolidation and concentration, and relocation to rural areas—contributed to either a growing demand for, or a shortage of, low-skilled workers in the meat-processing industry during a period when overall manufacturing employment declined in the U.S. In addition, stable or declining real wages from meat-processing employment made it relatively less appealing than alternative occupations and careers for an increasingly well-educated native-born workforce.

Historically, meat-processing employment offered relatively stable and well-paid employment for those with below-average education levels. Faced with mounting competition in the late 1970s, however, beef- and pork-processing firms with unionized plants in the Midwest demanded that workers accept wages comparable to those of nonunion plants. Poultry processing firms based in the Southeast had no tradition of unionized plants, and real wages in the industry have remained unchanged for roughly three decades. At the same time, meat-processing plant work has become increasingly deskilled as a result of greater technological innovation. Thus, what had been an urban-based, unionized, and often skilled workforce employed in production plants, supermarkets, and butcher shops in the 1950s gradually changed into a rural-based, mostly nonunionized, and low-skilled workforce concentrated within manufacturing plants by the end of the 1980s, as it remains today.

Meat-processing wages continue to exceed those of low-skilled employment in other manufacturing sectors, but meat-processing work is relatively hazardous. Employees in rural plants may face greater challenges than urban-based workers, such as a lack of conveniently located housing, limited public and retail services, and longer, more costly commutes. Not surprisingly, large rural-based processing plants have difficulty filling employment slots, and turnover rates approaching 100 percent annually are not uncommon in some plants.

Although meat-processing is situated within the broader U.S. manufacturing sector that has seen employment levels decline, changes in meat-processing itself—the organization of production, industrial concentration, and plant relocation—have increased demand for low-skilled workers. Foreign-born Hispanics have helped meet that demand. Between 1980 and 2000, the share of non-Hispanic Whites in the meat-processing workforce declined from 74 to 49 percent. In contrast, the share of Hispanics increased from 9 to 29 percent, with the foreign-born segment of the Hispanic meat-processing workforce increasing from 50 to 82 percent. Roughly 1 in 10 nonmetro Hispanics now works in meat processing.

Hispanic Population Growth Transforms Rural Communities

The transformation of the meat-processing industry over the past four decades has significantly increased its labor demand and generated a workforce with a growing Hispanic presence. In the Southeast, for instance, a spike in the rural Hispanic population during the 1990s is clearly linked to a growing Hispanic representation in the poultry-processing industry. Hispanic and foreign-born workers in meat processing follow a pattern found in crop agriculture, forestry, construction, low-skilled services, and many other nondurable and durable goods manufacturing sectors. As educational attainment for the general population rises, and industrial restructuring and greater employment options reduce

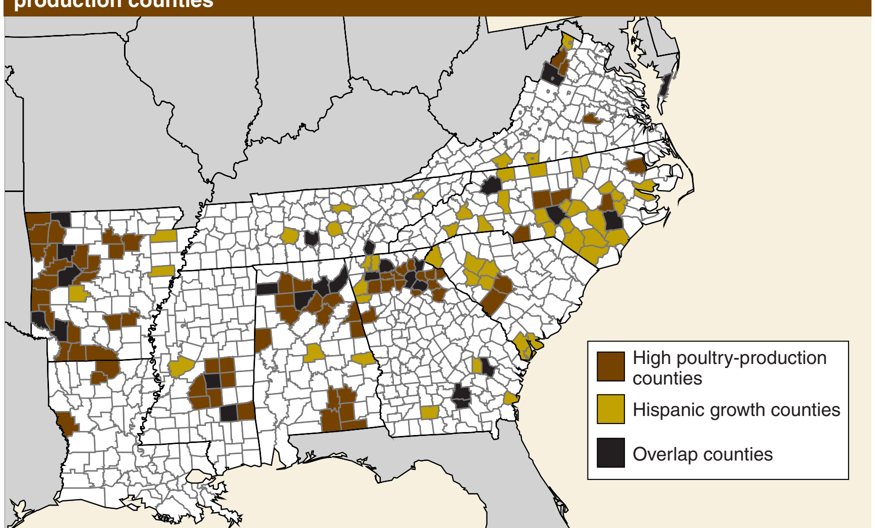

Ken Hammond, USDA

the relative attraction of low-skilled jobs, U.S. firms can be expected to employ growing shares of Hispanic and foreign-born workers.

Recent Hispanic population growth in nonmetro counties outside the Southwest represents one of the more profound social transformations currently affecting rural areas, altering their social and economic profiles as well as the broader national perception of rural and small-town America. Although a small share (10 percent) of all U.S. Hispanics live in nonmetro counties, the rapid growth of the U.S. Hispanic population—exceeding 100 percent in about half of all States over the past decade—has significant implications for rural communities. Hispanic population growth can alter demographic trends, as it has throughout the Central Great Plains, which since the 1950s has steadily lost population due to increased agricultural labor productivity and outmigration of young adults. During the 1990s, Hispanic population growth actually stemmed overall population decline in over 100 nonmetro counties.

Moreover, new Hispanic residents stimulate local rural economies as consumers, in addition to contributing considerably to local sales, property, and State tax revenues. Rural Hispanic population growth also has significant policy implications for social service provision. Because Hispanics in new nonmetro destinations are often younger and more economically disadvantaged than native-born residents, they may place new demands on resources allocated to local health care delivery, public schools, and various forms of public assistance. Rural communities seeking to attract companies to locate plants in their districts will be in a better position to integrate foreign-born newcomers and augment their public services accordingly if they are aware of these ramifications. W

In the Southeast, rapid Hispanic growth counties correspond to high poultry-production counties



Source: Prepared by USDA, Economic Research Service, using data from the 1987, 1992, and 1997 Census of Agriculture and the 1990 and 2000 Census of Population.

This article is drawn from . . .

New Patterns of Hispanic Settlement in Rural America, by William Kandel and John Cromartie, RDRR-99, USDA, Economic Research Service, May 2004, available at: www.ers.usda.gov/publications/rdrr99/

"Restructuring of the US Meat-processing Industry and New Hispanic Migrant Destinations," by William Kandel and Emilio Parrado, *Population and Development Review*, 31(3) (2005): 447-471.

Consolidation in U.S. Meatpacking, by James M. MacDonald, Michael E. Ollinger, Kenneth E. Nelson, and Charles R. Handy, AER-785, USDA, Economic Research Service, February 2000, available at: ww.ers.usda.gov/publications/aer785/

Structural Change in U.S. Chicken and Turkey Slaughter, by Michael E. Ollinger, James M. MacDonald, and Milton Madison, AER-787, USDA, Economic Research Service, November 2005, available at: www.ers.usda.gov/publications/aer787/

You may also be interested in . . .

Impacts of Hispanic Population Growth on Rural Wages, by Constance Newman, AER-826, USDA, Economic Research Service, September 2003, available at: www.ers.usda.gov/publications/aer826/

Rural Hispanics at a Glance, by William Kandel, EIB-8, USDA, Economic Research Service, December 2005, available at: www.ers.usda.gov/publications/eib8/

Land Retirement and Working-land Conservation Structures

A Look at Farmers' Choices

Dayton Lambert, dlambert@ers.usda.gov
Patrick Sullivan, sullivan@ers.usda.gov

- Roughly 37 percent of farm operators had retired cropland from production or had working-land conservation structures in place in 2001. Of these, 36 percent received conservation payments.
- Operators of smaller retirement and lifestyle farms are more likely to retire farmland.
- Operators of larger farms are more likely to adopt conservation measures that are compatible with farm production.

Operators of all types and sizes of farms have adopted conservation-compatible farming practices and installed conservation structures. Many farmers do so for sound business reasons—to protect the productive capacity of their farmland, to reduce seed, fertilizer, and other input costs, or to save time and labor. However, the costs of conservation practices that primarily create off-site benefits to society—in the form of cleaner air, improved water quality, and a healthier ecosystem—often pose significant barriers to their adoption by farm operators. To encourage these efforts, USDA provides technical and financial support to farm and ranch operators through a diverse set of conservation programs that either retire environmentally fragile land from production or encourage the adoption of conservation-

Creatas

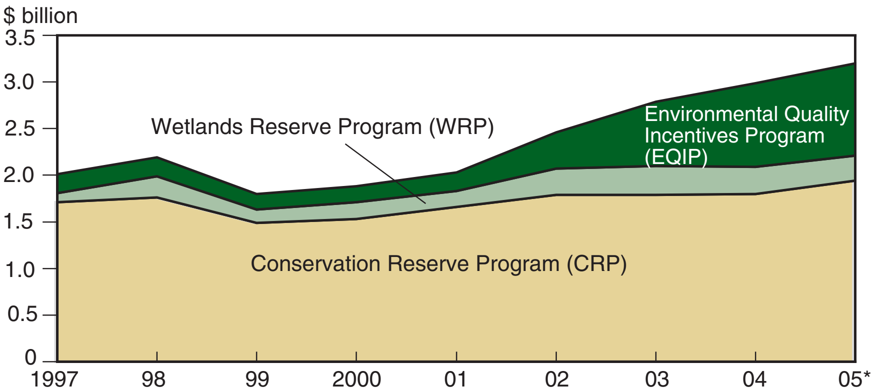
friendly farming practices. Recent ERS research suggests that farms and farm households that install working-land conservation structures (such as contour strips or grass waterways) often differ from those that retire farmland. Therefore, as working-land program budgets increase, the mix of farms participating in USDA's conservation programs may change.

The effectiveness of a conservation program depends on the choices farm operators make because adoption of conservation practices is voluntary. But, despite the importance of farmers in determining environmental outcomes, relatively little is known about those who adopt conservation practices and participate in USDA's conservation programs, and why they do so. A recent study by ERS found that household characteristics and operator attributes such as age, gender, educational attainment, household size, and dependence on off-farm income affect the types of conservation efforts farm operators are likely to engage in, as well as the types of conservation programs they are likely to find appealing (see box, "An Array of Conservation Programs Is Available to Farmers"). For example, older farm operators and those focused on a nonfarm occupation are less likely to install working-land conservation structures than younger farm operators whose primary occupation is farming. As a result, programs supporting a wide array of alternative conservation practices are most likely to match the interests of a wide range of farmers.

Different Conservation Structures Are Used by Different Types of Farms

Farm practices that are potentially compatible with USDA's conservation goals fall into three broad categories: (1) adopting farm management practices, such as conservation tillage; (2) installing working-land structures, such as grass waterways; and (3) retiring land from agricultural production. While a high percentage of farms have adopted one or more conservation-compatible farm management practices (see the February 2006 issue of *Amber Waves*), the focus here is on working-land structures and land retirement. These two types of practices account for most of the conservation payments that farmers receive and their adoption is likely to depend more on conservation program subsidies than the adoption of new farm management practices.

Working-land conservation program budgets have been expanding recently, but land retirement programs still account for most conservation spending



*Estimated
Source: ERS analysis of USDA's Office of Budget and Policy Analysis data.

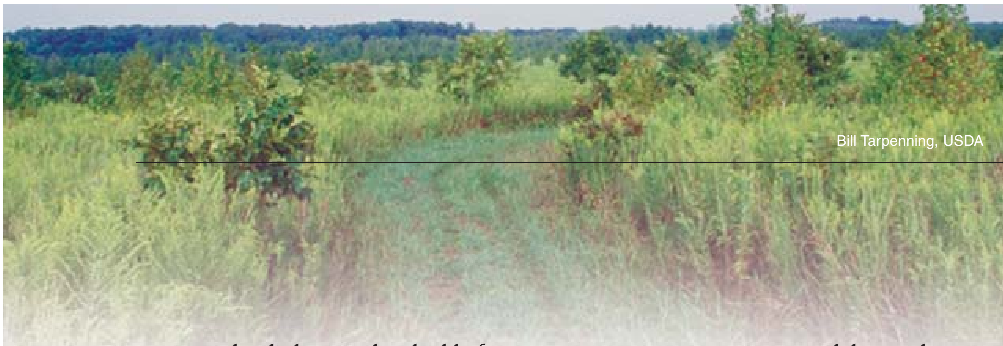
USDA's 2001 Agricultural Resource Management Survey (ARMS) provides data on characteristics of farm businesses and households that have installed a select group of conservation practices, with or without the financial support of conservation programs. About 37 percent of farm operators had retired whole farmland fields from production; dedicated farmland to wildlife habitat; or installed grass waterways, filter strips, and riparian buffers (trees planted along stream banks) as of 2001. Each of these vegetative structures can reduce unwanted environmental impacts of cultivation and, when farm operators install them on environmentally

An Array of Conservation Programs Is Available to Farmers

Efforts to mitigate unwanted environmental side effects of agricultural practices are not new. For more than a century, the Federal Government has managed programs to curtail soil erosion caused by farming. Earlier conservation efforts focused on the onsite benefits of reducing soil erosion. But in recent decades, USDA has broadened its emphasis to include water and air quality improvement and wildlife habitat protection. The following programs support these goals by reimbursing farmers and farmland owners for eligible conservation practices.

