Introduction

About ERS

The Economic Research Service (ERS) is a primary source of economic information and research in the U.S. Department of Agriculture. The agency's 250 social scientists, most of them Ph.D. economists, conduct research to inform public and private decisionmaking on economic and policy issues involving food, farming, natural resources, and rural development.

The ERS mission is to anticipate policy issues and conduct sound peer-reviewed economic research. By the time the issues reach the policy agenda, our research is at hand to give additional, dispassionate perspective to the issues. We do not make recommendations; our research is intended to demonstrate the economic outcomes of alternative policies or programs so as to highlight the consequences of any one policy decision.

Our mission to inform policy requires not just the capability to conduct high-quality research but also the capability to get the research to the right audience in the right format. To this end, ERS researchers publish their findings in a variety of publications, ranging from articles in our popular and award-winning magazine, *Amber Waves*, to individual research monographs, to peer-reviewed professional journals. And our Website (www.ers.usda.gov) provides a comprehensive storehouse of ERS research findings going back more than a decade.

About This Book

This book contains a sampling of recent ERS research illustrating the breadth of the Agency's research on current policy issues: from biofuels to food consumption to land conservation to patterns of trade for agricultural products. What you won't find in this collection is any mention of economists' favorite analytic tools (regression analyses, for example, and coefficients of variation). We wanted this guide to highlight results, not process. Even so, the findings on display here are all based on rigorous and robust application of such tools as well as use of the latest econometric techniques.

If the samples presented here whet your appetite for a fuller platter of ERS research, be sure to visit our website, where you'll also find more information about our agency and contact information for agency specialists.

www.ers.usda.gov

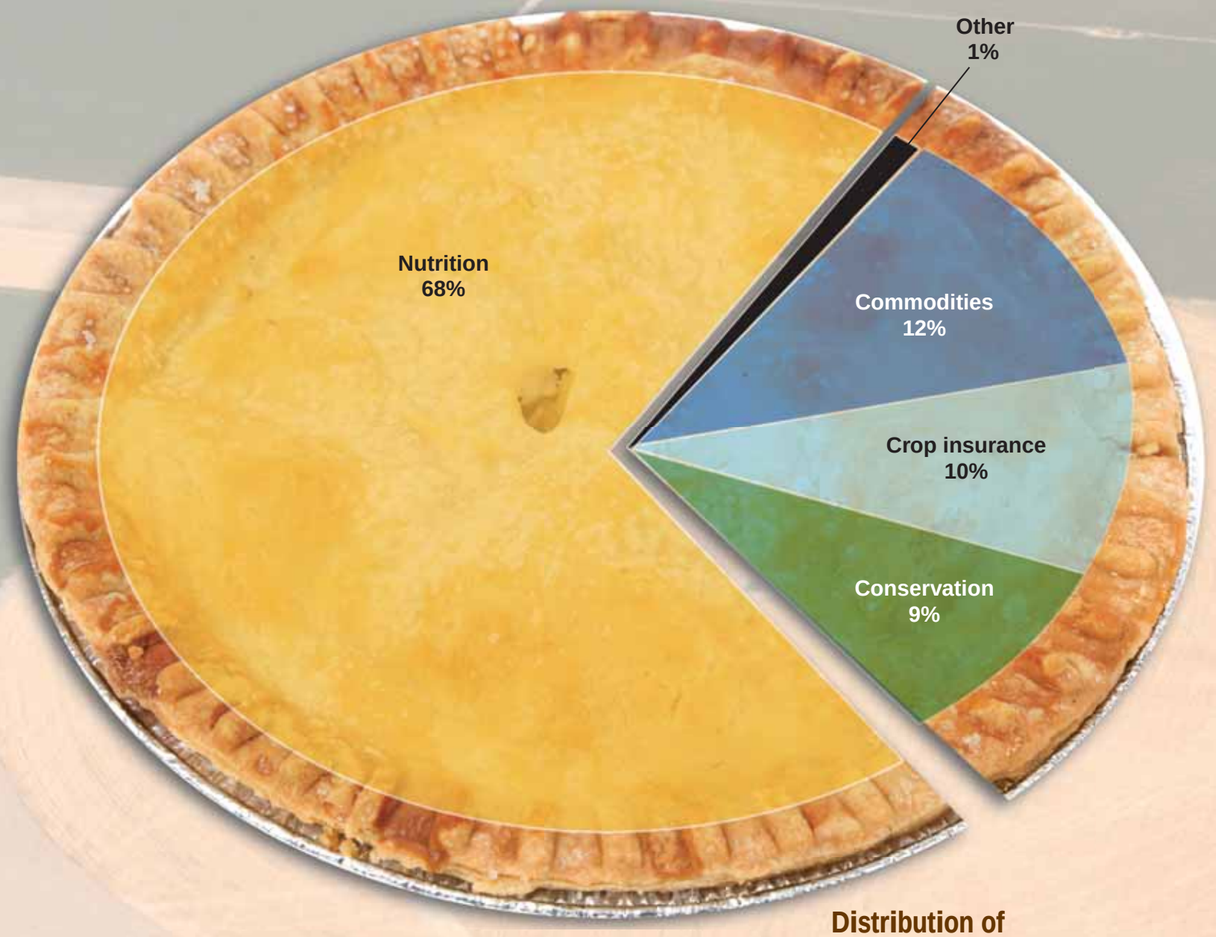
Katherine R. Smith
Administrator, Economic Research Service

USDA's Farm Act Funds

2008 Farm Act*
How the pie gets sliced

- **Conservation Programs:** Remove environmentally sensitive land from production and encourage farmers to farm in an environmentally sensitive manner.
- **Commodity Programs:** Help farmers deal with price and income variations. A new Average Crop Revenue Program is introduced.
- **Crop Insurance:** Allocations were not included in 2002 Farm Act, but now make up 10 percent under the 2008 Farm Act.
- **Nutrition:** Expands eligibility for Food Stamp Program (renamed Supplemental Nutrition Assistance Program beginning in fiscal year 2009) and increases benefits. Increases funding for the Fresh Fruit and Vegetable Program in participating elementary and secondary schools.

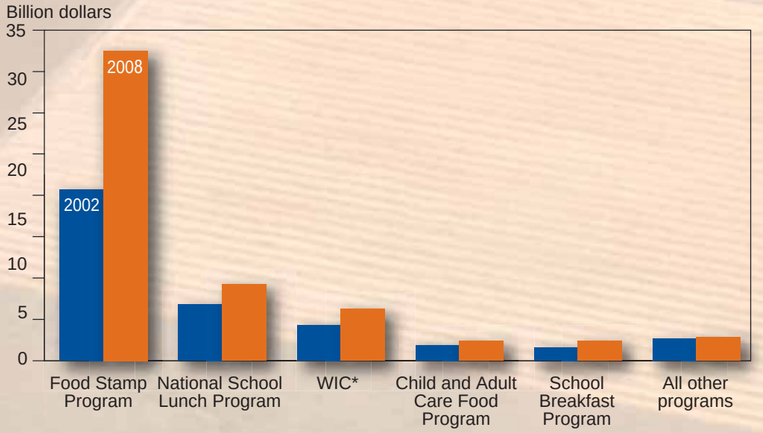
*The Food, Conservation, and Energy Act of 2008.



Distribution of Farm Act funds

Total spending under the 2008 Farm Act is estimated at $781 billion over 10 years.

USDA nutrition expenditures, by assistance program

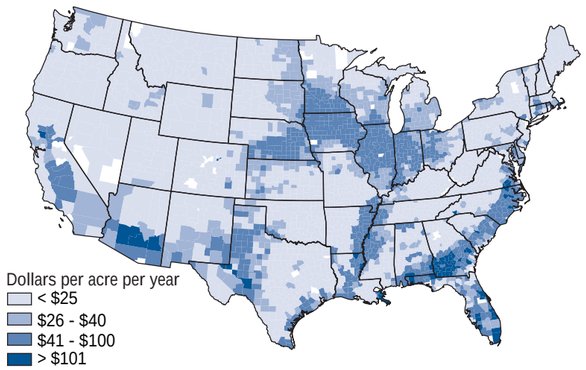


*Special Supplemental Nutrition Program for Women, Infants, and Children

The Food Stamp Program (SNAP) is the cornerstone of USDA's food assistance programs, accounting for 62 percent of total expenditures in 2008.

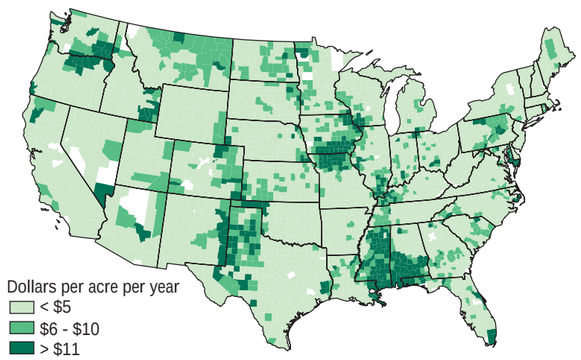
Expenditures Expected to Follow History

Average Commodity Payments and Crop Insurance Subsidies per Cropland Acre, 2004-2007



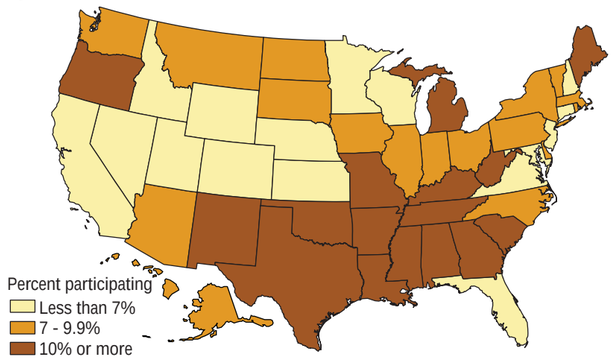
High commodity payments and crop insurance subsidies were concentrated in major producing areas: Corn Belt (corn and soybeans), Southeastern Coastal Plains (cotton and peanuts), California (cotton and rice), Arizona (cotton), and the lower Mississippi River (cotton and rice).

Average Conservation Payments per Cropland Acre, 2004-2007



Conservation payments, per acre of cropland, tend to be largest in the High Plains where soils are susceptible to wind erosion, parts of the Intermountain West, and where land is hilly and prone to rainfall erosion.

Percent of Population Participating in the Food Stamp Program, by State, FY 2007



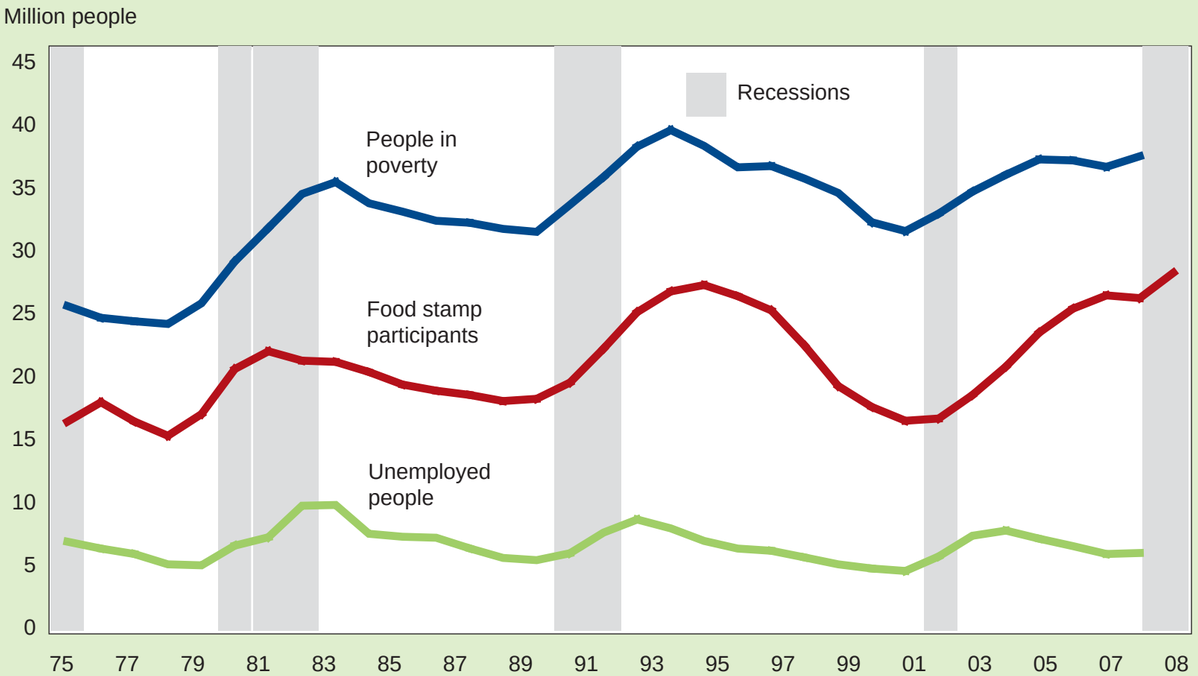
In a typical month in FY2007, about 9 percent of Americans participated in the Food Stamp Program. In general, a greater proportion of the population in southern States participated in the program.

ERS research and analysis address both the near- and longer-term economic aspects of complex policy-oriented issues related to farm commodities, risk management, food and nutrition, and conservation. ERS analysis draws on economic modeling tools and information technology to help decisionmakers compare alternative policy options.

For more information, see the ERS Website: www.ers.usda.gov/ . . .
. . . Briefing/FarmPolicy/ (Farm and Commodity Policy); . . . Briefing/RiskManagement/ (Farm Risk Management); . . . Briefing/FoodNutritionAssistance/ (Food Assistance and Nutrition);…Briefing/ConservationPolicy/ (Conservation Policy)

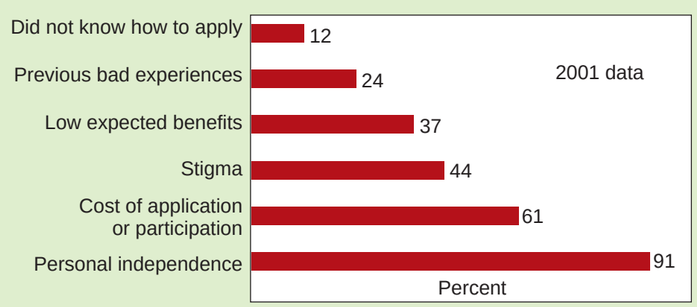
About 1 in 5 Americans participates in at least one of USDA's nutrition assistance programs during the year

A 1-percentage-point increase in the unemployment rate resulted in about 700,000 more food stamp recipients during the first year and about 1.3 million additional recipients in the long run. (The Food Stamp Program was renamed the Supplemental Nutrition Assistance Program beginning in fiscal year 2009.)

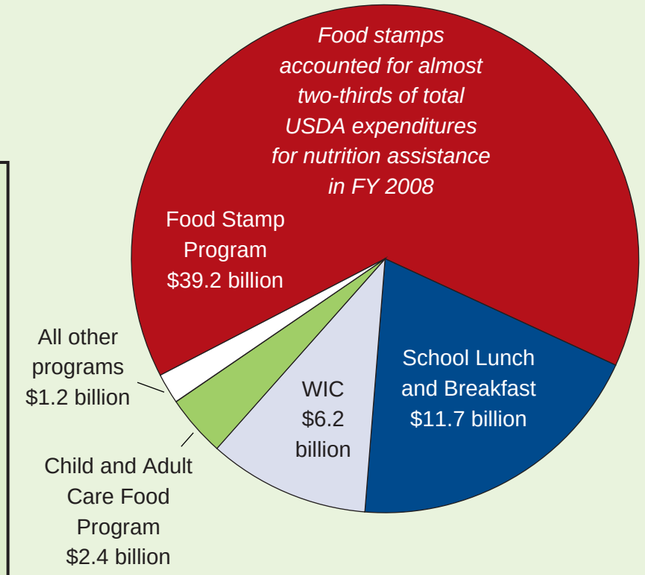


The Food Stamp Program responds quickly to natural disasters. An ERS study estimated that economic effects from Hurricanes Katrina, Rita, and Wilma in the Gulf Coast increased total food stamp benefits by $1.2 billion in FY 2005.

Major reasons why, historically, almost one in three people eligible for the Food Stamp Program does not participate.

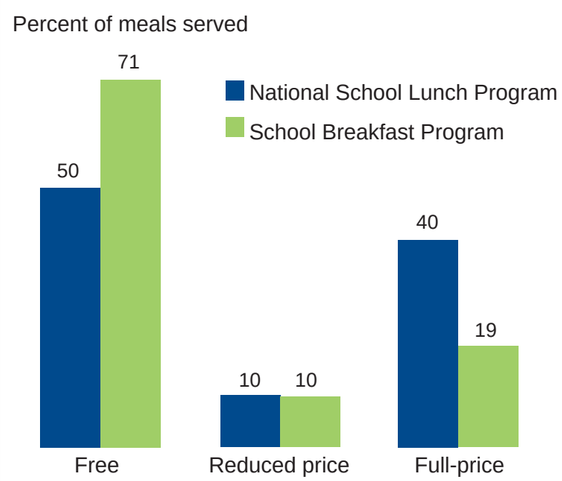


The Food Stamp Program acts as a fiscal stimulus. ERS estimates that every dollar of food stamp benefits stimulates $1.84 of economic activity.



USDA's investment in the nutrition assistance safety net totaled $60.7 billion in FY 2008 about 64% of the Department's total outlays

About 55% of all schoolchildren participated in the National School Lunch Program on a typical schoolday in FY 2007



Half of all school lunches and 71% of all school breakfasts were served free in FY 2008.

Over half of all infant formula sold in the United States is purchased through the WIC program*

- About half of all infants born in the United States participate in the WIC program.
- Breastfeeding rates are lower among WIC women than among non-WIC women.
- WIC receives significant rebates ($1.8 billion in FY 2007) from infant formula manufacturers.
- Infant formula rebates allow WIC to support about 25% more participants than it otherwise could.

*Special Supplemental Nutrition Program for Women, Infants, and Children.

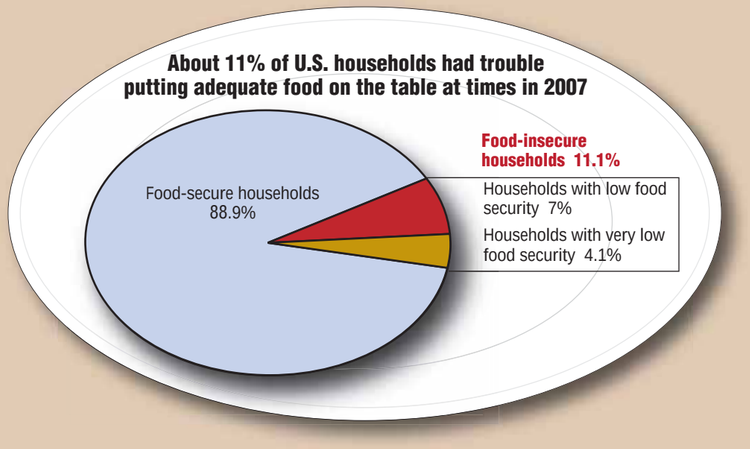
ERS's Food Assistance and Nutrition Research Program (FANRP) is the premier source of economic research on food assistance and nutrition and USDA's nutrition assistance programs in the United States. FANRP research addresses topics such as program participation and the macroeconomy, diet quality and obesity, and food insecurity.

For more information, see the ERS Website:
Food Assistance and Nutrition Programs, www.ers.usda.gov/briefing/foodnutritionassistance/

Who Has Trouble Putting Food on the Table?

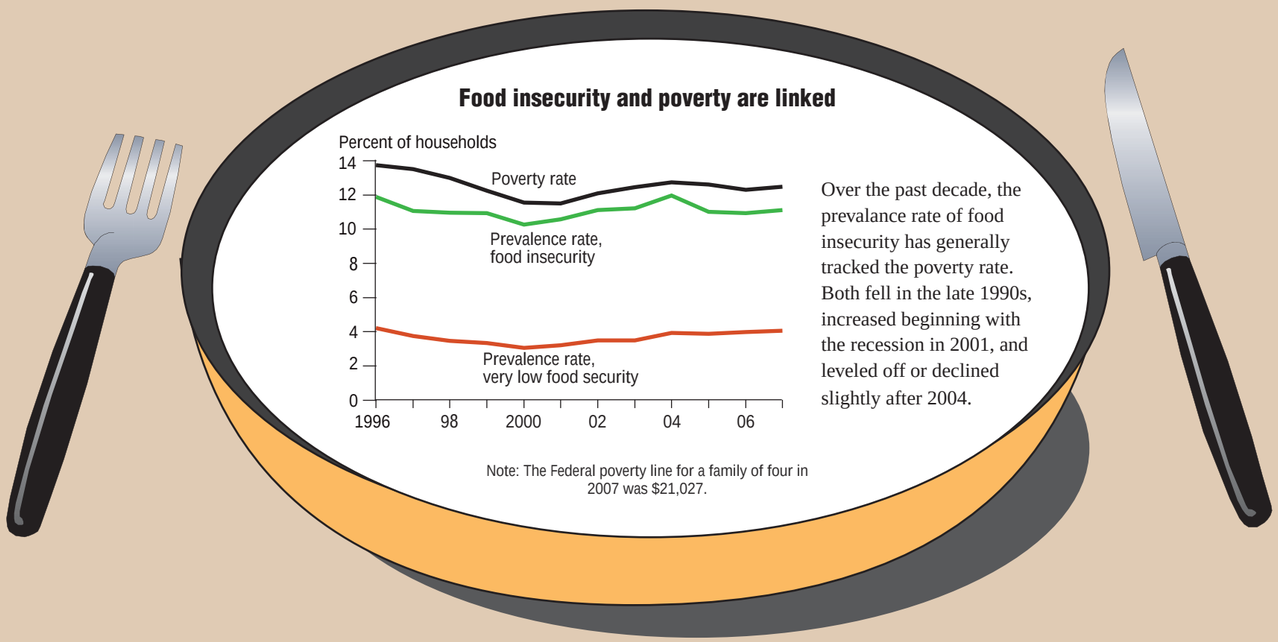
Most U.S. households have consistent, dependable access to enough food for active, healthy living.

But **about 11% of U.S. households were food insecure in 2007**, meaning that at times during the year their access to adequate food was limited by a lack of money and other resources.

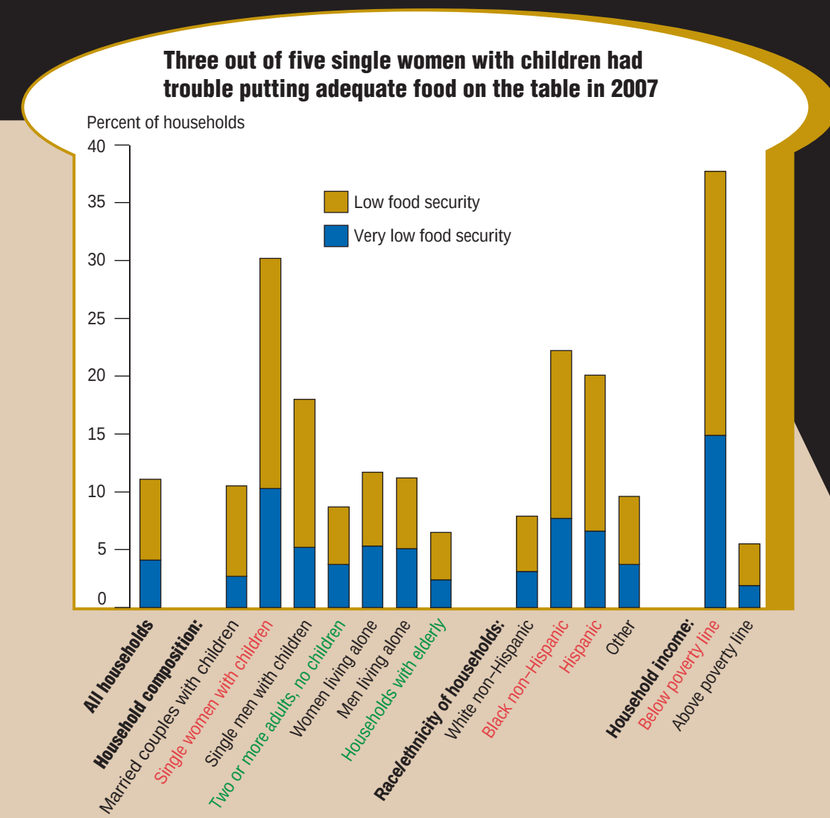


About one-third of food-insecure households had very low food security. In these households, the food intake of some members was reduced and their normal eating patterns disrupted because of the household's food insecurity. The other two-thirds of food-insecure households obtained enough food to avoid substantial disruptions in eating patterns and food intake.

Children are usually protected from the worst effects of food insecurity. In 2007, less than 1% of households with children had very low food security among the children.

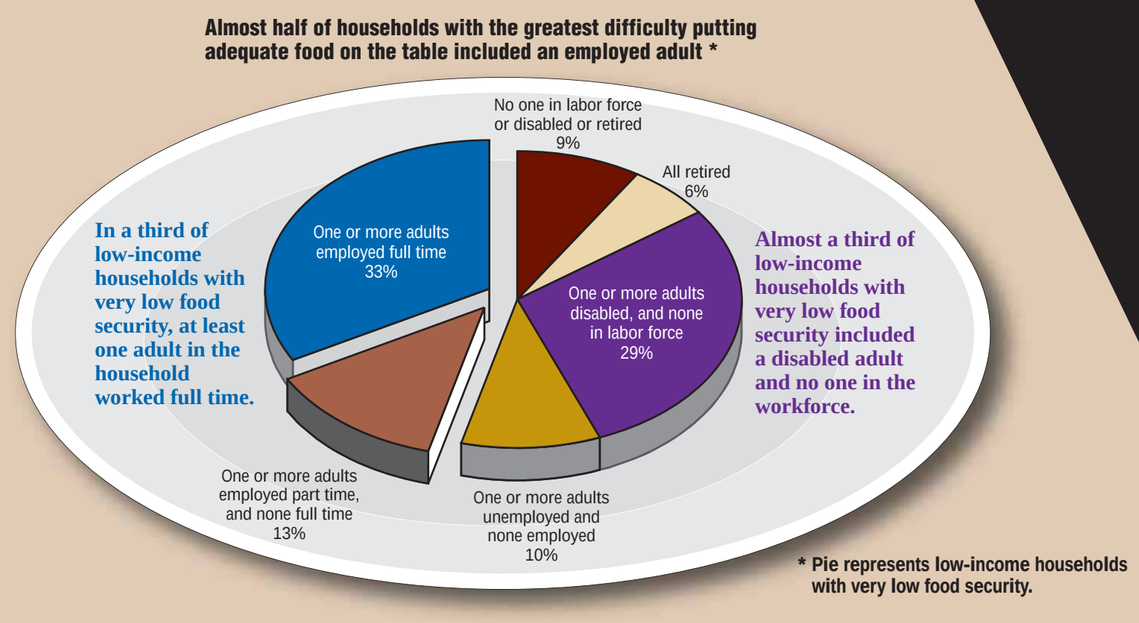


Over the past decade, the prevalance rate of food insecurity has generally tracked the poverty rate. Both fell in the late 1990s, increased beginning with the recession in 2001, and leveled off or declined slightly after 2004.