- The ***Conservation Reserve Program* (CRP)** was authorized by the Food Security Act of 1985 to retire environmentally sensitive land from agricultural production for 10-15 years. In return for an annual rental payment and partial reimbursement for the cost of establishing and maintaining approved groundcover, program participants agree to take enrolled land out of production and plant grasses, trees, and other conservation-cover crops. Since 1996, farmers have also been allowed to enroll land through a continuous signup program focused on developing riparian buffers and other working-land conservation structures. On roughly 35 million acres of enrolled cropland in 2004, farmers and landowners received $1.8 billion in cost-share and rental payments from the CRP.
- The ***Wetlands Reserve Program* (WRP)** was first implemented in the early 1990s to retire and restore wetlands that had been converted to cropland. The Farm Security and Rural Investment Act of 2002 (the 2002 Act) authorized enrolling slightly over 2 million acres in WRP.
- The ***Conservation Reserve Enhancement Program* (CREP)** was initiated in 1997. This Federal-State partnership targets farmland for retirement in specific geographic areas to achieve local conservation goals. Nearly 600,000 acres have been enrolled in CREP, which is administered through the Conservation Reserve Program.
- The ***Environmental Quality Incentives Program* (EQIP)** provides financial and technical assistance to help participants adopt conservation practices on eligible agricultural land. EQIP is a working-land program that shares with farmers the costs of installing approved structural practices (grassed waterways, riparian buffers, etc.) or of implementing conservation management practices (integrated pest management, fertilizer management, etc.). Funding for EQIP increased substantially under the 2002 Act, from roughly $200 million annually in the early part of the decade to $1.3 billion in 2007. By statute, at least 60 percent of EQIP funds go to livestock producers, including large confined-livestock operations.
- The ***Conservation Security Program* (CSP)** was authorized in the 2002 Act to support continuing conservation practices on working lands. In 2004, the first year of the program, 2,200 farmers received $35 million for conservation practices on roughly 2 million acres of working land.

Other conservation programs administered by the Federal Government include the Farm and Ranch Lands Protection Program, the Conservation Technical Assistance Program, the Grassland Reserve Program, the Wildlife Habitat Incentives Program, and Agricultural Management Assistance.


Bill Tarpenning, USDA

sensitive land, they can be eligible for support from USDA's Conservation Reserve Program. The installation of grass waterways, contours, and riparian buffers also qualifies farmers for Environmental Quality Incentives Program support because these structures offer larger environmental benefits when integrated into the activities of farms producing crops and/or livestock for sale.

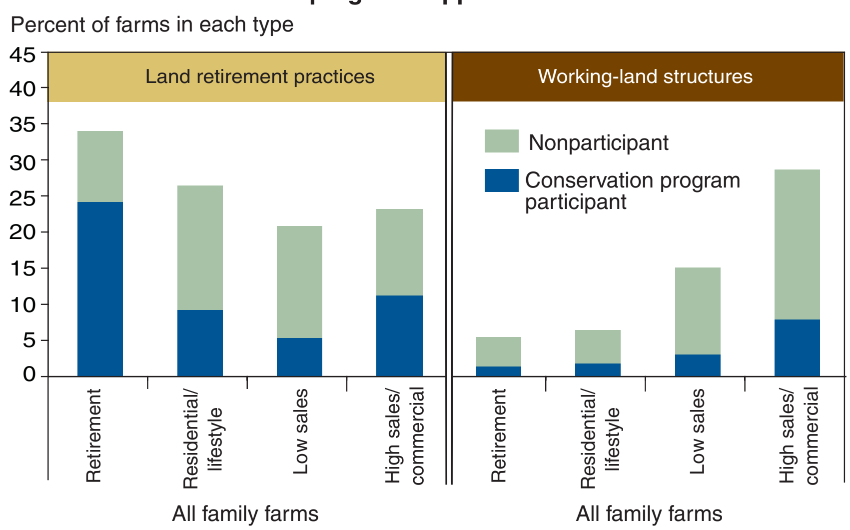
Significant differences across farm types are evident in both adoption of conservation practices and participation in conservation programs. Of the farms that had one or more conservation structures in place in 2001, over half had planted whole fields to conservation cover (grasses, legumes, etc.), while another third had installed working-land structures, such as riparian buffers. Operators of retirement and lifestyle farms, which are generally smaller and whose operators are less engaged in farming as an occupation, are more likely to adopt land retirement practices than operators who report farming as a primary occupation. In contrast, larger farms are more likely to install working-land structures than smaller farms. Households operating farms with higher sales rely more on income from farming, and their operations are large enough that investments in land improvements pay off. In addition, farms retiring land from production are more likely to participate in a conservation program than farms installing working-land conservation structures.

What motivates decisions to retire farmland or to install working-land conservation structures? Certainly, environmental factors (such as the erodibility of farmland) and financial considerations (such as profitability, or costs associated with changing a practice) play major roles. But other factors are also likely to influence farm operator decisions.

Using economic modeling techniques, ERS measured the associations between individual farm, operator, and household attributes and the adoption of conservation practices, holding other factors, such as environmental conditions, constant. Farms that had retired whole fields from production had a significantly higher share of retired farm operators, a higher level of conservation program payments, and a smaller share of production from high-value crops (vegetables, fruits, and nursery products) than farms that had not retired land and had not installed conservation structures. Differences abound between farms that retired whole fields and those that installed grass waterways, filter strips, and other structures compatible with working land. Farms that installed working-land conservation structures were generally larger grain farms that received lower conservation payments. These farms had operators who were more likely to consider farming their primary occupation, slightly younger, and less reliant on off-farm income than farm operators who retired whole fields from production.

While conservation program participants are reimbursed for some of the costs of installing one or more conservation practices on their farmland, many farm operators not enrolled in a conservation program and, thus, not receiving payments, have retired land or installed conservation structures for other reasons. On the other hand, while eligibility rules determine whether a farm operator can participate in a conservation program, the operator's business and personal goals determine whether or not eligible land is enrolled.

Retirement and residential farmers are more likely to retire land, while high-sales farmers are more likely to install working-land conservation structures with or without program support



Notes: The bottom portion of each bar represents farms that have conservation structures in place and that currently receive conservation funding. Farm types are: Retirement farms (small family farms—those with sales less than $250,000/year—whose operator is retired); Residential-lifestyle farms (small family farms whose operator reports a nonfarm business as primary occupation); Low-sales farms (family farms whose operators report farming as primary occupation, with sales less than $100,000/year); High-sales farms (family farms whose operators report farming as primary occupation, with farm sales between $100,000 and $250,000/year, and all family farms with sales exceeding $250,000). Nonfamily farms are excluded.
Source: Prepared by USDA, Economic Research Service using data from USDA's 2001 Agricultural Resource Management Survey, Costs and Returns Report.

Larger Farms More Likely To Use Conservation Structures Than Smaller Farms

Larger farms are often perceived to behave differently than smaller farms, and agricultural pollution is sometimes viewed as a "big-farm" problem. While this study has not analyzed either the level or the source of environmental problems from the agricultural sector, the observed patterns of participation in conservation efforts raise doubts about the general validity of this notion.

Conservation practices adopted by farmers and ranchers often vary by size of farm, but both large and small farms have adopted conservation-compatible practices and participate in USDA's conservation programs. Working-land conservation practices appeal more to farms focused on agricultural production. These tend to be larger operations producing most of the Nation's farm commodities. Alternatively, farm households with resources more focused on off-farm activities find land retirement more appealing. These operations tend to be smaller, lower production farms that control roughly 25 percent of the Nation's farmland.

Simply examining the proportions of large and small farms that have adopted conservation practices ignores the fact that large farms generally control more land and thus are more likely to encompass environmentally sensitive parcels of land in need of special treatment. To adjust for this, ERS researchers tied the rate of increase in conservation program participation to farm size.

Looking only at farm operations that produce crops or livestock, a 1-percent increase in farm size (as measured by acres of cropland operated) is associated with more than a 1-percent increase in the *probability* of participating in CRP to retire land. The decision to install conservation structures on CRP land is largely unaffected by farm size. But, once a farm operator decides to participate, a 1-percent increase in farm size is associated with more than a 1-percent increase in the *amount of land* enrolled. The evidence suggests that as farms grow in size, they are likely to install more conservation structures or plant more native grasses, legumes, or trees under the provision of the CRP, even after adjusting for the amount of land they control.

Lynn Betts, USDA/NRCS

Who Participates in Conservation Programs?

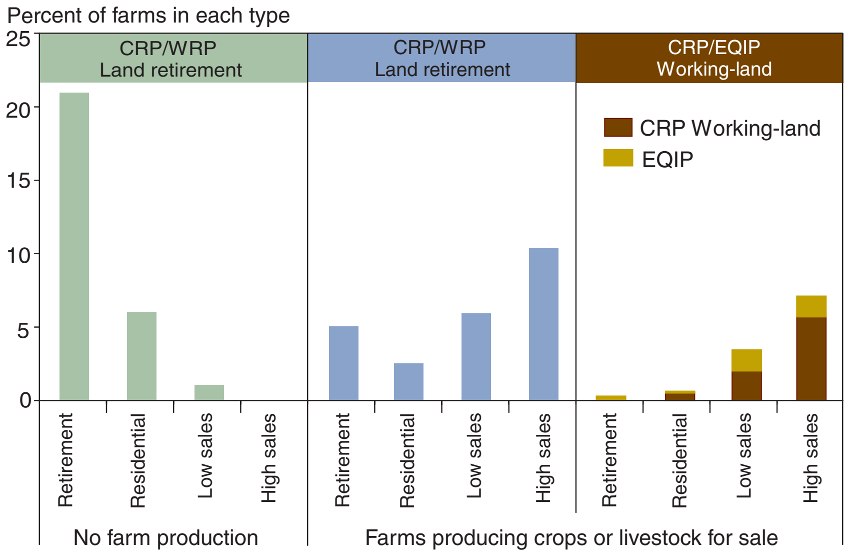
Among all farms that had retired land from production or had working-land conservation structures in place in 2001, roughly 36 percent received conservation payments. In general, of the farms that have adopted these conservation practices, smaller operations participate in conservation programs at a higher rate than larger operations. Program choice, however, varies by farm size, with small farms participating more heavily in land retirement programs and larger farms participating more heavily in working-land programs (see box, "Larger Farms More Likely To Use Conservation Structures Than Smaller Farms").

A different pattern emerges, however, for farms that continue producing a farm commodity while receiving conservation payments versus those that cease production. About half of farms participating in conservation programs do not produce farm commodities—these are overwhelmingly small farms that have chosen to rent their farm assets to the government, through conservation program enrollments, and to other farm operators rather than continue producing commodities themselves. Among farms producing crops and/or livestock for sale, high-sales operations participate in both land-retirement and working-land programs at higher rates than other farms.

Not surprisingly, farms participating in conservation programs but no longer growing crops or raising livestock tend to own a large portion of their land, their operators tend to be older, and the farm households tend to have fewer children and receive a higher percentage of income from nonfarm sources than other farms.

Among farmers still producing crops and/or livestock for sale, program participants tend to rent more of the land they operate, farm more cropland, have more

Among farms that continue producing crops or livestock for sale, occupational farmers participate in conservation programs at a higher rate



Notes: Land retirement participants refer to farms that retire land from production or that install wildlife habitat structures. Working-land participants had installed one or more vegetative working-land structures, such as grassed waterways, contours, and riparian buffers. These data are based on type of program payment rather than on specific conservation practices and so differ slightly from the previous chart.
Source: Prepared by USDA, Economic Research Service using data from USDA's 2001 Agricultural Resource Management Survey, Cost and Returns Report.

children in the household, and rely less on off-farm income than nonparticipating farmers. In general, among participants who continue to focus on farm production, few major differences are apparent between those who retire land and those who have installed structures. Working-land program participants are more likely than land-retirement program participants to depend on revenue from high-value crops and to rent relatively more of the land they operate, both of which make land retirement less attractive. They also receive relatively more commodity program payments than working farms that retire land from production.

Participation Depends on a Variety of Factors

While environmental considerations are associated with the decision to participate in conservation programs, farm size, farm operator goals, and farm household characteristics also play a role. But not all conservation programs appeal to all farm operators who decide to participate. Over half of the participants in land retirement programs take land out of production while curtailing their farming activity, perhaps to retire or to take advantage of off-farm activities. These participants have little incentive to participate in working-land programs. But land retirement need not signal retrenchment from agriculture. In many instances, farm operators focused on agricultural production enroll farmland in a land retirement program as a farm management strategy, perhaps to diversify their income.

Working-land programs seem to appeal especially to those who report farming as their primary occupation and can invest time and managerial oversight to incorporate new farming practices and conservation structures into their operations. And, as these farms grow in size, they may equip more of their farmland with working-land conservation structures. Thus, the importance of conservation programs in influencing conservation practice decisions varies by the type of program, practice, farm cost structure, operator skill, and household goals. This suggests that conservation programs offering a wide array of practice alternatives are most likely to match farmers' interests and enable USDA to meet program goals cost effectively. W

This article is drawn from . . .

Conservation-Compatible Practices and Programs: Who Participates? by Dayton Lambert, Patrick Sullivan, Roger Claassen, and Linda Foreman, ERR-14, USDA, Economic Research Service, February 2006, available at: www.ers.usda.gov/publications/err14/

You may also be interested in . . .

"Use of Conservation-Compatible Farm Practices Varies by Farm Type," by Dayton Lambert and Patrick Sullivan, *Amber Waves*, Vol. 4, Issue 1, February 2006, available at: www.ers.usda.gov/amberwaves/february06/findings/findings_re2.htm

Manure Nutrients Relative to the Capacity of Cropland Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the United States, by Robert L. Kellogg, Charles H. Lander, David C. Moffitt, and Noel Gollehon, NPS00-0579, USDA, Natural Resources Conservation Service and Economic Research Service, December 2000, available at: www.nrcs.usda.gov/technical/land/pubs/manntr.html

Contrasting Working-Land and Land Retirement Programs, by Marcel Aillery, EB-4, USDA, Economic Research Service, March 2006, available at: www.ers.usda.gov/publications/eb4/

A Revolution in Food Retailing Underway in the Asia-Pacific Region

William Coyle
wcoyle@ers.usda.gov

AMBER WAVES VOLUME 3 • ISSUE 4

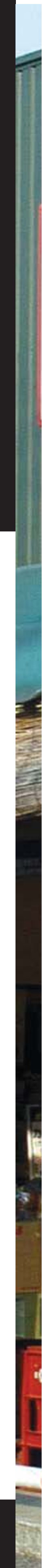
- The spread of modern food chains in the Asia-Pacific region is having profound effects on consumers, food suppliers, and the broader economy.
- International supermarket chains are adding muscle to the region's retail revolution, providing capital, technology transfer, and organizational innovation.
- Specialized suppliers are emerging to help modern supermarkets do business with small-scale producers and traditional market channels.

Rapid economic growth and urbanization are transforming the retail food sector in the developing economies of the Asia-Pacific region. At the center of this revolution is the spread of modern self-service foodstores: supermarkets, hypermarkets, discount and club stores, and chain convenience stores. Through highly efficient procurement and distribution systems, modern chain stores are able to offer consumers lower prices, greater convenience, and higher quality and safer food in increasingly complex, often congested, urban markets. They are also having profound effects on the food supply chain through their increased capacity to trade with large and distant suppliers and their ability to force domestic food producers to adapt and modernize (see box, "What Is the Pacific Economic Cooperation Council?").

Retail food sales in the Asia-Pacific region were about $1.8 trillion in 2005, with modern supermarkets accounting for about 75 percent ($1.35 trillion) and traditional outlets accounting for the rest ($450 billion). While more than 40 percent of the region's sales are concentrated in the U.S. and Japan, most of the growth is attributed to the region's developing economies in China, Southeast Asia, and Mexico.

In China, the traditional food retail sector is still dominant, but supermarket store units are multiplying, and their share of total food retail sales is expected to increase from 10 to 12 percent in 2002 to 50 percent by 2012. Across Southeast Asia, supermarket sales are growing at double-digit rates. And in Mexico, supermarkets now account for more than 50 percent of retail food sales, compared with less than 5 percent in the mid-1990s.

In the developing economies of the region, supermarkets typically first appear in the biggest cities, catering to a limited number of high-income consumers. Stores then spread to smaller cities and towns, increasingly serving middle- to lower-income clientele. Initially, supermarket chains tend to specialize in easily storable packaged and processed foods, sometimes including dairy products, gradually moving into fresh fruits and vegetables, meats, and fish.




FRESH&COST

Income Growth and Urbanization Fuel Spread of Supermarkets

The remarkable rise of supermarkets in developing parts of the Asia-Pacific region is primarily fueled by rapid economic growth, which in recent years was almost twice that of the region's developed economies and is swelling the ranks of the middle classes. China now has 200 to 300 million middle-class consumers; Mexico and Indonesia together have a middle-class population of about 70 million. Across the region, as per capita incomes approach $10,000 and a country's middle class expands, supermarket penetration rises sharply, reaching about 50 percent. At income levels above $20,000, supermarket shares of total food retail sales level off at 70 to 90 percent.

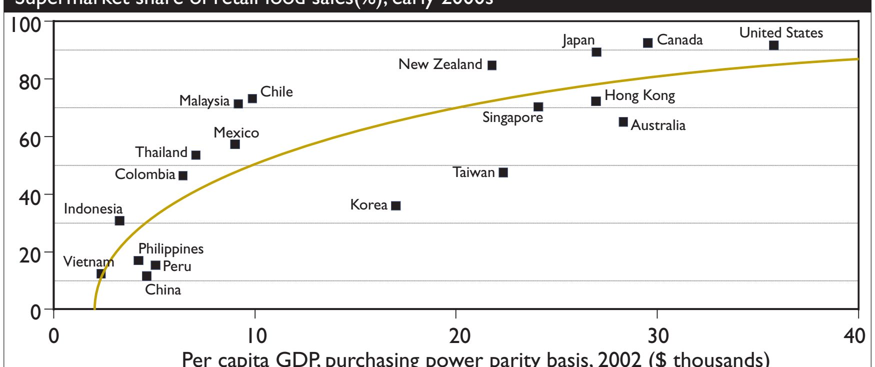
Rapid urbanization in the region's developing economies has also accelerated the spread of supermarkets. The Asia-Pacific region's urban areas are expected to grow by more than half a billion people in the next 20 years, accounting for more than half of the region's total population. The less-developed economies of the region will generate three-quarters of this growth, with urban population increases of 300 million in China, 70 million in Indonesia, and 30 million in Mexico.

What Is the Pacific Economic Cooperation Council?

This article presents findings from *Pacific Food System Outlook 2005/06: A Revolution in Food Retailing*, first released at the Asia Pacific Economic Cooperation Forum Ministerial in Busan, Korea, in November 2005. Sixteen Pacific Rim countries contributed to the original report, which was jointly sponsored by the Pacific Economic Cooperation Council, ERS, Farm Foundation, Euromonitor International, the China National Committee for Pacific Economic Cooperation, and the People's Government Panlong District, Kunming, China. The Asia-Pacific region comprises countries on both sides of the Pacific Ocean, including Australia, Brunei, Canada, Chile, China, Hong Kong (China), Indonesia, Japan, Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russia, Singapore, Thailand, U.S., and Vietnam. These countries are also members of the Pacific Economic Cooperation Council.

Supermarket penetration rises with per capita income

Supermarket share of retail food sales(%), early 2000s



Source: Prepared by USDA, Economic Research Service using data from the Pacific Economic Cooperation Council.

Supermarkets provide a one-stop shopping experience and are more equipped to meet the needs of higher income urban consumers than traditional food retail outlets. They provide under one roof a broad variety of fresh, processed, and semi- and fully-prepared foods as well as other merchandise and services. The supply chains supporting supermarkets are also more efficient than traditional suppliers and are better able to facilitate the physical flow of food products into cities, reducing traffic congestion and adding less stress to transportation infrastructure.

Yet, despite the lure of modernity, some consumers at all income levels still prefer to shop for produce at open-air markets, where they expect to find higher quality meats and fresher fruits and vegetables. Prices of fresh fruits and vegetables tend to be lower in traditional outlets as well. But the higher produce prices in modern supermarkets are a transitory phenomenon: prices tend to drop as supermarkets continue to spread and their supply chains become more developed. For example, surveys have shown that in higher income economies such as Korea, fresh produce prices tend to be lower in supermarkets than in traditional outlets.

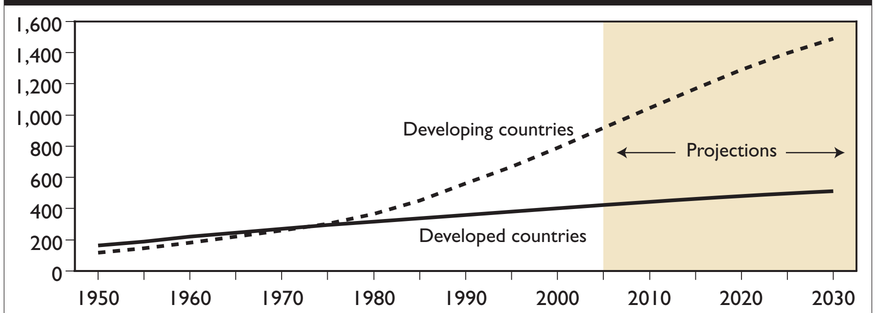
In the developed economies, demographic factors more than income growth affect the outlook for supermarkets. Japan's population, for example, is aging rapidly and is beginning to shrink. Supermarket chains there face increasingly intense competition and declining profit margins. Populations in Australia, Canada, New Zealand, and the U.S. are also aging but at a slower pace than in Japan. Population growth rates in these countries are boosted by high rates of immigration and the higher fertility rates of recent immigrants. The outlook for supermarkets in these economies is more robust, but the sector will need to retool itself to serve a growing share of older and retired consumers, as well as a population grown more ethnically diverse. In the U.S., the Hispanic share of the population is expected to increase to 19 percent in 2020, up from about 13 percent in 2003. Similar shifts are expected in Australia, Canada, and New Zealand, where Asians are the fastest growing ethnic group.

Foreign Investment Drives Supermarket Expansion

Prominent international supermarket chains—Wal-Mart, Carrefour (a French company), and Tesco (from the United Kingdom)—are now heavily invested in the Asia-Pacific region and are instrumental in the region's retail revolution, providing capital, technology transfer, and organizational innovation. Foreign companies began investing in the region fairly recently (Carrefour in Taiwan in 1989, Wal-Mart in Mexico in 1991, and Tesco in Thailand in 1998), motivated primarily by higher expected returns in the less-developed economies, where consumer incomes are rising quickly and middle classes are expanding more rapidly, than in saturated, low-margin home markets. Other factors attracting investors include lower labor costs, availability of public services, and well-developed transportation infrastructure, including roads, railroads, inland waterways, ports, and airports.

Rapid urban growth in developing economies puts food sector logistics to test

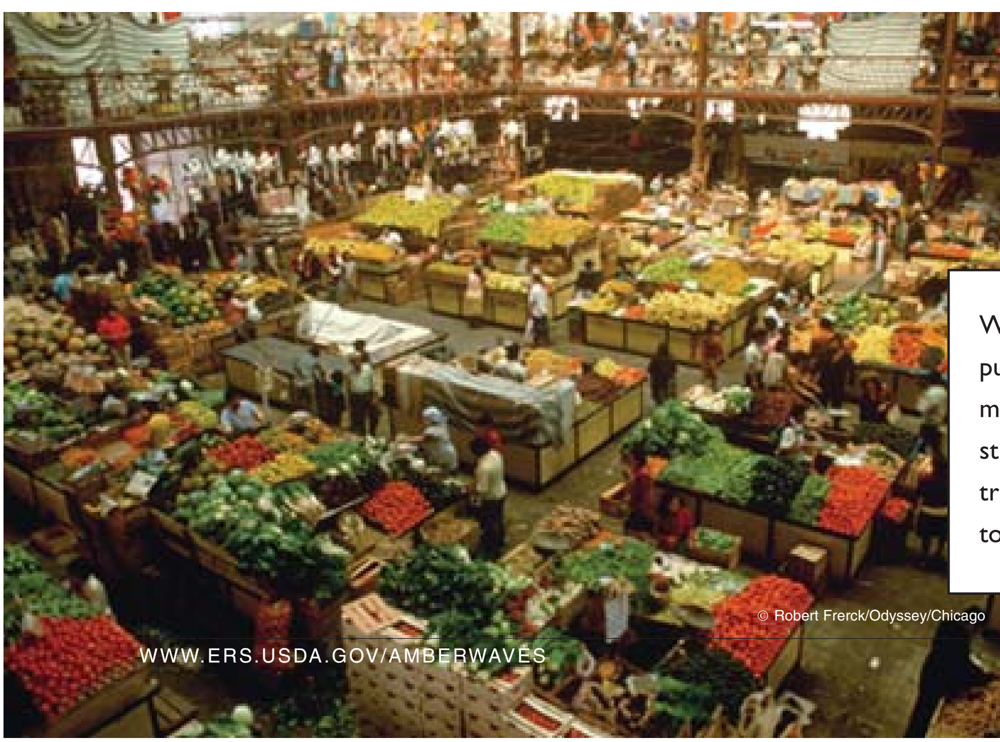
Millions of urban residents



Source: Prepared by USDA, Economic Research Service using data from the United Nations.