Food insecurity is least prevalent in households consisting of two or more adults with no children and in households with one or more elderly members.

Rates are substantially higher than the national average for single parents with children, Black and Hispanic households, and households with incomes below the poverty line.



* Pie represents low-income households with very low food security.

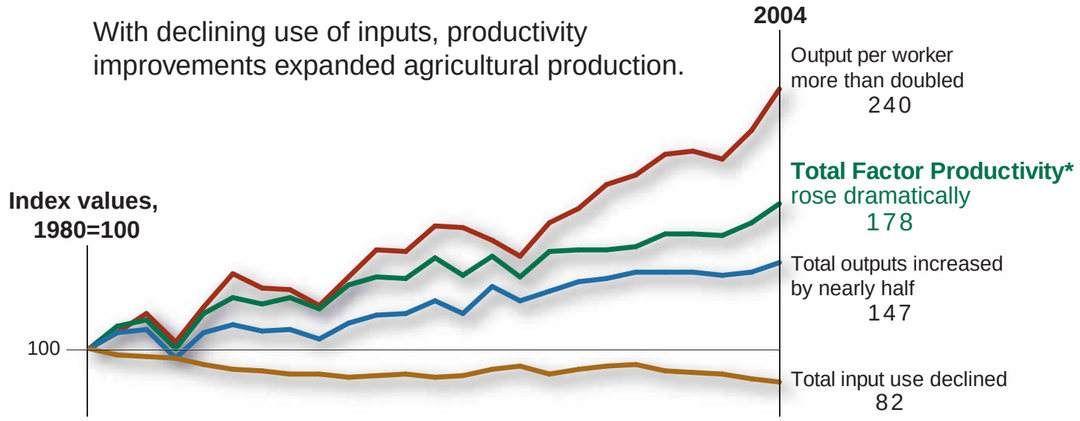
ERS monitors the food security of U.S. households and plays a lead role in research on household food security. Each year ERS publishes a report providing USDA's annual statistics on the food security of U.S. households at the State and national levels.

For more information, see the ERS Website:
Food Security in the United States, www.ers.usda.gov/briefingfoodsecurity/

Higher productivity drives growth in U.S. agriculture

More output per unit of input

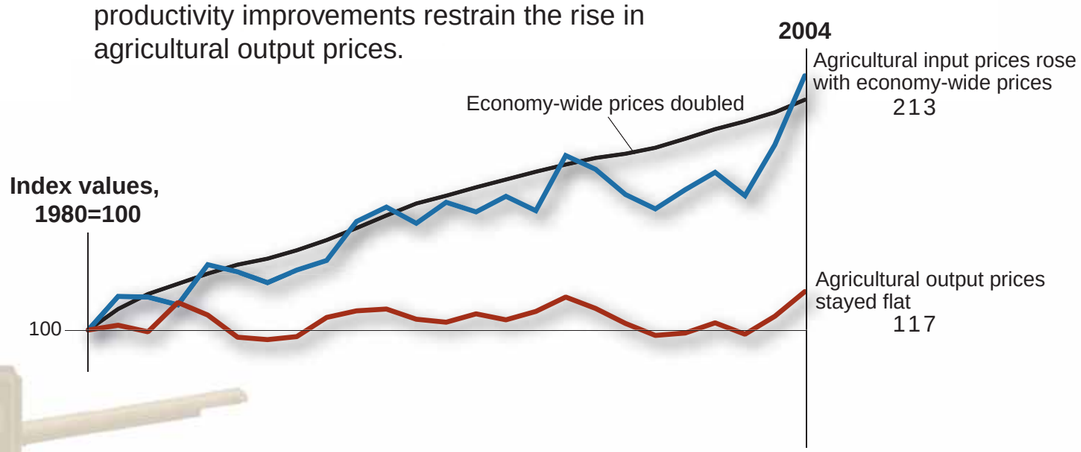
With declining use of inputs, productivity improvements expanded agricultural production.



***Total Factor Productivity** measures the output per unit of *all* inputs combined.

Lower costs to produce commodities

Even as prices for agricultural inputs rise, rapid productivity improvements restrain the rise in agricultural output prices.



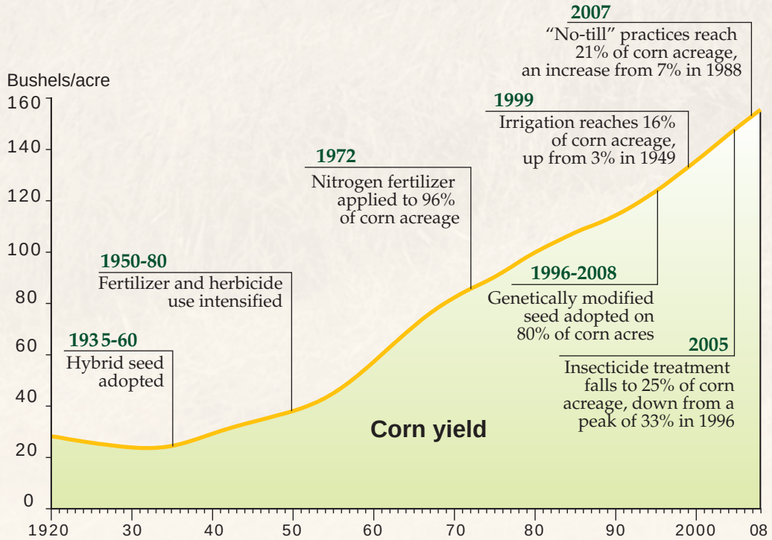
Technological advances brought about by agricultural research and development have both improved yields and reduced input requirements. Public agricultural research investments are responsible for about half of the measured productivity gain in U.S. agriculture.

Innovations in farm business size, organization, structure, and management further reduced the costs of production, keeping commodity prices low.

CROP EXAMPLE

Corn yield and technical change

U.S. corn yields averaged less than 30 bushels/acre until the mid-1930s, when the first of a series of major technical innovations—hybrid seed—was introduced. The switch to hybrid seed ushered in an era of steady improvement to corn cultivars grown by farmers and put yields on a growth path of about 2% per year. By 2008, average U.S. corn yield reached 155 bushels/acre, and the rate of growth showed little sign of slowing down.



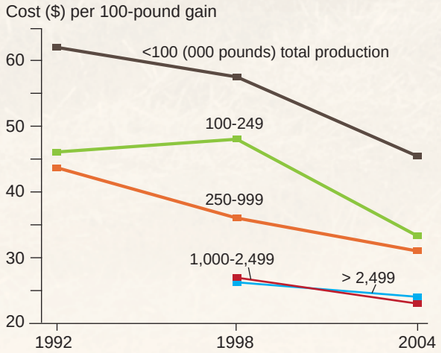
LIVESTOCK EXAMPLE

Hog operations and productivity growth

Productivity changes in hog production have been spurred by economies of scale and technological innovations . . .

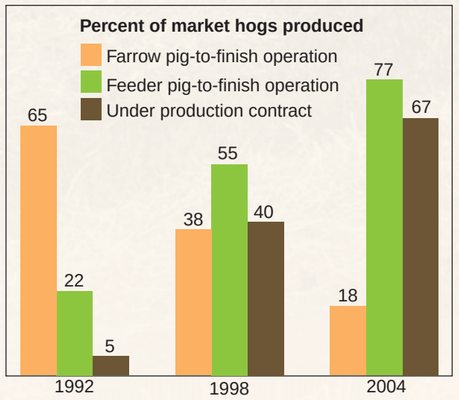
Farmers within the same size category are able to lower production costs over time.

In any year, larger operations produce hogs at a lower unit cost than smaller operations.



. . . and organizational innovations

Traditional farrow-to-finish operations have given way to large operations that specialize in one of the three major life-cycle phases of production, such as feeder to finish. Rise of production contracts between growers and owners has facilitated specialization.



ERS is a leading source of data and economic analysis on agricultural productivity trends, the economic impacts of agricultural research and development, as well as factors influencing the adoption of new technologies and practices by U.S. farm operations and their economic effects.

For more information, see the ERS Website:
Agricultural Productivity in the U.S., www.ers.usda.gov/data/agproductivity/

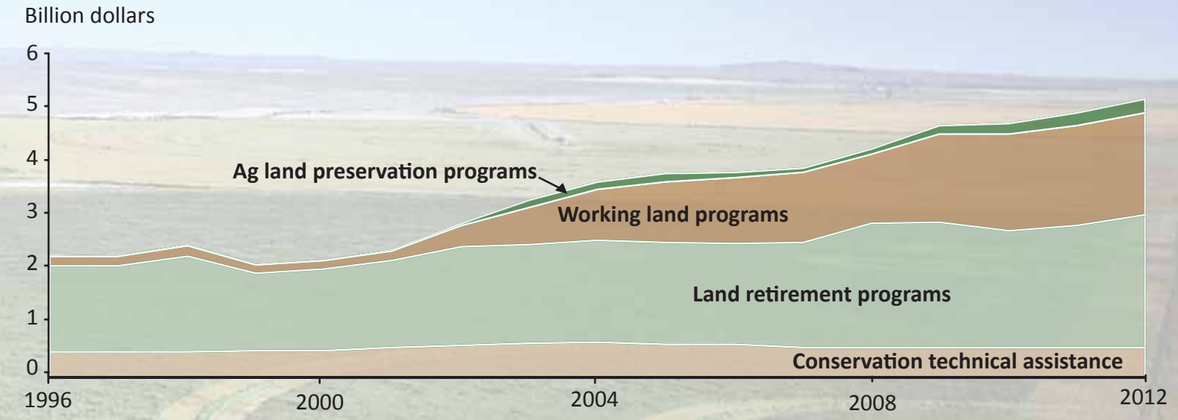
Transforming "Working Lands" Conservation Budgets into Environmental Gains

Since 2002, Federal expenditures have increased for all major conservation programs, though the majority of new money has gone to "working land" programs that support conservation on farmland.

Spending increases alone, however, do not guarantee cost-effective returns. The details of conservation program design—eligibility rules, participation incentives, and rules for accepting (or rejecting) applications—can help ensure that program funding goes to those in the best position to make environmental improvements.

Program designers can maximize returns by targeting producers, land, and practices that deliver a high level of environmental gain per dollar of program payment. Conservation program enrollment can be seen as a "winnowing" process to determine who participates and, ultimately, program outcomes, including changes in environmental quality and farm income.

Spending for Major USDA Conservation Programs



Conservation Program Enrollment as a Winnowing Process

Step 1 — Government Request for Proposals (Signup Notice)

The government tells producers:

- Who is eligible to participate
- What practices could be funded
- How much could producers be paid

Some programs allow applicants to "bid down" to improve enrollment chances; others offer fixed-cost share rates and incentive payments.

- What application ranking or targeting criteria will be used

Some programs rank by potential environmental gain and cost; others take applicants on a first-come, first-served basis.

Step 2 — Producers' Application Decision

Eligible producers tell the government:

- Which conservation treatments they are willing to apply (if any) and on which fields or livestock enterprises.
- Payment they would be willing to accept (if asked to bid on financial assistance).

Step 3 — Government Contract Acceptance Decision

The government uses information in the applications to:

- Estimate environmental gain
- Rank offers for acceptance
- Accept contracts until the program budget is exhausted

When budget constraints limit the number of applications that can be accepted, producer offers can be prioritized by outcome potential and contract cost can be prioritized by their environmental outcome potential and contract cost.

Step 4 — Program Outcomes

Environmental gains depend upon:

- Producers' willingness to participate
- The government's ability to maximize environmental gain given limited program budgets

Key features of a cost-effective program may include:

- Competitive bidding to encourage producers to offer land and practices that yield high environmental gain at low cost.
- Environmental benefit/cost ranking to ensure that high-benefit, low-cost applications are accepted.

Conservation of environmental resources is a major goal of USDA. ERS provides economic research on the efficiency, effectiveness, and equity of policies and programs directed toward improving the environmental performance of working farmland.