Major international chains are also motivated by the role that investment in one country can play in the company's global system. Wal-Mart's global purchasing office in Shenzhen, China, for example, serves not just its China operations but the company's entire system, including its 3,700 outlets in the U.S., for which a large share of nonfood items is produced in China.

Foreign investment in the Asia-Pacific retail food sector has been facilitated by market deregulation and policy reforms implemented in many of the region's less-developed economies over the last 15 years. In the early 1990s, for example, China began to relax restrictions on foreign direct investment in its retail sector. By 2002, China allowed up to 65 percent foreign participation in joint ventures, and it liberalized foreign investment in wholesale and logistics services. In December 2004, it committed to full liberalization of its retail sector. The response of companies such as Wal-Mart and Carrefour has been to pick up the pace of expansion. Wal-Mart plans to have a total of 90 outlets in China by the beginning of 2007, up from 47 as of July 2005, and Carrefour expects to open 15 hypermarkets (stores with a sales area of over 2,500 square meters—26,910 square feet—with at least 35 percent of selling space devoted to nonfoods) a year in the next several years.



© Robert Frerck/Odyssey/Chicago

While most Mexican consumers purchase fresh produce in street and municipal markets or from mobile street markets known as "tianguis," traditional outlets are losing share to supermarkets.

Tesco

After South Korea liberalized its retail food market in 1996, foreign retailers like Tesco arrived, accelerating the modernization of the country's food system.

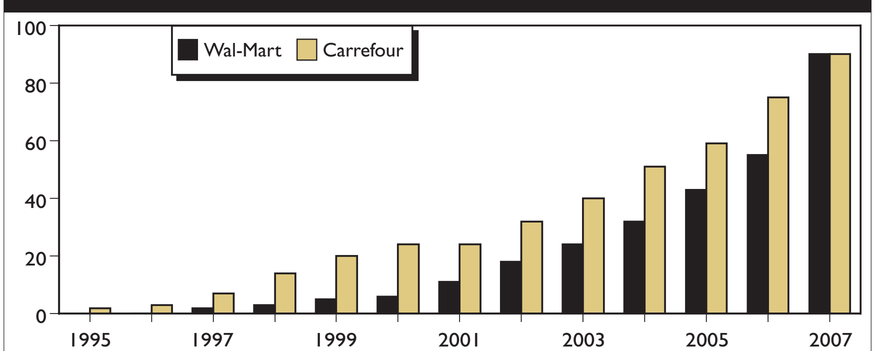
Foreign firms expanded investments in Indonesia in 1998 after that country lifted restrictions on wholesale and retail trade during the 1997-99 Asian financial crisis. At that time, some foreign investors were attracted to the cheaper asset prices and construction costs afforded by their stronger currencies. While foreign investment regulations in Indonesia were largely eased in the late 1990s, some restrictions remained. For example, both domestic and foreign modern-format foodstores are required to locate at specific distances from traditional outlets, with the distances determined by each store's floor size. Restrictions are more severe outside provincial capitals. Even so, foreign firms such as Carrefour and Makro are expanding rapidly in Indonesia: from 2004 to 2005, these two firms increased their number of outlets by 25 percent.

Other Asia-Pacific economies also liberalized their markets in the 1990s. South Korea and Vietnam lifted restrictions in 1996, allowing foreign joint ventures in supermarkets for the first time.

Foreign investment in the retail food sector is not always a cakewalk. Some international chains face intense competition from national retailers. Ito-Yokado in Japan, Matahari in Indonesia, E-Mart in South Korea, and Lianhua in China have fared well against foreign competition. Some foreign companies have pulled back investments in Asia and Latin America. In March 2005, Carrefour announced the sale of eight stores in Japan to Aeon Co., a major Japanese retail chain. It also sold all of its assets in Mexico, which included 29 operating hypermarkets plus two due to open in 2005, to the Chedraui Group, a leading Mexican retailer. Wal-Mart faces the challenges of rehabilitating its Japanese affiliate, Seiyu Ltd., and is rethinking its low-price strategy in an effort to appeal to Japan's more status-conscious consumers.

Major foreign supermarket firms are expanding rapidly in China

Number of foodstores



Source: Prepared by USDA, Economic Research Service based on Carrefour and Wal-Mart annual reports.

Centralized Procurement and Distribution Lowers Costs of Supermarkets . . .

Once supermarket chains have more than 10 outlets in a particular geographic area, they tend to take more control over procurement and distribution functions by investing in centralized warehousing and distribution centers. While such a move might raise transportation costs in some cases, it nevertheless lowers overall costs by reducing handling, delivery times, and, in the case of fresh produce, shrinkage (loss of weight or volume). Centralized functions also increase in-store and head-office productivity, and, through the application of information technology, enable stores to improve sales monitoring and inventory management. Centralization also allows supermarkets to add products and services to meet the demands of consumers and to spread risk over a larger product portfolio. This diffusion of risk allows companies to pursue different pricing strategies, including deep discounts on some food items, to attract customers. For some companies in China, centralized procurement and distribution is cutting logistics costs by as much as 30 to 40 percent.

While most small and medium-sized chains in the Asia-Pacific region still procure goods on a store-by-store basis from wholesale markets and dedicated wholesalers, some have opened distribution centers. Others are forming joint ventures and/or participating in collective arrangements with other companies to procure and distribute both dry goods and fresh produce.

. . .and Broadens Their Geographical Reach

Centralized procurement and distribution functions broaden the geographic reach of a firm's business to include more distant regional and national suppliers, displacing traditional, localized channels in the process. Distribution centers' use of standardized equipment and organizational systems—such as shipping containers, tractor trailers, pallets, forklifts, and barcode readers and computerized inventory management systems—facilitates domestic and international transactions with large suppliers and other distribution centers. Modernization of port facilities, a priority in many Asia-Pacific developing countries, may also facilitate a supermarket chain's ties with foreign suppliers, making it less expensive to buy food products from distant foreign sources than from nearby domestic producers, who may be handicapped by lack of scale or by inadequate refrigeration and transportation infrastructure.

Wal-Mart's distribution center in Mexico, for example, procures avocados not only for its Mexican stores but also for shipment to distribution centers in other countries, including China. The big European chains Metro and Auchan procure exotic vegetables for sale in their stores in Chengdu, China, from their Shanghai headquarters, more than 1,200 miles away. The compatibility of Carrefour's procurement and distribution operations across countries facilitates the procurement of nonfood products in China, where it is the leading foreign supermarket chain, for sale in its Indonesian hypermarkets.

Despite such trends, most processed food products sold by supermarket chains in the Asia-Pacific region's low-income countries are still processed nationally, using either domestic and/or imported raw materials. According to ERS research, food manufacturers of highly processed products generally prefer to locate production facilities close to the point of consumption. On a global basis, imports account for only 6 percent of processed food sales, compared with 16 percent of sales of major bulk agricultural commodities.

Supermarkets are most likely to sell imported products they cannot procure nationally. These may include out-of-season or tropical fresh fruits and vegetables; livestock products whose production requires forage area and grain supplies typically found in a few land-extensive economies, such as the U.S., Australia, Canada, and New Zealand; and highly processed products with an exotic appeal, like French wines and Dutch cheeses.

A Force for Modernization: Specialized Suppliers

In response to the centralization of supermarket procurement in developing Asia-Pacific economies, specialized suppliers are emerging to provide modern food retailers with larger product volumes at lower cost. These suppliers are more

Many middle- and lower-income consumers consider the quality of fresh fruits and vegetables much higher in "ferias libres" (street markets), like this one in Valparaiso, Chile.

Specialized Suppliers Respond to the Revolution in Food Retailing

Specialized suppliers take many organizational forms to bridge the divide between the modernizing and traditional food sectors. They may be large modern farms that supplement their own production by contracting with small producers or buying from intermediaries, including traditional wholesale markets. Others might be companies that specialize in procurement and marketing, sometimes deriving experience from international trade. In other cases, small farmers might form associations or cooperatives, sometimes with the aid of government, to deal directly with modern supermarkets. Some suppliers are expanding by contracting with more producers. Others are consolidating by dealing only with producers that can meet the demand for growing volume and higher standards. The following case studies by U.S. and foreign researchers illustrate the variation within the specialized supplier trend.

PT Saung Mirwan, established in 1983 near Bogor, Indonesia, is a relatively large vegetable and flower farm that supplements its own production with supplies from 50 other producers, 40 of which are small-scale operations that average less than half a hectare of cultivated area. The company supplies 18 types of flowers and more than 40 varieties of fresh vegetables to supermarkets' central distribution centers. The company has grown rapidly, doubling its greenhouse capacity from 1.5 hectares in 1991 to 3 hectares by the early 2000s.

Xincheng Foods supplies fresh vegetables to supermarket chains in the Shanghai area. It operates nine farms, with 1,000 hectares of vegetable area. It also produces livestock and fish. In 1997, Xincheng began supplying China's top three national supermarkets; by 2003, it was supplying 500 supermarkets owned by domestic and foreign chains. As much as 20 percent of the company's supplies comes from its own land and greenhouses, 50 percent from 4,200 contract producers, and 30 percent from wholesale markets. The company also rents land to grow vegetables for export to Japan and Southeast Asia.

PT Bimandiri of Indonesia specializes in procurement and marketing of fresh produce, buying 30 percent from producer groups and the remainder from traditional channels. Since 1998, Bimandiri has been a dedicated supplier of produce to Carrefour, Indonesia, rapidly expanding its business from half a ton per day in 1998 to 7 tons per day in 2003. In 2001, it contacted a group of 100 farmers about producing a small low-pesticide watermelon for Carrefour. Eventually, half the farmers were able to produce this special watermelon, earning twice the price per kilogram of a standard watermelon.

Malaysia's state-run Federal Agricultural Marketing Authority (FAMA) began supplying supermarkets and hypermarkets in 2000. It has contract arrangements with more than 1,350 producers of fruits and vegetables, livestock, freshwater aquaculture, and coconuts. Farmers produce according to cropping schedules designed to ensure steady supply. FAMA's 44 collection centers supply seven distribution centers. Supermarkets also obtain supplies directly from farmers and wholesalers.

The Bukidnon Lettuce Cluster in northern Mindanao, the Philippines, consists of five farms that sell lettuce directly to fast food companies and a cash-and-carry chain. According to the United Nations Food and Agriculture Organization, Bukidnon ships 10 tons of lettuce weekly. The largest of the farms coordinates the cluster's business activities and serves as a liaison with input suppliers, transporters, and buyers. Surplus production or off-sizes of lettuce are sold on the wholesale market.

responsive to supermarket demands for higher and more consistent quality, steady supplies, and product innovation (see box, "Specialized Suppliers Respond to the Revolution in Food Retailing").

This restructuring has happened most rapidly with dry goods and processed and semi-processed foods, but it is also affecting fresh produce, which tends to lag other categories.

In all less-developed economies, there exists a technologically advanced and competitive segment of the food sector. This sector is well adapted to modern supermarkets and centralized procurement systems, including those of large multinational food companies operating in the region, like Nestlé, the Lotte Group, and Unilever.

Modern supermarkets naturally favor these suppliers. But in a developing economy, a significant share of food supplies still must come from the traditional sector, which tends to be fragmented and often burdened by inadequate transportation and cold storage infrastructure.

Specialized suppliers are developing and adapting to help modern supermarkets do business with small-scale producers and traditional market channels. These suppliers assume responsibility for collecting production, packaging, assuring steady supply, and, in some cases, meeting traceability objectives.

Specialized suppliers are also held accountable for product quality, consistency, and food safety—factors that strongly influence a supermarket's business reputation. A supermarket must choose its

William Coyle, USDA/ERS

suppliers carefully because lapses in quality or food safety, even if it originates from a link elsewhere in the food supply chain, tend to be associated with the supermarket itself. Consumers might react to negative information about a supermarket by avoiding not just the outlet in which the incident occurred, but all of a chain's outlets. Such a reaction could have significant short- and longer-term consequences on firm revenues.

Government Too Has a Role in the Retail Food Revolution

The growth of supermarkets is a significant economic force in developing economies of the Asia-Pacific region. Supermarket expansion is contributing to lower food costs, higher food quality and safety standards, and a modernized food system. Lower food prices help sustain economic development—consumers spend less on food and more on nonfood items, thus providing a stimulus to other economic sectors. Enhanced food supply chains help modern supermarkets overcome the logistical challenges inherent in areas undergoing rapid urbanization.

The shift to modern food retailing has no singular path. Some markets combine larger scale retailers, such as hypermarkets selling food and nonfood items, with small-scale neighborhood shops. The corporate focus ranges from large multinational chains to companies that focus more narrowly on a single city or region within an economy.

Specialized suppliers are emerging as transitional change agents, enhancing the best that traditional small-scale producers and markets now offer. At the same time, these suppliers are promoting upgrades to their operations by adopting better and safer production and marketing practices, as well as modern technologies.

Many of these changes are occurring without direct government aid. But policymakers can have a direct role in the modernization of the retail food sector. Government investment in expanding and upgrading transportation infrastructure improves access to distant locales or food surplus areas and enhances the flow of products to urban food distribution systems. The reduction or elimination of investment barriers creates opportunities for foreign investment to modernize existing retail outlets and build new outlets and the supply chains to support them.

Governments can also help by lowering trade barriers, thus making it easier for food retailers and processors to acquire food products with desired characteristics from sources offering those products at the lowest price. This policy intervention may open new markets to producers able to meet market demands and keeps consumer food costs low.

The growth of supermarkets—largely the result of private industry and consumer actions—presents significant economic opportunities for developing countries in the region. Government efforts to temper this expansion would be difficult if not impossible. A more favorable action by policymakers may be to assess resources and policy options that help the traditional sector adapt to a modernizing food system. W

This article is drawn from . . .

"Asia-Pacific Transportation Infrastructure, Linking Food Sources to Urban Centers," by William Coyle, in *Amber Waves*, Volume 3, Issue 4, USDA, Economic Research Service, September 2005, available at: www.ers.usda.gov/amberwaves/september05/features/asiapacifictransportation.htm.

Pacific Food System Outlook 2005-06: A Revolution in Food Retailing, Pacific Economic Cooperation Council, November 2005, available at: www.pecc.org/food/

"The Emergence of Supermarkets with Chinese Characteristics: Challenges and Opportunities for China's Agricultural Development," by Dinghuan Hu, Thomas Reardon, Scott Rozelle, Peter Timmer, and Honglin Wang, *Development Policy Review*, 2004.

"Supermarketization of the Emerging Markets of the Pacific Rim: Development and Trade Implications," by Thomas Reardon, Julio Berdegué, and Peter Timmer, *Journal of Food Distribution Research*, 36 (1), March 2005.

You may also be interested in . . .

ERS Briefing Room on Global Food Markets, www.ers.usda.gov/briefing/globalfoodmarkets/

ERS Briefing Room on China, www.ers.usda.gov/briefing/china/


STORM EVACUEES CREATING STRAINS ON TEXAS HOSTS
MORE FEDERAL AID SOUGHT
Military Plans 'Long War' on Terrorism
Cure for Neglected Diseases: Funding
Large Doses of Donations Will Lead to New Drugs, Report S
Health for Life
Leading the Hunt For Cancer Genes
A pioneer researcher talks about the quest to identify and understand the origi
The Next Flu
Can we stop it?

PhotoSpin

Where Should the Money Go?

Aligning Policies With Preferences

Fred Kuchler
fkuchler@ers.usda.gov

Elise Golan
egolan@ers.usda.gov

- Budget constraints force policymakers to choose which programs to fund, even when human health and safety are at risk.
- New Federal guidelines emphasize tallying health outcomes to help decide among programs.
- Benefit estimates based on money measures of risk preferences provide better guidance on programs most highly valued by society.

Homeland security, avian flu, floods, health care, hunger, obesity—the list of life-and-death issues competing for government funding is long and seems to be growing. Policymakers are increasingly faced with allocating scarce funds among critical programs. Should more funding go to safer airports or safer food? Nutrition programs or kidney machines? Flood relief or avian flu control?

Though there are no rules for making these types of decisions, economic principles can help. The principle of weighing costs and benefits can help policymakers determine which programs will save the most lives or lead to the largest improvements in health and well-being. But there are a variety of ways to tally costs and benefits. Analyses using health-based benefit measures—the type of benefit measure newly required by the Office of Management and Budget (OMB) for all economically significant rules—provide information on health outcomes. Analyses using money to estimate health-risk preferences provide policymakers with information on the types of risk reduction most highly valued by society. Only by recognizing that preferences for risk reduction vary across risks can we make sense of how to best spend scarce funds.

Analysts Need a Standard Benefit Measure To Compare Diverse Outcomes

The first step in determining which regulations to fund is to devise a method to compare diverse health outcomes. The list of health risks regulated by the government is long and varied, as is the list of government agencies responsible for their administration. The Department of Transportation, the Department of Labor, the Environmental Protection Agency, the Department of Homeland Security, the Department of Agriculture, the Consumer Products Safety Commission, and the Food and Drug Administration (FDA) are among the Federal agencies responsible for programs affecting life and health. These agencies all manage risks associated with a daunting variety of health outcomes, ranging from mild illnesses to death. Foodborne pathogens alone pose risks that include kidney failure, arthritis, paralysis, and death.

A comparison of health risks is further complicated by the fact that the affected population may also vary. Some hazards, like foodborne pathogens, pose greater risks to children and the elderly. Others, such as workplace chemicals and machinery, are hazards mainly for working-age adults. While it is difficult to compare the value of preventing diverse health outcomes, such as renal disease and paralysis, it is even more difficult to make these comparisons when diseases afflict children and adults at different rates.

To overcome the problem of comparing diverse health outcomes in diverse populations, analysts must translate improvements in health and well-being into a common unit of measurement. Some use health as the unit of measurement, others choose money. Either unit of measurement entails difficult philosophical choices about what to value and methodological challenges about how to assign values. Analyses based on one unit are not necessarily comparable to those based on the other.

A ranking of health outcomes by itself, however, does not usually provide enough information to inform policy decisions.

Health-Based Measures Provide Information on Health Preferences

The most common approach for translating diverse health outcomes into a standard health measure uses health- or quality-adjusted life years (QALYs). The QALY approach translates health outcomes to healthy-time equivalencies using a health index that accounts for changes in both length and quality of life. To calculate QALYs, analysts use individual assessments of health outcomes arrayed on a 0-1 scale, with 0 indicating death and 1 indicating robust good health.

QALYs, and other nonmonetary health-based benefit estimates, can be used to provide a ranking of potential program benefits, with programs saving the highest number of QALYs ranked highest. A ranking of health outcomes by itself, however, does not usually provide enough information to inform policy decisions. Policymakers must also have information on the costs of programs to determine which policies are the most cost effective—yielding the greatest increase in

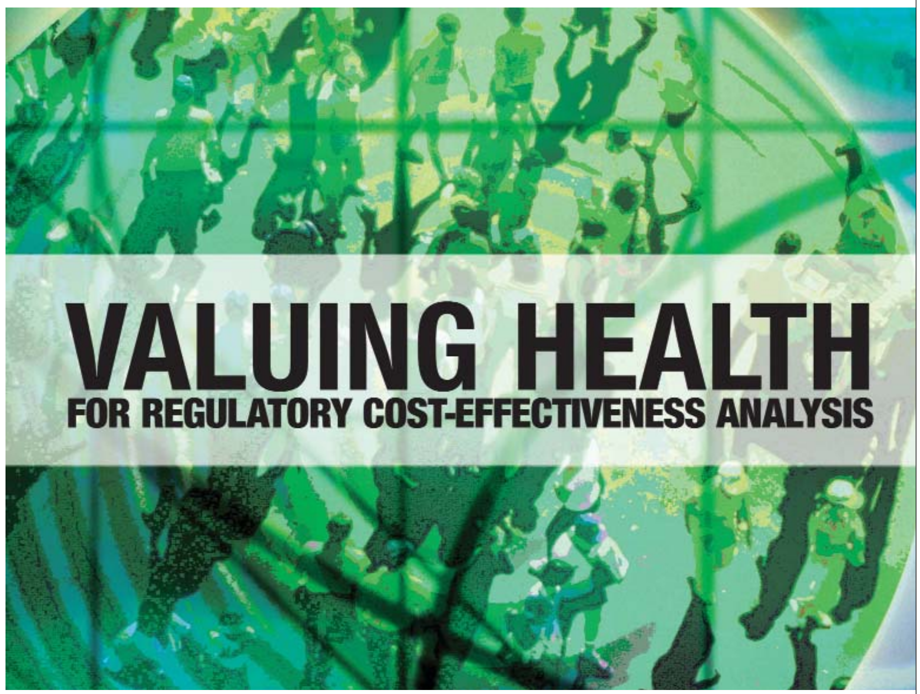
Numerous Federal agencies manage programs affecting health.

health per dollar. The need for economic balancing is inevitable in a world of constrained resources. It is impossible to protect everyone from every threat to their health and safety.

If costs are not considered when allocating funds among health or life-saving programs, programs that save lives at great expense may be funded before inexpensive programs that save just as many. If funding is allocated efficiently, the amount of money spent to save one life or prevent a particular adverse health outcome should be similar across programs. If funding is allocated inefficiently, the amount varies and more lives could have been saved and health better protected. All things being equal, programs with the highest number of lives saved per dollar or the highest QALY per dollar cost ratio should be funded before those with lower cost-effectiveness ratios.

Health-based cost-effectiveness analysis is a relatively new step in the Federal regulatory process. In 2003, OMB began requiring that Federal agencies provide this type of cost-effectiveness analysis for all economically significant rules. This new requirement, bolstered by the 2006 guidance document developed by the National Academy of Sciences' Institute of Medicine, has focused Federal efforts on cost-effectiveness analysis.

A ranking of policies by health-based cost effectiveness is invaluable for helping policymakers allocate funding among safety programs, but such a ranking does not tell whether any program is worth the price. For example, a cost-effectiveness ranking may indicate that a $1 million



In 2006, the Institute of Medicine published guidelines for measuring program benefits in terms of health outcomes per dollar spent.

kidney dialysis machine that saves 10 lives is a better buy than a $2 million nutrition program that saves 10 lives, but it does not indicate whether either program is worth the cost. Analysts must turn to dollar-based benefit estimates for this type of information.

Money-Based Measures Provide Information on a Wide Range of Preferences…

Analysts' first attempt at assigning money values to diverse health outcomes relied on the actual expenses incurred because of illness or premature death. This approach, known as the cost-of-illness (COI) approach, became common in health policy 40 years ago. With COI, economists tally the dollars spent on medical expenses and income forgone as a result of illnesses, accidents, or premature deaths. COI estimates provide an ex-post accounting of the economic impact of illness. Such an accounting is the basis of liability or tort law. When courts set compensation for wrongful death or injury, compensation is usually limited to lost earnings.

Until the early 1980s, most government agencies calculated benefits from health and safety regulations as the reduction in COI due to the regulation. ERS has estimated the medical and productivity costs (nonfatal) for Shiga-toxin producing *E. coli* strain O157 (STEC O157) infections at $38.7 million. Like health-based benefit measures, COI-based benefit measures can provide a cost-effectiveness ranking of

A ranking of policies by health-based cost effectiveness is invaluable for helping policymakers allocate funding among safety programs.

policies. All things being equal, programs with the highest COI averted per dollar cost should be funded before those with lower ratios. In addition, because COI is measured in dollars, it also provides policymakers with information on whether programs are worth the cost. Only when analysts use dollars to measure both costs and benefits are they able to calculate net benefits—the value of a program minus the value of goods and labor services that have to be used to carry out the program. Negative net benefits indicate that the program is not worthwhile, even if it is ranked higher than every other program. In short, the goods and labor services that would be used to secure the benefits are more valuable elsewhere.

A money measure also allows analysts to compare values and consider tradeoffs among all goods and services.

Even though individuals may place an infinite value on their own lives (and the lives of those they hold dear), they do not feel similarly about small changes in risk.

For example, the net benefits of a nutrition program could be compared with those of a college scholarship program. QALYs do not provide a straightforward means for making comparisons with nonhealth goods and services.

...Including Risk Preferences

COI was a major innovation in health policy analysis as it highlighted the notion that human capital has value just like physical and financial capital do, and COI offered a way to quantify those values. However, the approach tends to place relatively low values on the lives of children and the elderly because they are not wage earners. The COI approach offers no way to account for pain and suffering. Nor does COI measure individuals' preferences for risk reduction, the major function of government health and safety programs.

More recently, the willingness-to-pay (WTP) approach has been used to translate projected risk reduction into money values. With WTP, economists measure the resources (dollars) individuals are willing and able to give up for a reduction in the probability of encountering a certain hazard. WTP attempts to measure the value individuals place on preventing risks to life and health.