For more information, see the ERS Website:
Conservation Policy Briefing Room, www.ers.usda.gov/briefing/conservationpolicy/

U.S. Farms — Large and Small

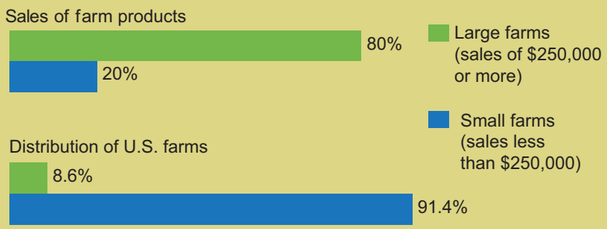
Most farms are small, selling less than $250,000 of farm products per year. Small farms also own most farm assets—including farmland—and receive three-fourths of payments from conservation-related farm programs. Sales, in contrast, are concentrated among large farms, especially the 37,300 "million-dollar farms" selling at least $1 million of farm products per year. The share of sales by million-dollar farms has grown, doubling since the early 1980s.

High profit margins give larger farms a competitive advantage, which explains the shift of production to million-dollar farms. Many small farms stay in the business because the farm household receives enough off-farm income so that their livelihood does not depend on farming. Only $1,000 of farm sales is necessary to be defined as a farm. Thus many small farms are more like rural residences than farm businesses.

Distribution of farms and sales of farm products, 2007

Farms with sales of at least $250,000 make up only 9% of farms, but account for 80% of total sales.

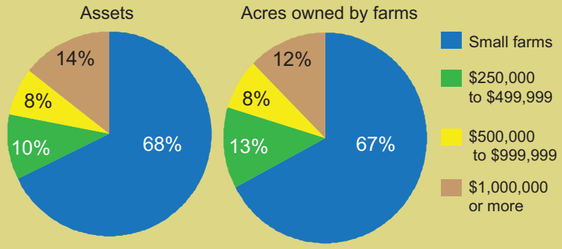
Ninety-one percent of all farms are small, but large farms sell 80% of all farm products. Many small farms actually are rural residences. Nevertheless, small farms account for one-fourth or more of the production of specific commodities, including grains and oilseeds, hay, tobacco, and beef.



Share of farm assets and acres owned by farms, 2007

Small farms hold most farm assets (including land)

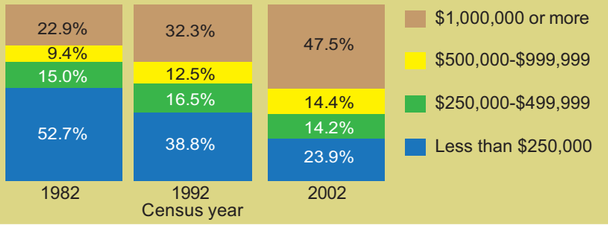
Small farms still play a role in U.S. agriculture. They hold two-thirds of farm assets and a similar share of the land owned by farms. They also receive a significant share of farm program payments—76% of conservation-related payments and 35% of commodity-related payments.



Farm product sales, by constant-dollar sales class (2002 dollars), 1982-2002

Million-dollar farms' share of sales has grown since the early 1980s

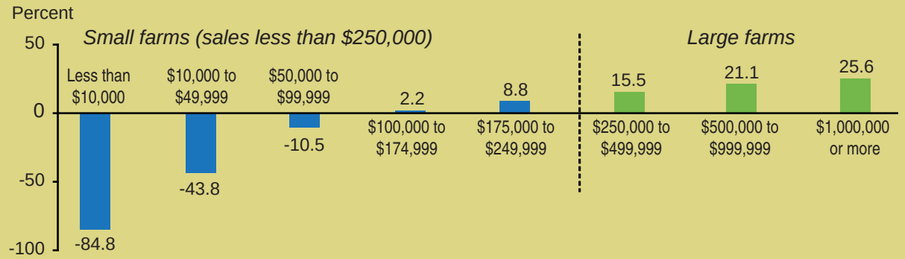
Million-dollar farms' share of farm product sales doubled from 23 percent in 1982 to 48% in 2002. Million-dollar farms now produce at least half of specialty crops, beef, hogs, milk, and poultry.



Operating profit margin, 2007

Operating profit margins increase with sales

Average operating profit margins are negative until sales exceed $100,000. Higher average profit margins give larger farms a competitive advantage that helps explain the upward shift in production.

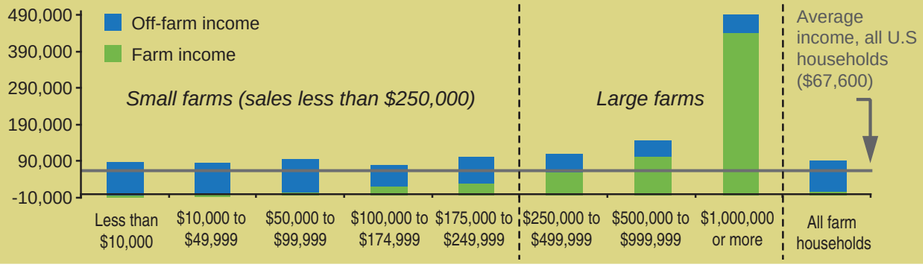


Operating profit margin = 100% X (net farm income + interest paid – charge for unpaid operators' labor and management)/gross farm income

Average income of farm operator households, 2007

Total operator household income increases with sales for large farms

Households operating small farms typically rely on off-farm income for their living. They produce little or no product and may lose money farming.



ERS provides data and analysis on the structure of the U.S. farming sector, farm financial performance, and the characteristics of farm operator households. A prime data source is USDA's Agricultural Resource Management Survey (ARMS), which allows the development of accounts for both the farm business and farm household.

For more information, see the ERS Website:
Farm Structure, www.ers.usda.gov/briefing/farmstructure/
Agricultural Resource Management Survey, www.ers.usda.gov/Briefing/ARMS/

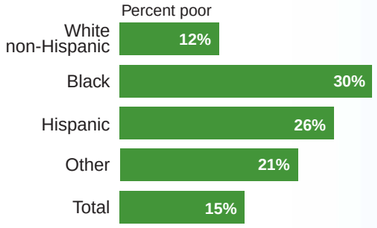
Racial and Ethnic Diversity is Increasing in Rural America

The face of rural and small-town America has slowly evolved as racial and ethnic diversity increases. Racial and ethnic minorities now make up 19% of nonmetro residents and have become more geographically dispersed across the Nation.

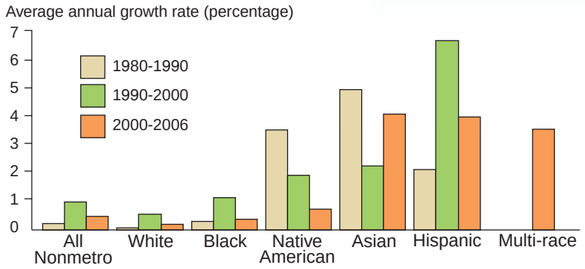
Hispanics and Asians are the fastest growing minority groups in the United States as a whole and in nonmetro areas. Higher growth rates partly result from a growing demand for low-skill labor and changes in 1960s era U.S. immigration laws that favored immigration from non-European countries.

Because immigrants tend to be young adults, they are more likely to form families and have children, cementing their presence in rural communities. On the other hand, minority populations tend to experience higher rates of poverty, potentially straining social service programs.

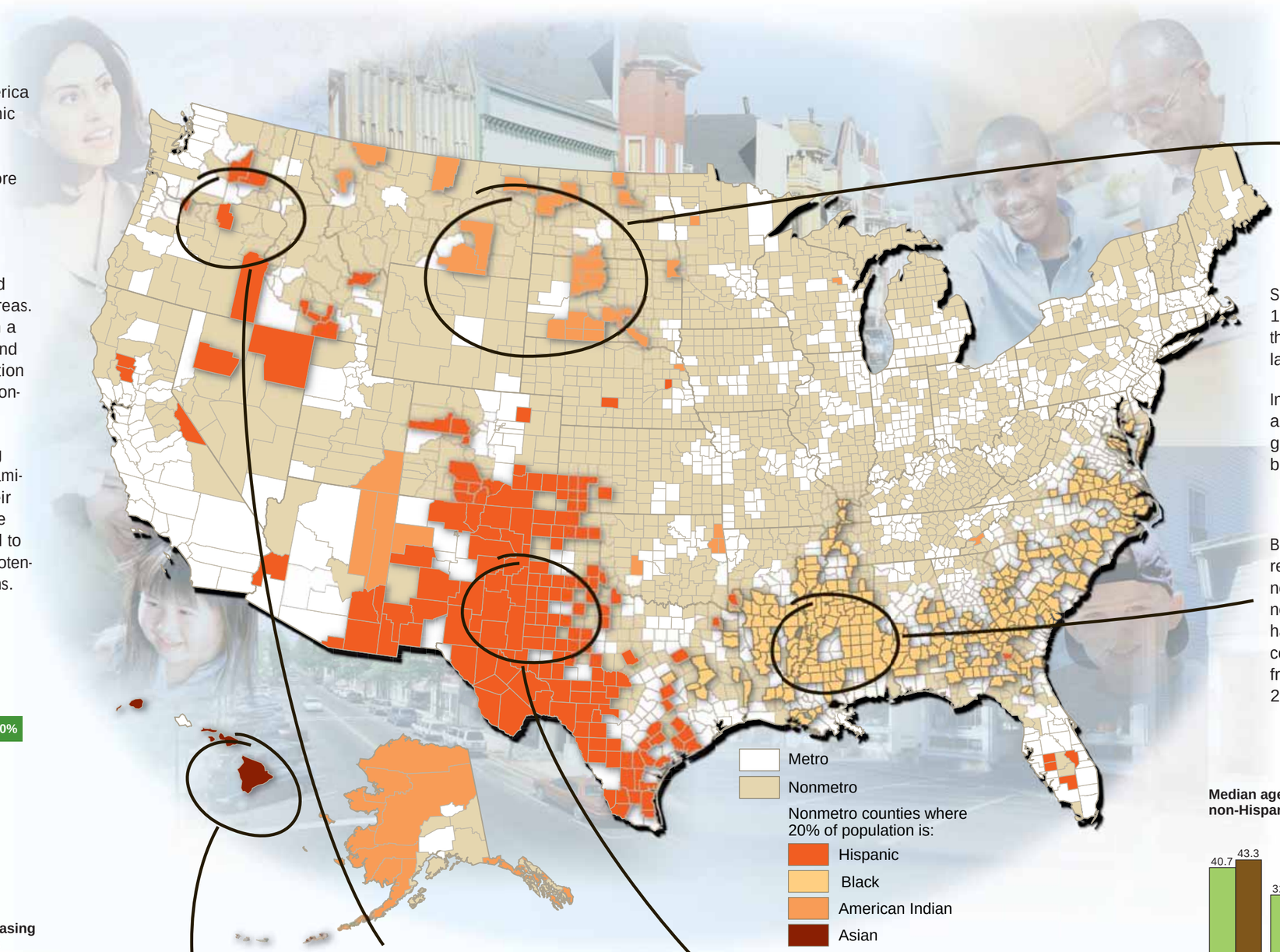
Blacks and Hispanics have the highest rates of nonmetro poverty



Nonmetro minority populations are increasing at higher rates than non-Hispanic Whites



Note: Multi-race data available since 2000 only.



Native American population growth from 1980 to 2000 resulted largely from more people reporting Native American heritage on their Census forms.

Since 2000, the minority population in 1,727 nonmetro counties (84% of the total) has increased and become a larger share of county population.

In roughly 150 nonmetro counties scattered across the country, the Hispanic population growth offset non-Hispanic population loss between 2000 and 2006.

Blacks, concentrated in the deep South, remain the largest minority group in nonmetro areas, making up 8.4% of all nonmetro residents in 2006. This figure has hardly changed since 1980. In contrast, the Hispanic proportion grew from 3.1% in 1980 to 6.4 percent by 2006.

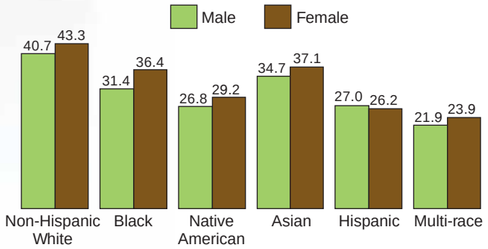
In recent decades, Hispanics have moved to the Pacific Northwest, attracted by jobs in labor-intensive fruit, vegetable, and horticultural sectors.

Asians, among the smaller minority populations, are concentrated in the state of Hawaii, mainland university towns, and refugee resettlement communities.

Nonmetro Hispanics have traditionally concentrated in the Southwest, but shifting employment opportunities have led to a wider geographic dispersion.

- Meat processing: the Hispanic percentage of the nonmetro workforce reached 36% in 2006.
- Crop agriculture: an estimated 75% of all hired farmworkers were Hispanic in 2006 and of these, an estimated 50% were undocumented.