The WTP method rests on the observation that individuals can and do make tradeoffs between health and other goods and services. Even though individuals may place an infinite value on their own lives (and the lives of those they hold dear), they do not feel similarly about small changes in risk. Individuals routinely and voluntarily accept many small risks in exchange for finite benefits. For example, driving a little faster than surrounding traffic may raise the risk of injury but could result in reaching a destination sooner. Or, a person might enjoy attending a popular movie at a crowded theater, recognizing that the activity raises the risk of contracting a contagious disease. WTP estimates are an ex-ante measure of the value individuals place on reducing the risk of a particular injury, illness, or death.

The WTP approach, unlike any other, targets funding toward the type of risk reduction most highly valued by individu-

If funding for health and safety programs is prioritized without any regard to preferences, then deaths due to skiing would be ranked equal to those due to childhood leukemia.


PhotoSpin

als. There are profound differences in the ways that individuals value reductions in different risks. Some risks rank quite low when preferences are considered. For example, skiing carries a risk of injury and death, but very few skiers (or nonskiers) would welcome a government program that banned skiing on the basis of risk. Saccharin may carry a cancer risk, but we know that consumers are willing to accept the risk for the benefit of a noncaloric sweetener. In the late 1970s, FDA attempted to ban saccharin on the basis of potential cancer cases, but consideration of consumer preferences led Congress to stop FDA's action.

Other risks rank quite high when preferences are considered. For example, potential exposure to cancer-causing pollutants may alarm many individuals, even when risks are identical to those of saccharin. Researchers have found, for example, that a significant proportion of the population values reductions in cancer risk much more highly than reductions in the risk of automobile fatality.

If funding is prioritized without any regard to consumer preferences, on the basis of either non-monetized health outcomes or COI, then deaths due to skiing would be ranked equal to those due to childhood leukemia. WTP benefit estimates provide policymakers with information on the value of reducing specific risks, not just health outcomes. Though QALYs may also indicate individual preferences toward pain and suffering, they only measure preferences over health outcomes, not over source or type of risk.

Money-Based Measures for Food Safety in Short Supply

Economists widely recognize the value of accurate WTP measures for policy guidance, and WTP is now commonly used to estimate the benefit side of cost-benefit analyses. For data reasons, many Federal agencies have adopted the practice of using an estimate derived from compensating wage studies to estimate a variety of WTP values. Compensating wage studies calculate the amount of money workers must be paid to leave them indifferent between jobs that entail different likelihoods of fatal injuries. Estimates of a "value of a statistical life" from compensating wage studies range from around $3 million to $7 million (in 1990 dollars). ERS has estimated the WTP to avoid fatal foodborne *E. coli* (STEC O157) illnesses at $392.8 million (2005 dollars).

The practice of using a single value derived from compensating wage studies to estimate WTP values flies in the face of empirical evidence. For food safety risks, this practice could potentially lead to large measurement errors because both the population most vulnerable to foodborne risk and the characteristics of foodborne risk are quite different from those in most compensating wage studies.

Those most vulnerable to complications from foodborne illness are infants, the elderly, and the immunocompromised—not the working-age males at the heart of the compensating wage studies. Empirical evidence suggests that people have different risk preferences with respect to these vulnerable groups. In investigating risk preferences toward household chemicals, insecticides, and cleaning products, researchers found a WTP to reduce risks to children 2.3 times

Economists widely recognize the value of accurate WTP for policy guidance, and WTP is now commonly used to estimate the benefit side of cost-benefit analyses.

The value of preventing premature deaths from *E. coli* swamps the cost-of-illness estimates

	$ million (2005)
Cost-of-illness (COI) approach:	
Medical care	
Medications	0.5
Office visits	2.2
Emergency room visits	2.7
Hospitalization	21.2
Chronic medical conditions	6.8
Lost productivity (nonfatal)	5.3
Total	38.7
Willingness-to-pay (WTP) approach:	
Value of preventing premature deaths	392.8

Source: Calculated by USDA, Economic Research Service using CDC 1999 incidence estimates.

Estimating Benefits Is a Research Problem, Not an Accounting Issue

Eyewire

The biggest practical problem in estimating the dollar value of a food safety rule or regulation is the lack of a market for reducing food safety risks. If food were marketed by risk levels (say, probabilities of inducing cancer) and consumers treated advertised risk levels as they do other objectively measurable product characteristics (weight or volume), valuing food safety would be easy. Product prices could be statistically associated with risk levels, yielding consumers' risk-dollar tradeoff. That is, consumer purchases would demonstrate the dollar value they attach to particular types of risk reduction.

Unfortunately, there is no obvious dollar value to assign to the major benefits of food safety programs—a reduction in the risks of foodborne illnesses—and there is no price that can be tabulated from commercial transactions. Although individuals do take actions that might reduce these risks, those actions do not leave a behavioral trail that is easy for analysts to follow.

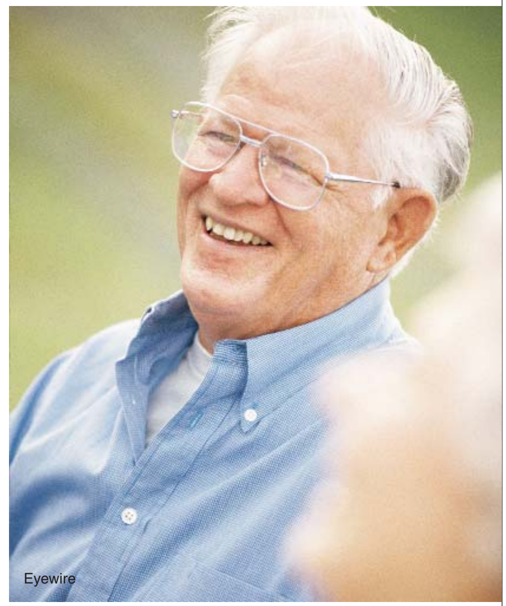
ERS is trying two approaches to find out how much individuals value lower risk of illness due to foodborne pathogens. Through cooperative research with Harvard University's Center for Risk Analysis and the University of Wyoming, two surveys have been administered to consumers through the Internet.

A contingent valuation survey, conducted in summer 2004, asked respondents about their behavior and what they would be willing to pay for greater safety. It described symptoms of gastrointestinal illness and then presented respondents with information on duration of symptoms and the likelihood of death. Respondents were asked how much they were willing to pay for foods (chicken, hamburger, and deli meats) with lower risk of foodborne illness. Respondents provided similar information about risks incurred by children so that researchers could assess the importance of protecting children.

A second survey examined actual food purchases and how purchases changed when information about safety changed. This survey, conducted in summer 2005, provided respondents with information about the likelihood of foodborne illnesses and asked them about the foods they consume and their food safety practices. Analysts will use the respondents' grocery store receipts to link food choices with the food safety information provided. This will allow researchers to infer values consumers place on reduced risk, recognizing that values vary with individual ability to self-protect and individual risk preferences.


ImageSource


Rubberball


Eyewire

The population most vulnerable to complications from foodborne illnesses—young children, the elderly, and the immunocompromised—is quite different from the population of working-age males on which current willingness-to-pay estimates are based.

higher than for adults. Cost estimates for foodborne illnesses that primarily affect children will therefore probably underestimate the value of risk reductions if they use compensating wage estimates.

People may also be less willing to accept involuntary risk, such as most foodborne risks, than risk that is voluntarily assumed. As a result, studies that measure response to voluntary risk, such as compensating wage studies, probably underestimate society's aversion to risk that is not contracted for, such as most foodborne risks. Other factors, such as the possibility of defensive behavior (for example, cooking hamburger longer) and whether the risk produces consequences in the near or distant future, may also influence the value of the risk reduction.

To improve measures of WTP for safer foods, ERS has funded two empirical investigations into consumers' attitudes about food risks (see box, "Estimating Benefits Is a Research Problem, Not an Accounting Issue"). Only with additional studies targeted specifically toward food safety risks will analysts be able to estimate relevant demands for food safety risk reduction throughout the population.

Better estimates of WTP over a wider range of risks will also help Federal analysts better comply with OMB's longstanding requirement to compare dollar estimates of policy benefits with anticipated policy costs. Cost-benefit analysis is still required for all economically significant rules—OMB's recent requirement of health-based cost-effectiveness analysis did nothing to change this. Cost-effectiveness analysis based on health outcomes provides valuable information to policymakers. However, only cost-benefit analysis using money-based measures of risk preferences provides information on the types of risk-reduction programs most highly valued by society. W

This article is drawn from . . .

Assigning Values to Life: Comparing Methods for Valuing Health Risks, by Fred Kuchler and Elise Golan, AER-784, USDA, Economic Research Service, November 1999, available at: www.ers.usda.gov/publications/aer784/

Valuing the Health Benefits of Food Safety: A Proceedings, compiled by Fred Kuchler, MP-1570, USDA, Economic Research Service, April 2001, available at: www.ers.usda.gov/publications/mp1570/

You may also be interested in . . .

ERS' Foodborne Illness Cost Calculator, available at: www.ers.usda.gov/data/foodborneillness/

Valuing Health for Regulatory Cost-Effectiveness Analysis, by Wilhelmine Miller, Lisa A. Robinson, and Robert S. Lawrence (eds.), Committee to Evaluate Measures of Health Benefits for Environmental, Health, and Safety Regulation, Institute of Medicine (Washington, DC: The National Academies Press), 2006.

A Web-Based Tool for Calculating the Cost of Foodborne Illness

Paul D. Frenzen
pfrenzen@ers.usda.gov

Government analysts estimate the cost and distribution of foodborne illness—illness caused by either naturally occurring pathogens or deliberate or accidental contamination of foods with toxic or other harmful substances—to help policymakers target food safety policies to programs where they will do the most good. Estimating costs requires a number of assumptions about illness incidence and burden. ERS's Foodborne Illness Cost Calculator (www.ers.usda. gov/data/foodborneillness/) provides policymakers and the general public with detailed information about the assumptions behind foodborne illness costs and provides the flexibility to change these assumptions and generate custom cost estimates. The Calculator describes the assumptions and calculations behind the ERS cost estimates for two foodborne pathogens, *Salmonella* and, as of spring 2006, Shiga-toxin producing *E. coli* O157 (STEC O157).

Create Custom Cost Estimates

Example: Change the number of cases

Some potential uses of the Calculator include determining the cost of illness for a State or community where the incidence of STEC O157 is known, estimating the cost of illness due to an STEC O157 outbreak, or updating the cost of STEC O157 when a new estimate of annual cases becomes available.

For example, ERS's cost estimate for STEC O157 of $431.4 million (in 2005 dollars) is based on the Centers for Disease Control and Prevention's (CDC) 1999 estimate of 73,480 annual cases. Newly released data from CDC's FoodNet program for monitoring foodborne illness show a 29-percent decrease in the incidence of lab-diagnosed STEC O157 cases in 2005 compared with the 1996-98 baseline period. A calculator user could assume that the number of annual cases has decreased by the same percentage. - Entering this assumption (which is equivalent to 52,171 cases) into the Calculator, without changing any other assumptions, yields a new cost estimate of $304.5 million (in 2005 dollars).

Example: Calculate costs of contaminated ground beef

The Calculator could also be used to estimate the cost of STEC O157 illnesses due to a specific food vehicle, such as ground beef. The 2001 risk assessment conducted by USDA's Food Safety and Inspection Service estimated that ground beef contaminated with *E. coli* O157: H7 caused a median of 19,000 illnesses each year, distributed across a range of health outcomes.

The outcomes include 17,200 cases who didn't see a physician; 1,400 cases who visited a physician; 310 nonfatal cases who were hospitalized without developing the serious complication, hemolytic uremic syndrome (HUS); 80 nonfatal HUS cases; and 10 fatal HUS cases.

Plugging these outcome estimates into the Calculator and changing no other assumptions puts the estimated cost of STEC O157 infections due to contaminated ground beef at $71.4 million (in 2005 dollars).

What can I do?

1. Change the number of cases of illness or the distribution of cases by severity
2. Change assumptions about the use or costs of medical care
3. Change assumptions about the amount or value of time lost from work
4. Include estimates of the cost of pain and suffering
5. Change assumptions about the costs of premature death
6. Adjust for inflation for any year from 1997 to 2005
7. View results in two additional formats: outcome tree or pie chart

USDA United States Department of Agriculture
Economic Research Service
The Economics of Food, Farming, Natural Resources, and Rural America

Home | About ERS | Briefing Rooms | Publications | Data Sets | Newsroom | Help | Contact

You are here: Home / Data Sets / Foodborne Illness Cost Calculator / STEC O157

Data Sets

Foodborne Illness Cost Calculator: STEC O157

ERS cost estimate: STEC O157, all sources, 2005 dollars (6) — (7) Tree diagram | Pie chart

Cost component	Not hospitalized: Didn't visit physician; survived — Change per case costs for Severity 1	Not hospitalized: Visited physician; survived — Change per case costs for Severity 2	Hospitalized: Didn't have HUS[1]; survived — Change per case costs for Severity 3	Hospitalized: Had HUS but not ESRD[2]; survived — Change per case costs for Severity 4	Hospitalized: Had HUS and ESRD; survived — Change per case costs for Severity 5	Hospitalized: Didn't have HUS; died — Change per case costs for Severity 6	Hospitalized: Had HUS; died — Change per case costs for Severity 7	Total
(1) Number of cases (Change number of cases)	57,656	13,656	1,797	300	10	23	38	73,480
All illness	dollars							
(2) Medical:	147,991	4,094,750	10,202,955	10,313,802	7,124,106	130,406	1,306,290	33,320,300
Medications	147,991	223,994	85,248	8,347	389	908	932	467,810
Office visits	0	1,914,507	202,338	63,916	2,131	2,590	8,096	2,193,577
Emergency room	0	1,956,249	566,332	136,448	4,548	7,249	17,283	2,688,109
Hospitalization	0	0	9,349,036	10,105,092	336,836	119,659	1,279,978	21,190,602
Chronic medical	0	0	0	0	6,780,202	0	0	6,780,202
(3) Productivity, nonfatal	1,404,428	2,418,294	926,893	18,761	493,965	18,516	11,770	5,292,626
(4) Disutility, nonfatal	0	0	0	0	0	0	0	0
(5) Premature death	0	0	0	0	47,485,493	97,481,442	247,864,296	392,831,230
ERS total cost, 2005	1,552,420	6,513,044	11,129,848	10,332,563	55,103,563	97,630,363	249,182,356	431,444,157
ERS average cost per case, 2005	27	477	6,194	34,442	5,510,356	4,244,798	6,557,430	5,872

[1]Hemolytic uremic syndrome
[2]End-stage renal disease (with shortened life expectancy)

This article is drawn from . . .

ERS's Foodborne Illness Cost Calculator, available at: www.ers.usda.gov/data/foodborneillness/

STATISTICS

Data may have been updated since publication. For the most current information, see www.ers.usda.gov/publications/agoutlook/aotables/.

Farm, Rural, and Natural Resource Indicators

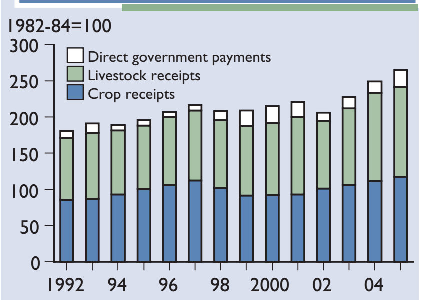
	2000	2001	2002	2003	2004	2005	Annual percent change 2002-03	2003-04	2004-05
Cash receipts ($ billion)	192.1	200.1	195.0	216.6	241.2	239.0 f	11.1	11.4	-0.9
Crops	92.5	93.3	101.0	111.0	117.8	114.1 f	9.9	6.1	-3.1
Livestock	99.6	106.7	94.0	105.6	123.5	124.9 f	12.3	17.0	1.1
Direct government payments ($ billion)	22.9	20.7	11.2	17.2	13.3	23.0 f	53.6	-22.7	72.9
Gross cash income ($ billion)	228.7	235.6	221.0	249.5	271.7	279.5 f	12.9	8.9	2.9
Net cash income ($ billion)	56.7	60.1	49.5	71.6	85.5	82.8 f	44.6	19.4	-3.2
Net value added ($ billion)	91.9	95.0	78.6	101.2	125.9	119.3 f	28.8	24.4	-5.2
Farm equity ($ billion)	1,025.6	1,070.2	1,110.7	1,180.8	1,293.9	1,376.9 f	6.3	9.6	6.4
Farm debt-asset ratio	14.8	14.8	14.8	14.4	13.8	13.4 f	-2.7	-4.2	-2.9
Farm household income ($/farm household)	61,947	64,117	65,761	68,597	81,480 p	83,461 f	4.3	18.8	2.4
Farm household income relative to average U.S. household income (%)	108.6	110.2	113.7	116.1	134.6 p	na	2.1	15.9	na
Nonmetro-metro difference in poverty rate (% points)	2.6	3.1	2.6	2.1	na	na	-19.2	na	na
Cropland harvested (million acres)	314	311	307	315	312	312 p	2.6	-1.0	0.0
USDA conservation program expenditures ($ bil.)[1]	3.3	3.7	4.2	4.3	5.1	na	2.4	18.6	na

Food and Fiber Sector Indicators

	2000	2001	2002	2003	2004	2005	2002-03	2003-04	2004-05
U.S. gross domestic product ($ billion)	9,817	10,128	10,470	10,971	11,734	12,487	4.8	7.0	6.4
Share of GDP in agriculture and related industries (%)[2]	4.8	4.8	4.8	4.8	4.8	na	0.0	0.0	na
Share of GDP in agriculture (%)[2]	0.7	0.7	0.7	0.8	1.0	na	11.1	19.2	na
Total agricultural imports ($ billion)[1]	38.9	39.0	41.0	45.7	52.7	57.7	11.5	15.3	9.5
Total agricultural exports ($ billion)[1]	50.7	52.7	53.3	56.2	62.4	62.4	5.4	11.0	0.0
Export share of the volume of U.S. agricultural production (%)	17.6	17.6	16.7	17.9	16.3	na	7.2	-8.9	na
CPI for food (1982-84=100)	167.9	173.1	176.2	180.0	186.2	190.7	2.2	3.4	2.4
Share of U.S. disposable income spent on food (%)	9.8	9.8	9.5	9.4	9.5	na	-1.1	1.1	na
Share of total food expenditures for at-home consumption (%)	51.7	51.7	50.8	50.3	49.7	na	-1.0	-1.2	na
Farm-to-retail price spread (1982-84=100)	210.3	215.4	221.2	225.6	232.1	238.3	2.0	2.9	2.7
Total USDA food and nutrition assistance spending ($ billion)[1]	32.6	34.2	38.0	41.8	46.2	50.9	10.0	10.5	10.2

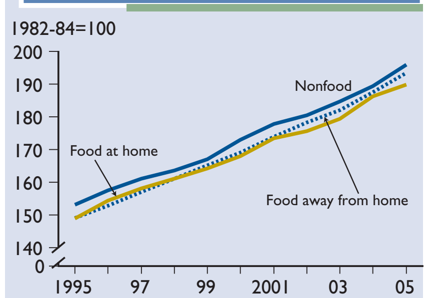
f = Forecast. p = Preliminary. na = Not available. All dollar amounts are in current dollars.
[1] Based on October-September fiscal years ending with year indicated.
[2] The methodology for computing these measures has changed. These statistics are not comparable to previously published statistics.
Sources and computation methodology are available at: www.ers.usda.gov/amberwaves/aggdp.htm

Revenue from farm commodities, 1992-2005

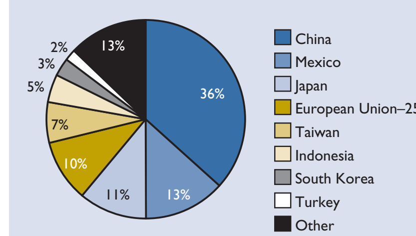


2005 forecast.

Consumer price indexes for food and nonfood items



Top export markets for U.S. soybeans, 2005



Total exports: $25.6 million

Behind the Data

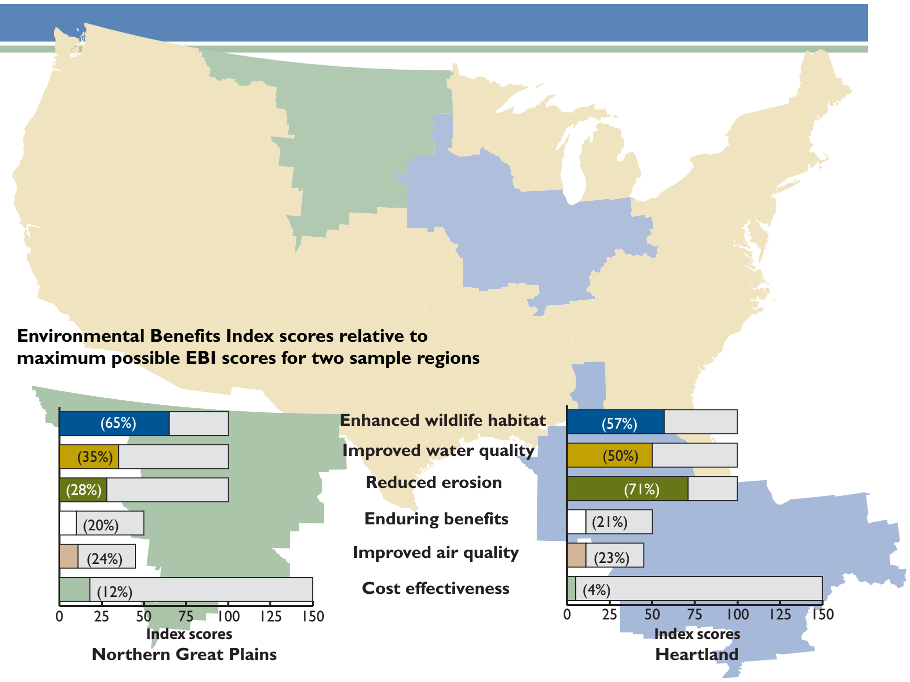
Measuring Potential Environmental Benefits in the CRP

Typically, programs to improve environmental performance on agricultural lands have multiple objectives, such as improving water quality and wildlife nesting grounds, and seek to achieve these objectives at the lowest cost. These programs often rely on voluntary participation and cost sharing to achieve these objectives. This means program managers need some way of choosing which program applications to enroll. An index that combines information about disparate environmental objectives and cost can serve this purpose. It can also be used to signal how well program objectives may be met.

USDA's Farm Service Agency (FSA) uses the Environmental Benefits Index (EBI) to evaluate and rank land offered for enrollment in the Conservation Reserve Program (CRP). The EBI aggregates different environmental objectives and a cost objective into a single number.

Points are first allocated to each objective based on the relative benefits of obtaining that objective. For example, the EBI in the 29th signup in 2004 included five environmental objectives. Three of these—enhancing wildlife habitat, improving water quality, and reducing erosion—were expected to provide relatively equal benefits and each was assigned 100 points, out of a total of 545 points. Improving air quality was expected to provide relatively fewer benefits, and this objective was allocated 45 points.

When an applicant offers to implement cover practices in any given signup, FSA evaluates them and assigns points based on the potential environmental benefits to be generated, or how well the practices are likely to contribute to each objective during the time the land is enrolled in the program. For example, an offer to plant a mixed stand of native grasses might earn 50 out of 100 points toward enhancing wildlife habitat, whereas planting one type of an introduced grass species might earn only 10 points. For each signup, FSA totals the points each offer earns toward each objective into a single summary EBI score. Offers are then enrolled based on which have the highest EBI scores until the program acreage cap is reached.



Environmental Benefits Index scores relative to maximum possible EBI scores for two sample regions

Note: Percentages equal the share of total possible EBI score/potential benefits provided by CRP contracts, on average, in signup 29 (2004).

The EBI reflects nationally determined priorities, and the same EBI is used to evaluate and enroll offers from across the country at the end of each signup. However, analysis of CRP data reveals that contracts vary by region in the environmental objectives they address. Even when contracts in different regions address the same objectives, contracts can have very different index scores, meaning they are likely to provide different levels of benefits in different regions. Scores for individual objectives, and thus potential benefits, can vary across regions due to inherent differences in land quality, as well as in the types of practices that producers find profitable to implement in exchange for the program payment.

EBI scores for each objective also reveal how much of the total possible benefits are likely to be achieved in the signup. Regions with contracts that average 50 out of 100 points for a particular objective provide 50 percent of that objective's total potential benefits.

Cynthia Nickerson,
cnickerson@ers.usda.gov

For more information . . .