Median age disparities between minorities and non-Hispanic Whites have policy implications

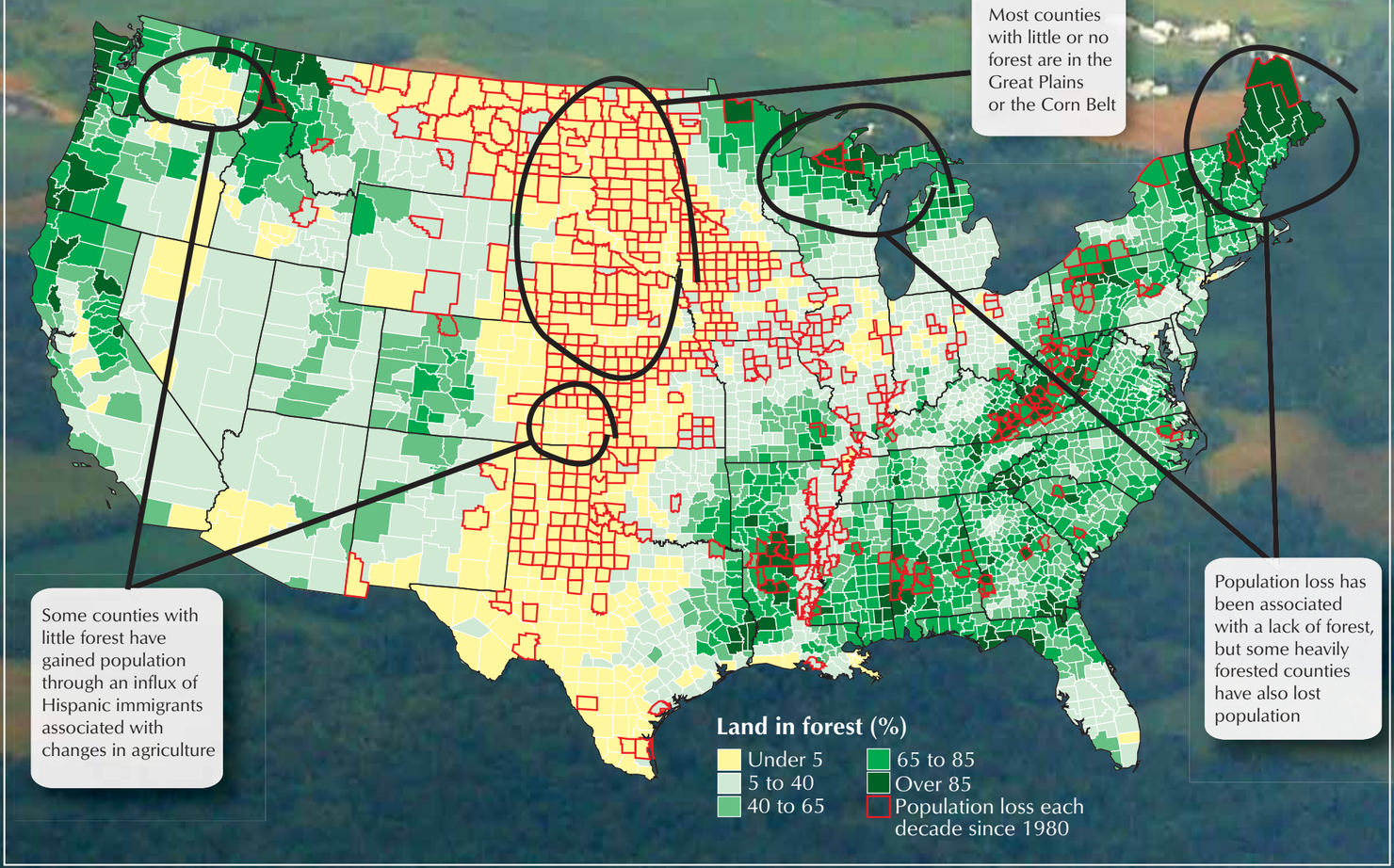


ERS is a leading source for demographic analysis of rural and small town America, focusing on population trends, racial and ethnic diversity, educational attainment, and income and poverty.

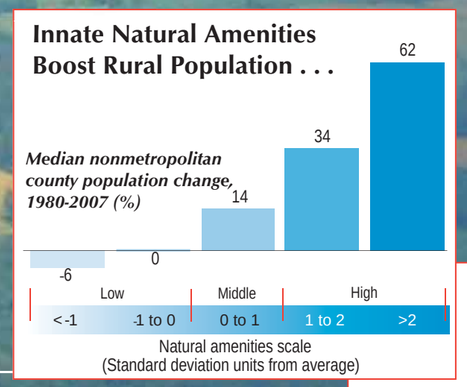
For more information, see the ERS Website:
Rural Population and Migration Briefing Room, www.ers.usda.gov/briefing/population/

Forestland a Big Draw for Rural Living

While considerable attention is paid to the creation of rural jobs, much of current rural growth has resulted from the attraction of people to features of the rural outdoors. Topography and climate are relatively fixed, but other aspects, such as the mix of forest and open country and access to the outdoors are amenable to Federal policies, but generally ignored by them.

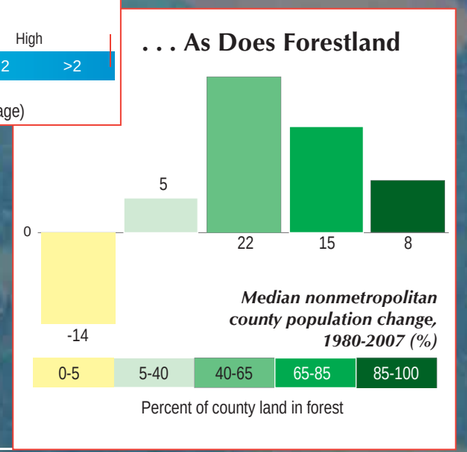


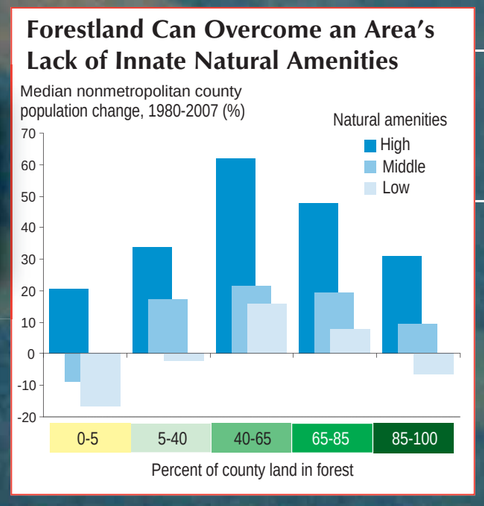
It seems likely that a natural park may sometimes do more for local development and well-being than an industrial park.



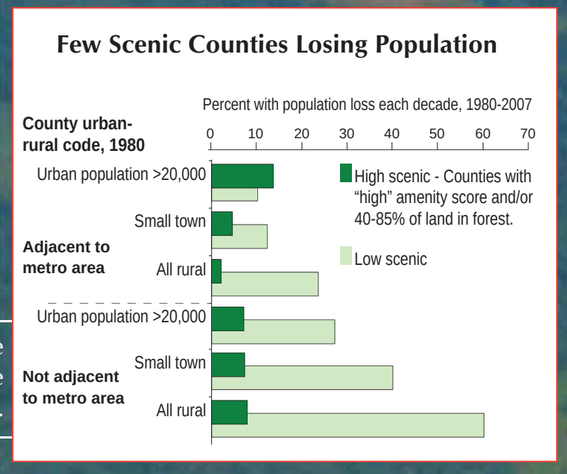
Those who live in or move to rural areas seem to be influenced by two primary environmental factors:

- innate natural amenities (topographic variation; bodies of water; warm sunny winters; and temperate, low-humidity summers) *and*
- the mix of forest and open country; most preferred is 40-85 percent of the land in forest cover.





Even counties lacking in innate natural amenities are perceived as more desirable places to live when the landscape offers a mix of forest and open country.



Likewise, the presence of forest cover and/or innate amenities can help retain population even among the most rural counties, which otherwise tend to lose it.

ERS provides data and analysis on factors affecting rural development and land use, focusing on the importance of natural amenities, industrial and labor market characteristics, and Federal programs and policies.

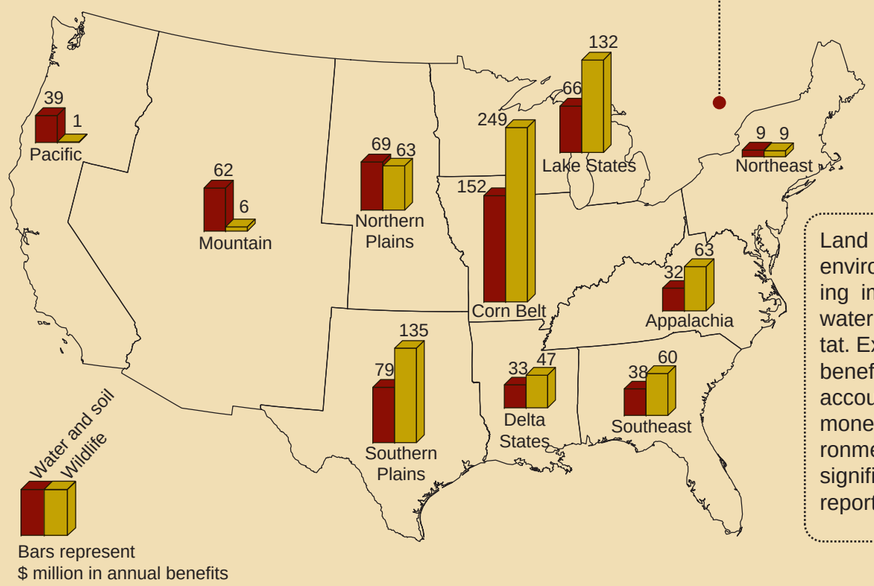
For more information, see the ERS Website:
Rural Amenities Briefing Room, www.ers.usda.gov/briefing/RuralAmenities/

Land Retirement

The Conservation Reserve Program (CRP) and the Wetlands Reserve Program (WRP) pay U.S. producers to retire cropland in order to protect soil, improve water quality, enhance wildlife habitat, and otherwise safeguard environmental quality. Projected land retirement payments of $13 billion between 2008 and 2012 would represent about half of USDA conservation program spending.

While CRP acreage is slated to get smaller, acreage in restored wetlands and other high-value practices is likely to increase. A growing portion of CRP acres, over 4 million acres in 2008, are enrolled via "continuous" signups that target more environmentally sensitive lands, such as streamside buffers, farmable wetlands, prairie potholes, and upland bird habitat. The 2008 farm act increased the WRP acreage cap from 2.275 to 3.041 million acres—just over 1 million acres more than the current cap. Wetlands provide wildlife habitat, filter sediment and nutrients from water entering streams and rivers, retain flood waters, and yield other environmental and economic benefits.

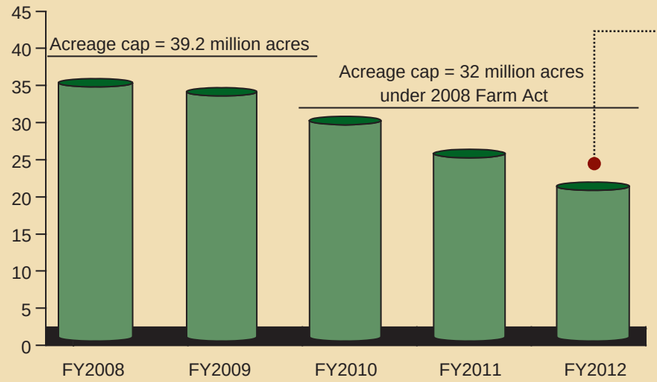
CRP benefits accrue nationwide, but vary considerably



Land retirement provides many environmental benefits, including improved soil productivity, water quality, and wildlife habitat. Existing estimates of CRP's benefits represent only a partial accounting. If fully measured in monetary terms, CRP's environmental benefits could be significantly higher than those reported here.

CRP acreage to shrink, but cap leaves room for new enrollment

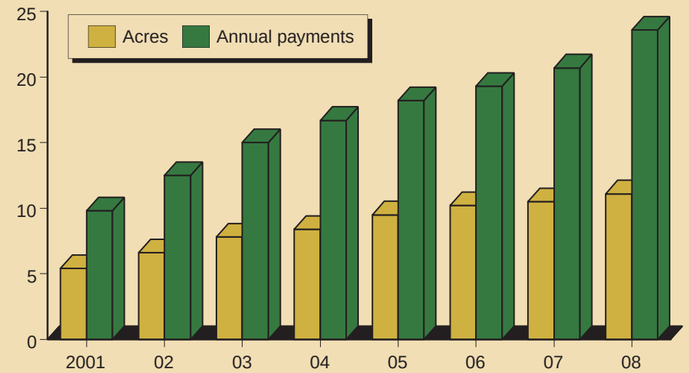
CRP acres (million) without additional signups



As CRP contracts expire, there will be opportunity under the 32-million-acre (roughly the size of Alabama) cap for carefully targeted smaller enrollments to address persistent environmental problems or target emerging issues.