Balancing the Multiple Objectives of Conservation Programs, by Andrea Cattaneo, Daniel Hellerstein, Cynthia Nickerson, and Christina Myers, ERR-19, USDA, Economic Research Service, May 2006, available at: www.ers.usda.gov/publications/err19/

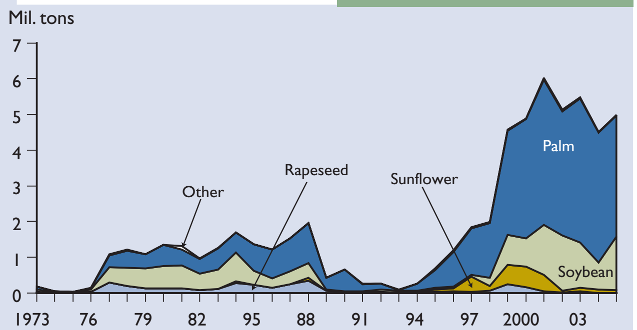
"Land Retirement," Chapter 6.2 in *Agricultural Resources and Environmental Indicators*, by Mark Smith, USDA, Economic Research Service, December 2000, available at: www.ers.usda.gov/publications/arei/ah722/arei6_2/arei6_2landretire.pdf

"Environmental Benefits Index," USDA, Farm Service Agency, September 1999, available at: www.fsa.usda.gov/pas/publications/facts/ebiold.pdf

STATISTICS

Markets and Trade

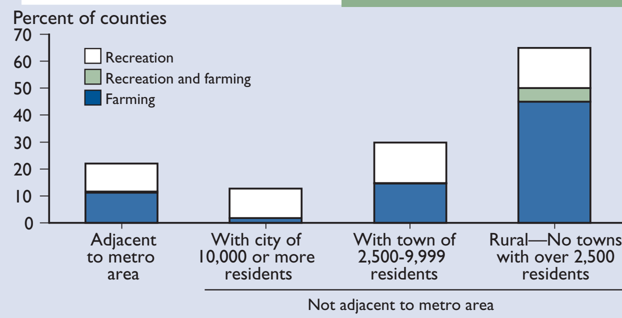
Palm oil dominated India's edible oil imports



Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution database.

Rural America

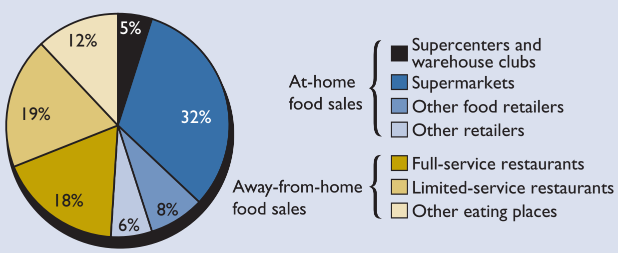
The most remote rural counties are more likely to depend heavily on both recreation and farming, 2000



Source: USDA, Economic Research Service, using data from the 2000 Census of Population.

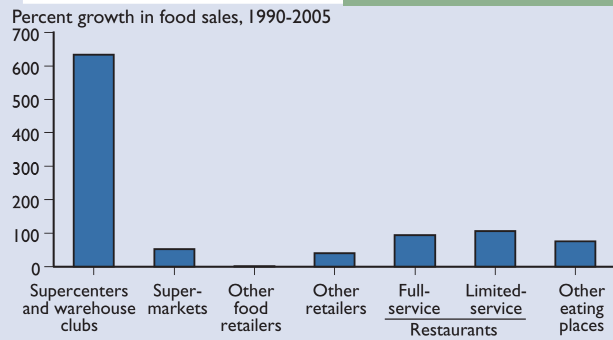
Diet and Health

Supercenters and warehouse clubs accounted for just 5 percent of total food sales in 2005…



Source: USDA, Economic Research Service, Food Expenditure Series.

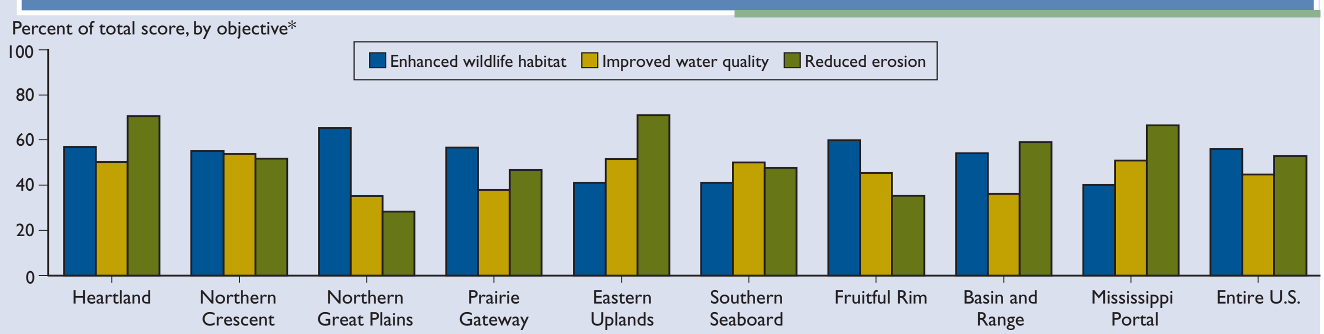
…but they were the fastest growing category over the last 15 years



Source: USDA, Economic Research Service, Food Expenditure Series.

Resources and Environment

Environmental objectives addressed by Conservation Reserve Program contracts vary by region



*The heights of the bars represent the percent of the total possible score for each of three Environmental Benefits Index objectives that was achieved by CRP contracts in each region, on average, in the 29th signup. Percentages can sum to greater than 100% within a region because each contract can address multiple objectives.

Source: USDA, Farm Service Agency contract data from Conservation Reserve Program, 29th signup (2004). See "Behind the Data" on page 41.

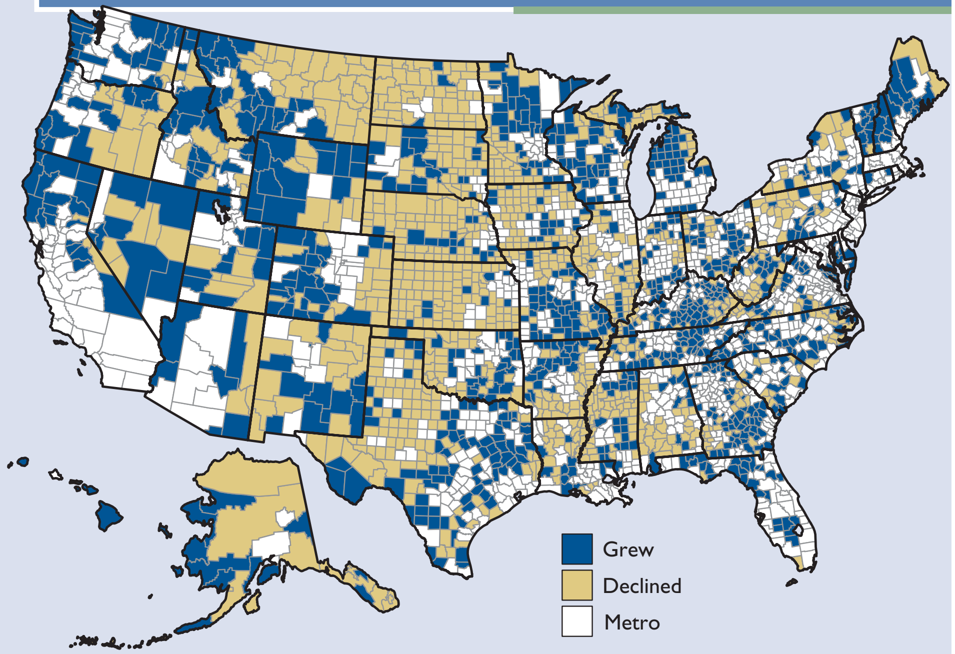
On The Map

Nonmetro county population change, 2000-05: Half grew, half declined

In the first half of the current decade, nonmetro America was almost evenly split between counties that grew in population (1,024) and those that declined (1,027). Declining counties contain only 34 percent of all nonmetro residents, however, because most are sparsely settled. Therefore, despite declining population in so many counties, total nonmetro population grew by 1.1 million from April 2000 to July 2005, to a total of 49.9 million.

Calvin L. Beale
cbeale@ers.usda.gov

Direction of nonmetro county population change, 2000-05



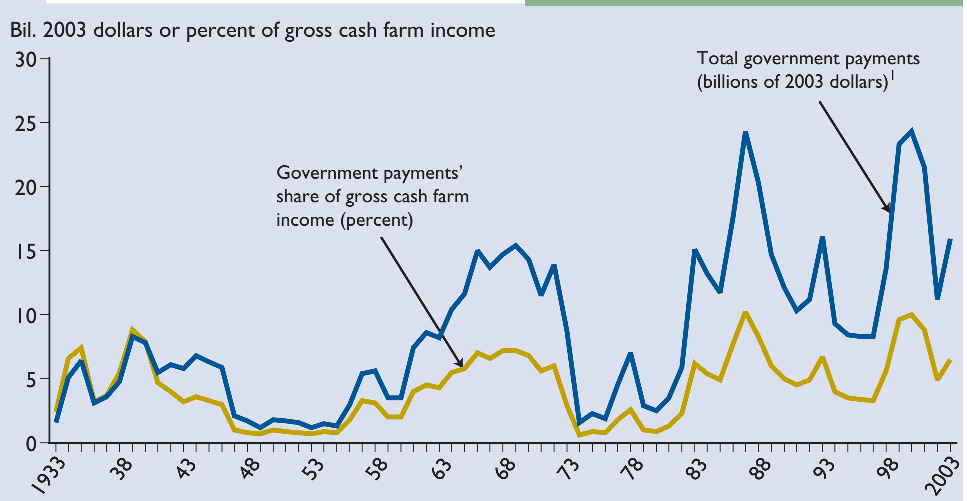
Source: Prepared by Economic Research Service using Census Bureau 2005 population estimates, available on the ERS website at www.ers.usda.gov/data/population/.

In the Long Run

Government payments peaked twice at $24 billion, measured in 2003 dollars. The first peak occurred in 1987, just after the end of the farm financial crisis. The second peak occurred in 2000, due to payments enacted by Congress in response to falling export demand and regional crop failures. Payments also spiked at $14 billion in 1993, due largely to high feed grain production and disaster payments for droughts and floods.

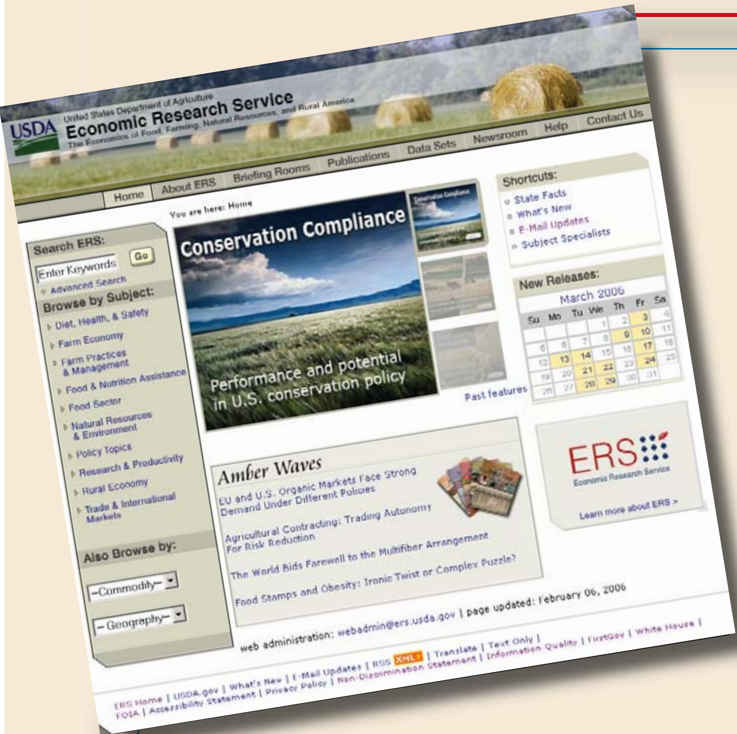
Robert A. Hoppe,
rhoppe@ers.usda.gov
David E. Banker,
dbanker@ers.usda.gov

Government payments and their share of gross cash farm income, 1933-2003



[1]Deflated with GDP chain-type price index. Deflating with the GDP price index shows the purchasing power of government payments.

Source: USDA, Economic Research Service, U.S. and State Farm Income Data, as reported in *Structure and Finances of U.S. Farms: 2005 Family Farm Report* (EIB-12), May 2006.



The **ERS** website has gotten a *makeover . . .*

Our new look includes improvements that should help you find information faster:

- **Simpler navigation**
- **A more information-rich homepage**
- **Information presented by subject, commodity, or geography**

Our content has not changed—you'll get the same great information, including:

- **Briefing rooms** ***(syntheses of ERS research on important topics)***
- **Data products** ***(the numbers behind the analyses in the formats you choose)***
- **Publications** ***(in-depth analysis, free online)***

Check out the new design at *www.ers.usda.gov*