Fast-growing continuous signup[1] could be avenue for new enrollment

Percent of all CRP

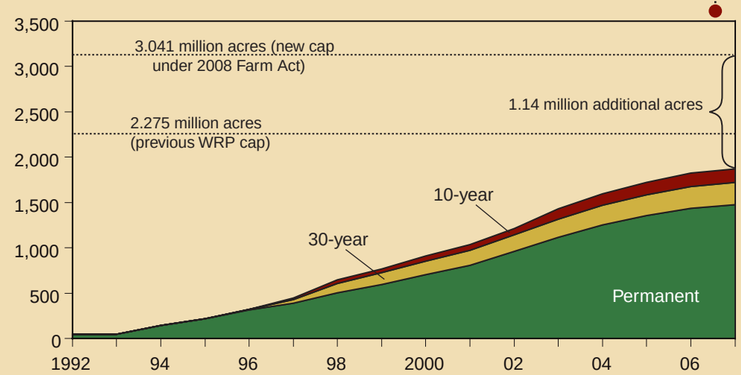


Continuous signup practices are more expensive on a per-acre basis than general signup, but can also achieve greater environmental benefits on an acre-for-acre basis.

[1]CRP general signups occur periodically and are designed to enroll whole fields or whole farms. Producers can offer land for continuous signup at any time, but can enroll only those acres needed for high priority practices.

Over 1 million acres could be enrolled under the new WRP cap

1,000 acres



Most WRP wetlands are under 30-year or permanent easements because restoration of fully functional wetlands can take many years.

Agricultural production can affect air and water quality, soil productivity, wildlife habitat, and human health. ERS examines the linkages between agriculture and environmental quality, and analyzes the effects of conservation policies on both the agricultural sector and the environment.

For more information, see the ERS Website:
Environmental Interactions with Agricultural Production Briefing Room, www.ers.usda.gov/briefing/agandenvironment/

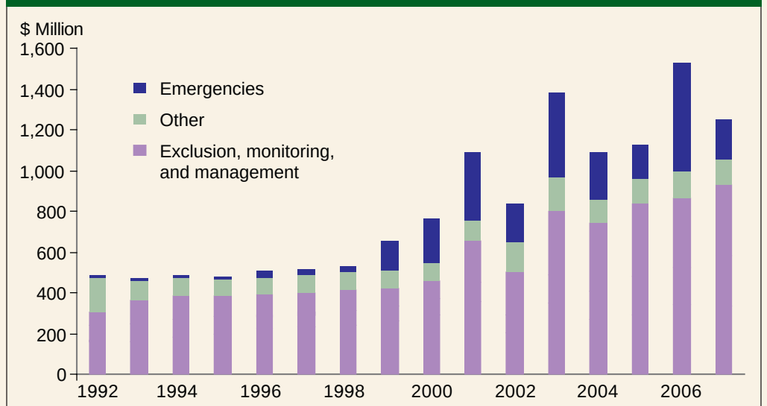
Economics of Invasive Species in Agriculture

Invasive species have been associated with billions of dollars in economic and environmental losses, including yield and quality losses for U.S. farmers and ranchers and lost export markets. Within USDA, the Animal and Plant Health Inspection Service (APHIS) has primary responsibility for handling invasive pests of significance to agriculture. The cost of efforts to prevent, monitor, and control pests (such as karnal bunt, citrus canker, and Mediterranean fruit flies) and animal diseases (such as bovine tuberculosis) have been increasing.

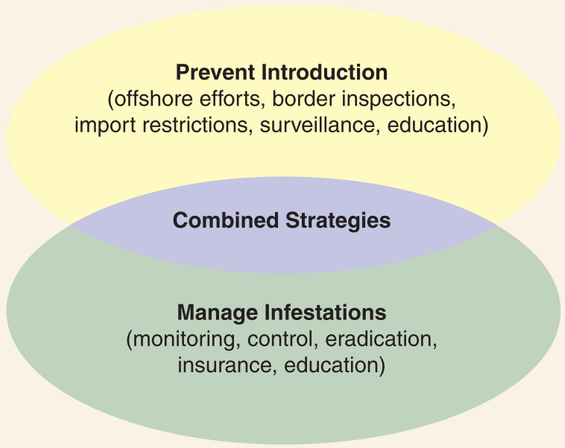
Policies or programs to minimize the threat of, or mitigate the damages from, invasive species may combine prevention, monitoring, eradication, control, or other strategies.

- The best approach depends on biological, ecological, and economic considerations.
- Economic analysis helps to assess tradeoffs and facilitates selection of the most efficient strategy.
- The tradeoffs depend on the vulnerability of agricultural and ecological systems to invasive species, the behavior of agricultural producers and other landowners when faced with the risk of economic loss, and the effectiveness and cost of prevention and management efforts.

APHIS expenditures by major category, 1992-2007



Approaches for dealing with the threat of invasive species

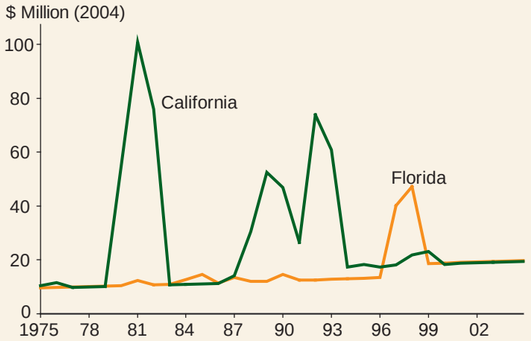


Economics of Preventing and Controlling Mediterranean Fruit Fly (Medfly) Infestations

The medfly is a significant pest of many important fruit and vegetable crops in California and Florida. They are difficult to detect in imports and after they are introduced into the United States. USDA therefore combines strategies to reduce the risk of new introductions with strategies that reduce the severity of new medfly infestations.

- To help prevent new infestations in the United States, USDA requires imports from countries where the medfly is known to exist to undergo preventive treatments, such as refrigeration, before arrival.
- Economic analysis shows that the optimal number of days to refrigerate imports increases with the severity of outbreaks abroad.
- To manage outbreaks that have occurred, millions of sterile medflies have been released weekly in California since 1994 and in Florida since 1999. This strategy reduced public eradication expenditures by over 96% in California during 1994-2004, and made additional eradication efforts in Florida unnecessary during 1999-2004.

Medfly detection and eradication expenditures, 1975-2004

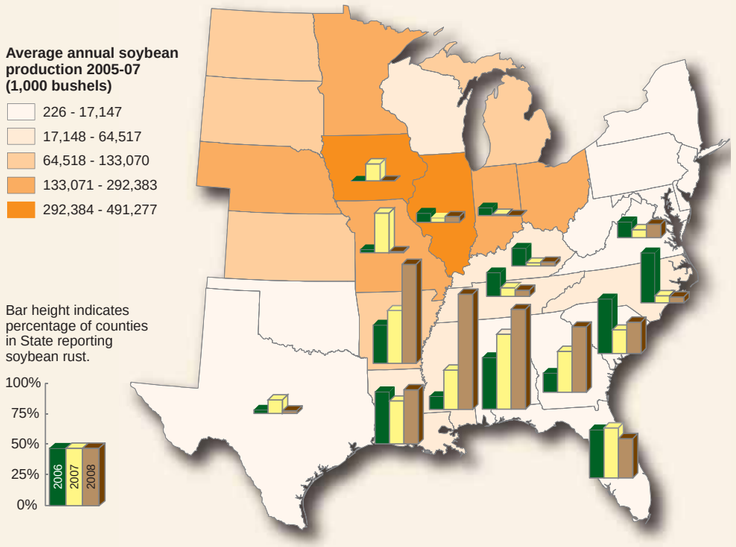


Economics of Monitoring and Control Efforts To Manage Soybean Rust

By 2002, Asian soybean rust was established in all major soybean-producing areas of the world except for the United States. Because it spreads easily by wind, its entry onto U.S. shores was viewed as inevitable. USDA efforts, therefore, focus on helping soybean producers manage outbreaks, rather than preventing the introduction of the fungus or controlling its spread directly.

- Soybeans are grown over a wide area in the United States, and the incidence of rust outbreaks has varied considerably. For these reasons, substantial economic benefits can be derived by providing producers with timely information to facilitate soybean planting and disease management decisions.
- USDA has established a coordinated management framework to help soybean producers manage their exposure to soybean rust.
- U.S. soybean producers use this information to determine if and when fungicide applications might be necessary to minimize crop losses.

Location of U.S. soybeans (2005-07) and incidence of soybean rust (2006-08)



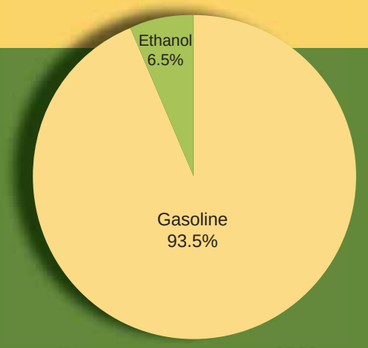
Under the Program of Research on the Economics of Invasive Species Management (PREISM), the Economic Research Service conducts research and funds extramural research to support the economic basis of decisionmaking concerning invasive species of significance to agriculture or USDA.

For more information, see the ERS Website:
Invasive Species Management, www.ers.usda.gov/Briefing/InvasiveSpecies/

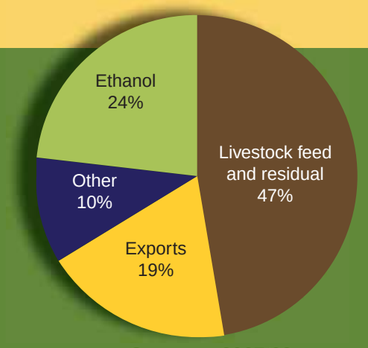
Biofuels and Agriculture

High oil prices and supportive energy policies have encouraged biofuel production in the United States. U.S. ethanol production could reach 9 billion gallons in 2008 which, when blended, would contribute about 6.5% to total U.S. gasoline consumption. Agricultural products that can be used as feedstocks for biofuel production, such as corn and soybean oil, are in much greater demand as a result. Ethanol production accounted for about 24% of total corn use in 2007/08; 14% of U.S. soybean oil use went to biodiesel production.

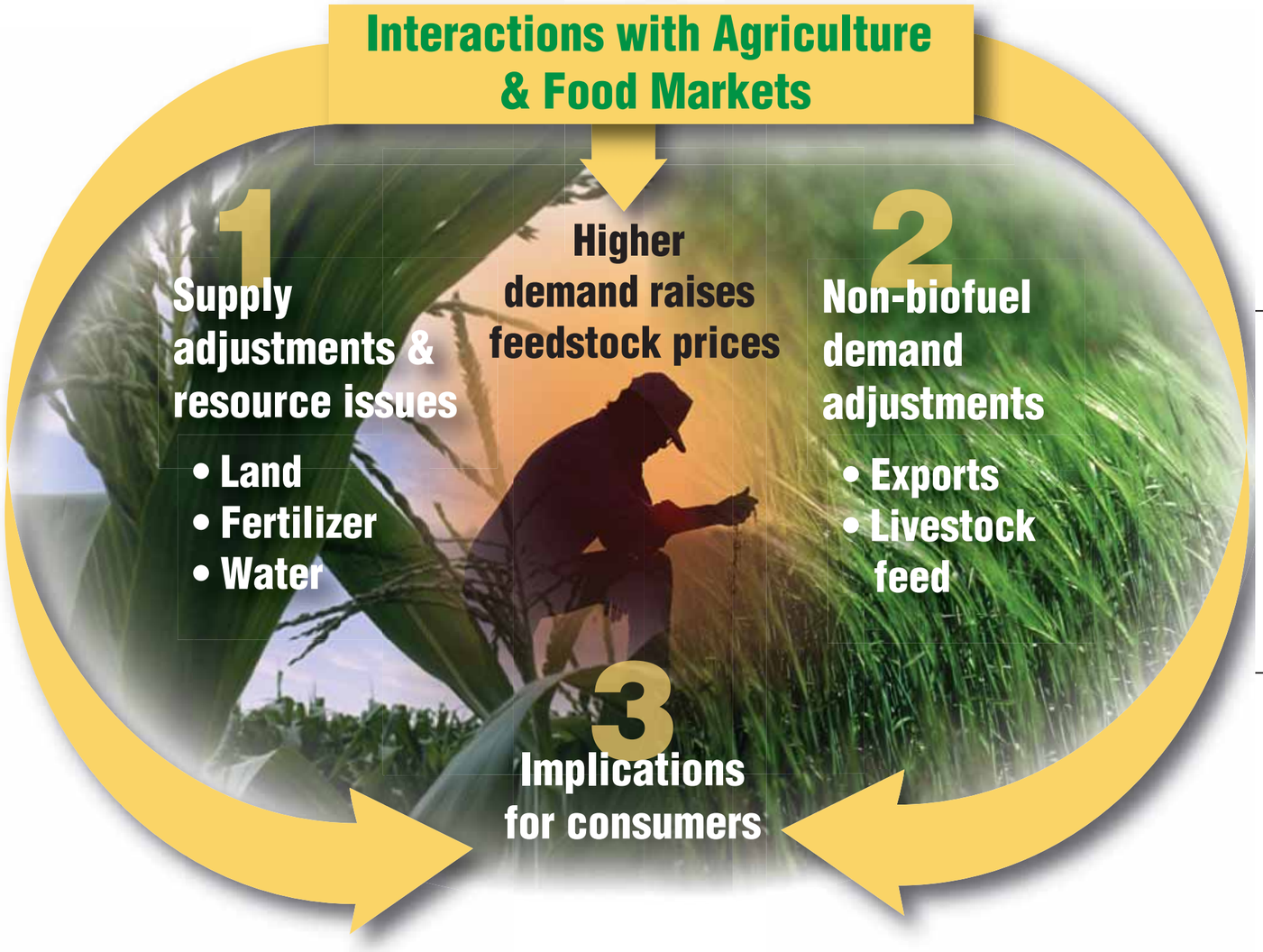
Ethanol is a larger factor for corn demand than for gasoline supply



Ethanol use in gasoline, 2008



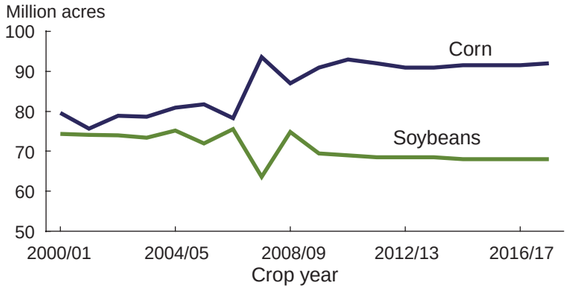
Corn use, 2007/08



1 Supply adjustments & resource issues

Higher prices are leading to increased total plantings of crops, with the mix of acreage shifting more toward corn. Corn production uses a lot of fertilizer, increasing U.S. fertilizer imports and raising environmental concerns. Feedstock and biofuel production also increase the demand for water and other resources.

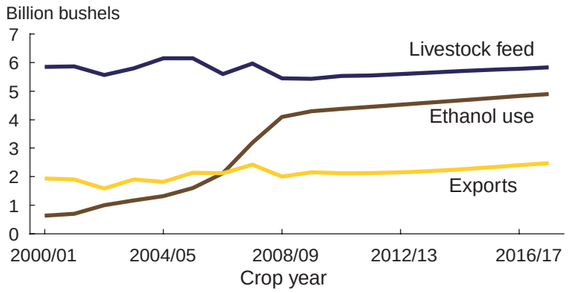
Corn and soybean projected plantings: Much of the corn area expansion comes from soybeans



2 Non-biofuel demand adjustments

Ethanol contributes a small share to the U.S. gasoline supply, but diverts corn away from other uses. With ethanol's expansion, U.S. corn exports are expected to decline to a 55-60% global market share compared with a typical historical share of 60-70%. And higher corn feed costs lowered returns for U.S. livestock producers, leading to projected declines in total red meat and poultry production in 2009-2011. Growth in global biofuels production contributed to higher grain and oilseed prices, raising food security concerns.

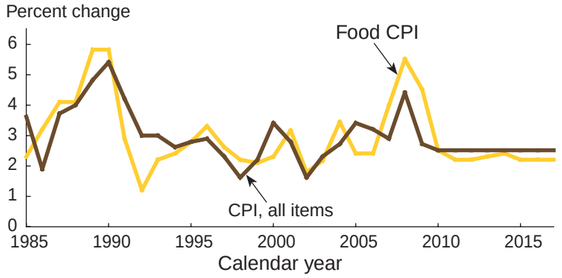
Corn use continues shift toward ethanol



3 Implications for consumers

Retail food prices in the U.S. are rising faster, up 4-6% annually during 2007-09, compared to an average 2.5% in 1990-2006. Demand for biofuel feedstocks is one factor. Pressures on agricultural markets and food prices could be reduced if alternative feedstocks become commercially viable. Cellulosic crops and residues, like switchgrass and corn stover, are potentially abundant and diverse biofuels feedstocks.

U.S. food price inflation



ERS research assesses the implications of bioenergy market developments for the U.S. feed and livestock markets, the environment, and economic indicators such as retail food prices. ERS products include historical data, current market analysis, and long-term projections of supply and demand for major agricultural resources used to produce bioenergy.

For more information, see the ERS Website:
Bioenergy, www.ers.usda.gov/Briefing/Bioenergy/
Agricultural Baseline Projections, www.ers.usda.gov/Briefing/Baseline/

Anatomy of a Global Food Price Spike

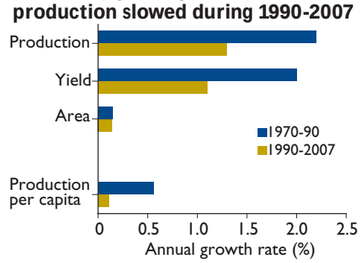
Both long- and short-term supply and demand factors played a role…

Slowing growth in global agricultural production

Key factors:

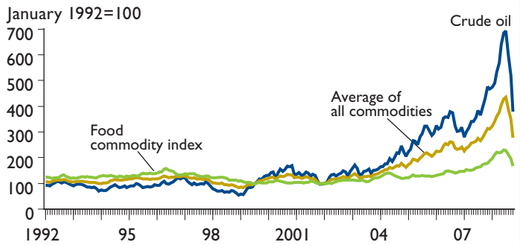
- Low food prices reduced producer incentives
- Land and water resource constraints
- Reduced investment in yield-enhancing technologies

Growth in global grain and oilseed production slowed during 1990-2007



Rising fuel prices and production costs

Fuel prices rose more sharply than food prices during 2000-08

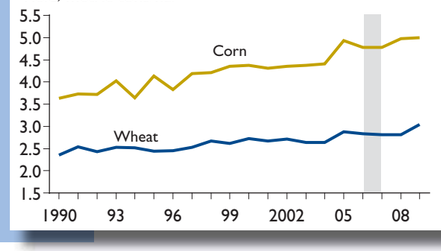


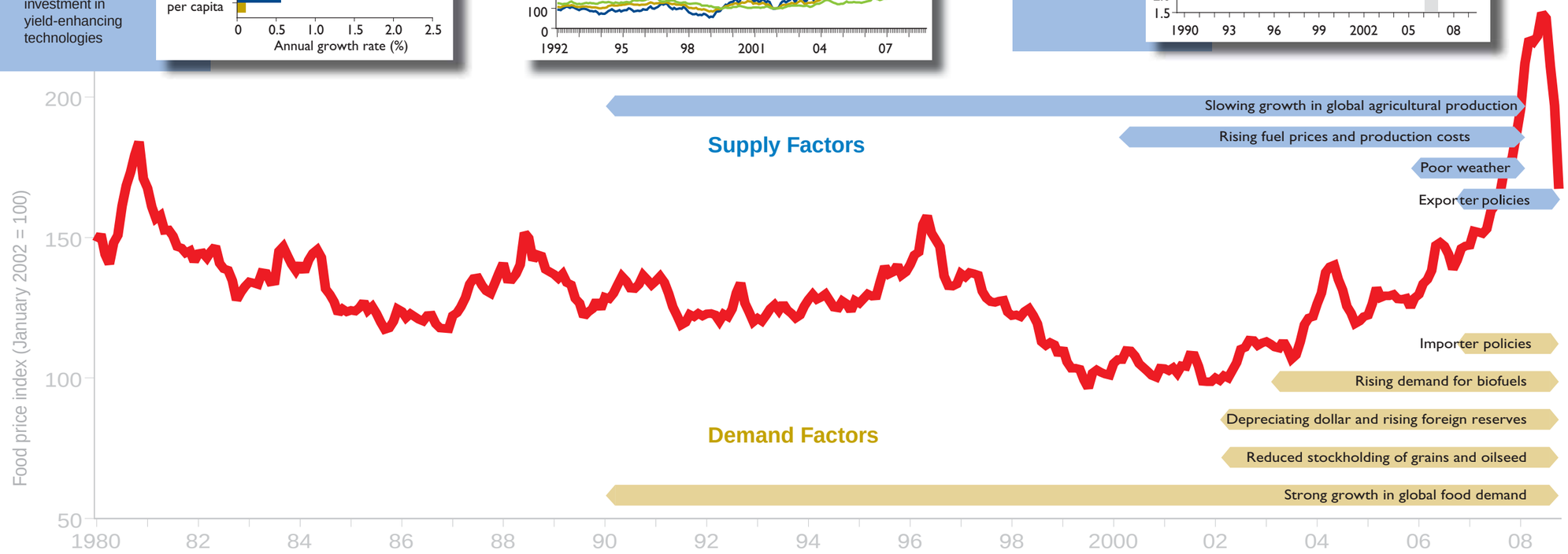
Poor weather

Poor harvests in exporting regions added to supply concerns at a time of strong demand and low stocks.

Poor weather reduces 2006 and 2007 harvests

Yield, metric tons/ha.





Exporter policies

In 2007-2008, as prices rose, some countries curbed their exports to ensure stable domestic supplies and prices:

- Argentina, Russia, Kazakhstan, China, Malaysia, and Indonesia raised export taxes.
- India, Argentina, Ukraine, Vietnam, and Kazakhstan banned or restricted exports.

Performance of Futures Markets

During 2007 and 2008, short and long hedging and speculative activity increased in futures markets for most agricultural commodities. How and to what degree futures trading activity may have influenced commodity markets during this period are topics of ongoing research.

Importer policies

In 2007-2008, some countries adjusted policies to promote imports to help stabilize domestic supplies and prices:

- India, Indonesia, the EU, Thailand, and Korea reduced import tariffs.

Rising demand for biofuels

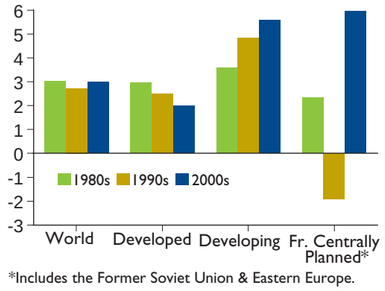
Use of grains, sugarcane, and vegetable oils to produce ethanol and biodiesel added to demand side pressures. While the share of cropland used to produce biofuel feed stocks remained small—about 3-4 percent of arable land in the major biofuel producing countries in 2007— biofuel uses accounted for important shares of growth in crop area during 2003-2008.

Strong growth in global food demand

In low income countries, relatively large shares of new income are spent on food, boosting food and feed demand.

Faster income growth in developing and former centrally planned countries during 1990-2007

Real GDP growth rate (%)

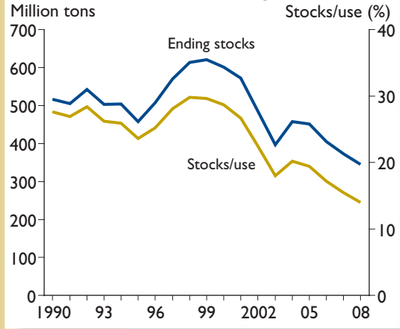


*Includes the Former Soviet Union & Eastern Europe.

Reduced stockholding of grains and oilseeds

Prices did not increase significantly until 2006, indicating that stockholders now preferred to hold smaller stocks. But, low stocks created an environment for price volatility when supply and demand shocks occurred during 2006-2008.

During 2002-2007, global grain and oilseed stocks declined to historically low levels

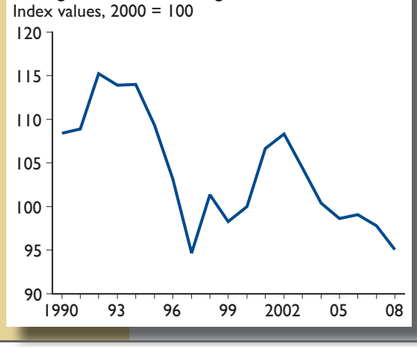


Depreciating dollar and rising foreign reserves

Prices of many food commodities remained relatively low in foreign currency terms because their prices are set in dollars. Also, large foreign currency reserves in many importing countries allowed them to continue to import despite rising dollar prices.

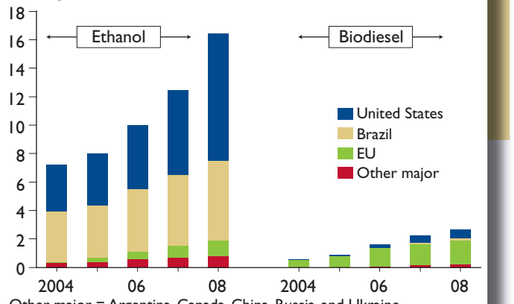
Depreciating U.S. dollar strengthens foreign demand during 2002-08

Index values, 2000 = 100



Rapid growth in global biofuel production during 2003-08

Billion gals.



Other major = Argentina, Canada, China, Russia, and Ukraine.

ERS provides the primary economic analysis behind USDA's forecasts for agricultural products in U.S. and global markets. ERS analyzes short-term market developments, and develops long-term projections for global supply and demand for major commodities. ERS also conducts research on key developments in U.S. and global agricultural markets.

For more information, see the ERS Website:
ERS market outlook publications, www.ers.usda.gov/Publications/Outlook/
Agricultural Baseline Projections, www.ers.usda.gov/Briefing/Baseline/

Developing countries emerge as biggest destination for U.S. food exports

Income growth and urbanization are key factors

In fiscal year 2008, for the first time, developing countries accounted for more than half of U.S. food and agricultural exports. While Canada, Europe, and Japan have been large markets for a long time, Mexico and China have recently joined them.

This shift to developing markets may be temporarily reversed because of the global economic downturn but will likely continue afterwards, driven by rapid economic growth and the growing concentration of food demand in urban areas.

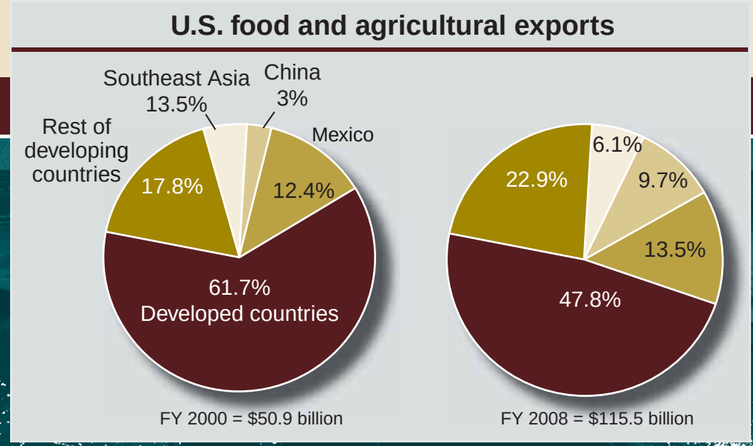
The pace of economic growth in developing countries, while forecast to slow in the short term, will still be more than twice as fast as in developed countries.

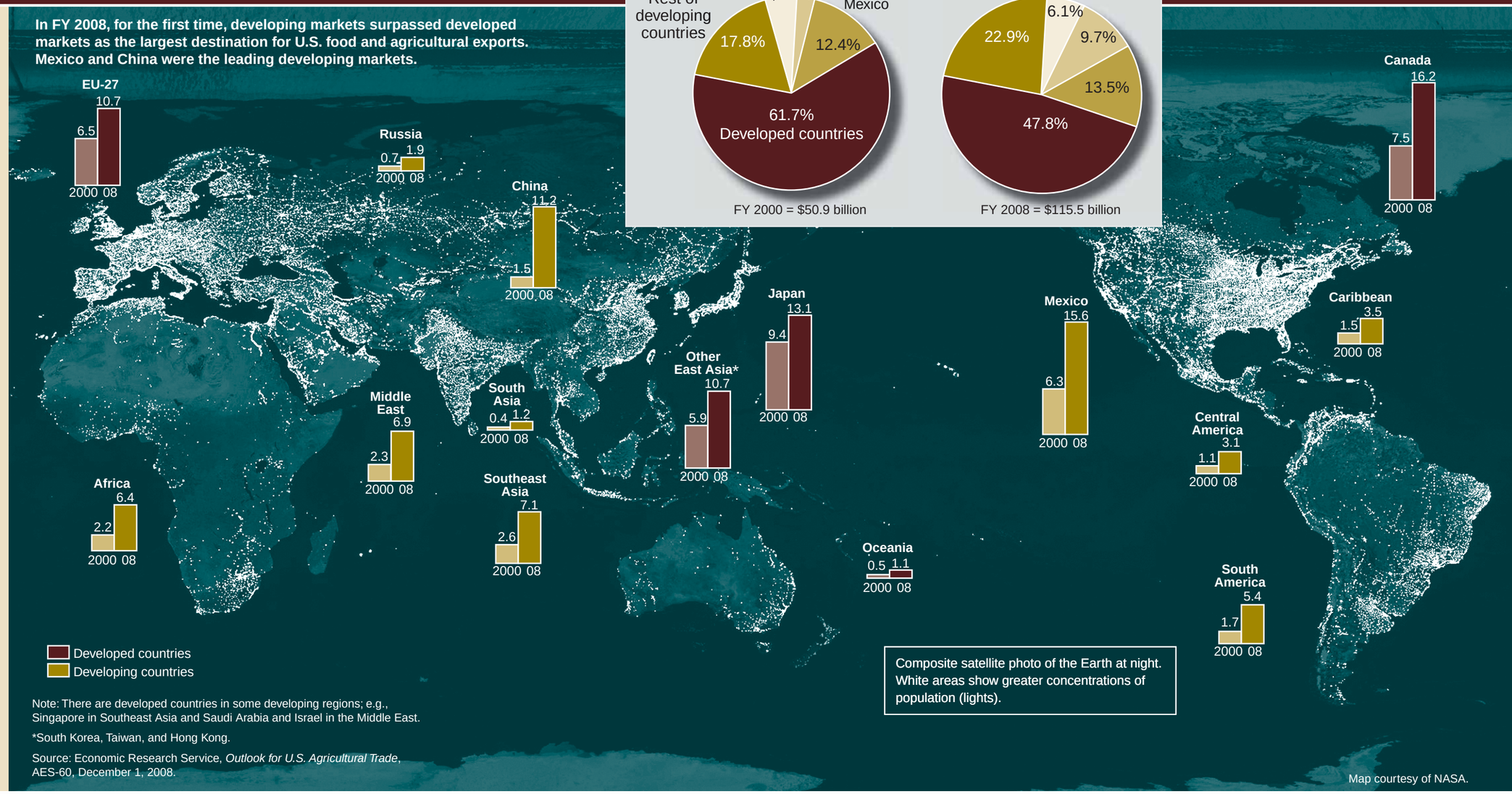
Rising incomes lead to predictable dietary shifts from starchy staples to more protein-rich foods, such as meat, dairy, and soy products, in which the United States has a comparative advantage.

Rapid urbanization in developing countries causes logistical challenges that U.S. exporters are well positioned to overcome. Urban congestion and costs in delivering food to central markets are giving way to more efficient marketing systems, including modern supermarkets that keep costs down through economies of scale in procurement and distribution.

As markets develop, adoption of standardized equipment and organizational systems facilitates international transactions. The resulting trade gains may be transitory as pressures within these countries grow to expand and streamline linkages with their restructuring and modernizing agricultures.

In FY 2008, for the first time, developing markets surpassed developed markets as the largest destination for U.S. food and agricultural exports. Mexico and China were the leading developing markets.





Composite satellite photo of the Earth at night. White areas show greater concentrations of population (lights).

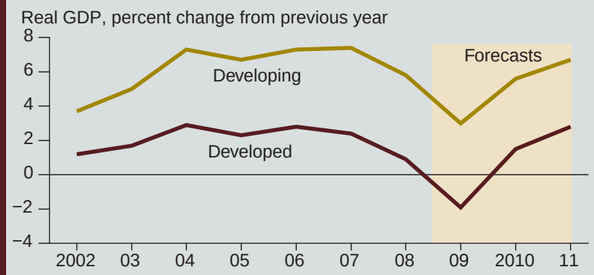
Note: There are developed countries in some developing regions; e.g., Singapore in Southeast Asia and Saudi Arabia and Israel in the Middle East.

*South Korea, Taiwan, and Hong Kong.

Source: Economic Research Service, *Outlook for U.S. Agricultural Trade*, AES-60, December 1, 2008.

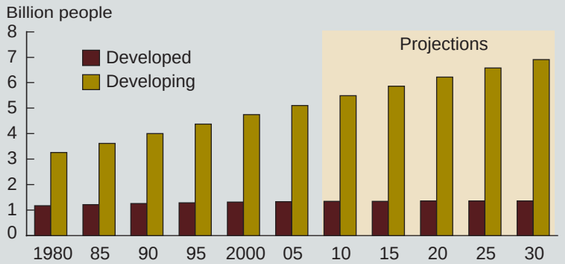
Map courtesy of NASA.

Developing country incomes are growing more than twice as fast as those of developed countries, and consumers are becoming increasingly affluent.



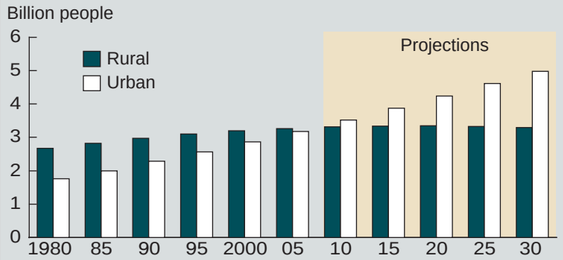
Source: Oxford Economic Forecasting, December 2008.

Population growth is most rapid in developing countries, but rates are slowing. Populations in some developed markets, like Japan and a number of European countries, are actually shrinking.



Source: Food and Agriculture Organization of the United Nations.

Urbanization is increasing in developing countries, which will account for 90 percent of projected urban growth.



Source: Food and Agriculture Organization of the United Nations.

Ranking of U.S. agricultural export markets

Country/region	FY2000	FY2008
Canada	2	1
Mexico	4	2
Japan	1	3
China	7	4
European Union-27	3	5
South Korea	5	6
Taiwan	6	7
Indonesia	12	8
Egypt	9	9
Russia	13	10
Colombia	17	11
Developing countries		

ERS provides research assessments of supply, demand, and policy developments for major U.S. foreign markets and competitors. Recent research examined changes in global food consumption, global trade in processed products, food consumption and food safety in China, and prospects for India's food grain and oilseed sectors.

For more information, see the ERS Website: ers.usda.gov/ . . .
. . . Briefing/GlobalFoodMarkets/ (Global Food Markets); . . . Briefing/Baseline/ (Agricultural Baseline Projections);
. . . Briefing/AgTrade/ (U.S. Agricultural Trade)

NAFTA Clears the Way for Agricultural Trade With Canada and Mexico

Today, thanks to the North American Free Trade Agreement, implemented in 1994, almost all agricultural trade within North America is free of tariff and quota barriers. Our NAFTA partners, Canada and Mexico, supply by far the most agricultural imports to the United States, accounting for nearly **30%** of U.S. agricultural imports in 2007. In addition, our NAFTA partners rival East Asia as the leading destination of U.S. agricultural exports; Canada/Mexico and East Asia each buy about **30%** of U.S. agricultural exports.

TRADE WITH CANADA

Much of Canada-U.S. agricultural trade consists of intra-industry trade; that means we trade **similar products** with one another.

$14.1 billion
U.S. agricultural exports to Canada (2007)

UP 184% since 1991-93

TRADE WITH MEXICO

About **75%** of U.S. agricultural exports to Mexico are in **grains**, **oilseeds**, **meat**, and related products.

$12.7 billion
U.S. agricultural exports to Mexico (2007)

UP 265% since 1991-93

U.S. **corn exports** to Mexico equal about 42% of Mexican corn production, compared with 15% during the decade before NAFTA (1984-93)

$15.2 billion
U.S. agricultural imports from Canada (2007)

UP 277% since 1991-93

Mexico and Canada are major suppliers of **fresh tomatoes** to the U.S., with exports in 2007 of $960 million and $238 million, respectively

Common examples of Canada-U.S. intra-industry trade are: **beef, pork, pet food, mixes, dough, pastries, cake, bread, pudding, cereal, and pasta.**

Over **70%** of U.S. agricultural imports from Mexico consist of **beer**, **fruits**, and **vegetables**.

$10.2 billion
U.S. agricultural imports from Mexico (2007)

UP 300% since 1991-93

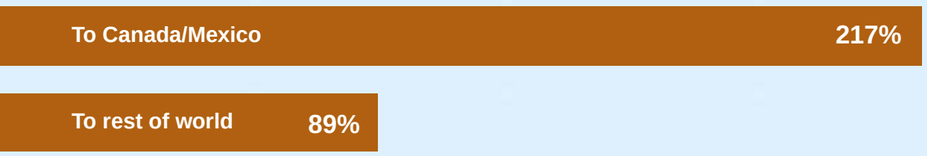
EMPLOYMENT

About **243,000** jobs are supported throughout the U.S. economy by U.S. agricultural exports to Canada and Mexico (2006)

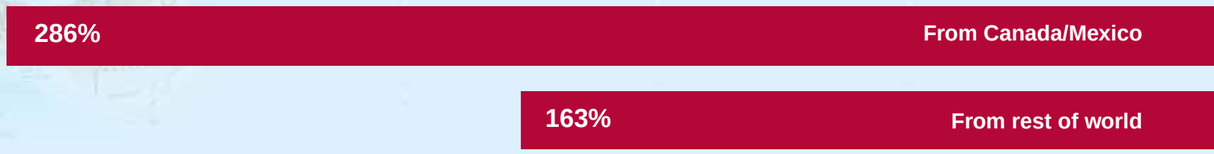
FOREIGN INVESTMENT

In 2005, Canadian and Mexican majority-owned affiliates of U.S. multinational food companies had sales of **$16.3** billion and **$7.1** billion, respectively.

U.S. AGRICULTURAL EXPORTS
Change, 1991-93 to 2007



U.S. AGRICULTURAL IMPORTS
Change, 1991-93 to 2007



ERS supplies research and analysis on the economic implications of bilateral, regional, and multilateral trade policies. ERS prepares periodic reports on NAFTA and analyzes the agreement's impacts on the agricultural economy. ERS is a key source of research in support of agricultural trade negotiations under the World Trade Organization.

For more information, see the ERS Website: ers.usda.gov/ . . .
. . . Briefing/NAFTA/ (NAFTA, Canada, and Mexico); . . . Briefing/WTO/ (World Trade Organization);
. . . Briefing/AgTrade/ (U.S. Agricultural Trade)

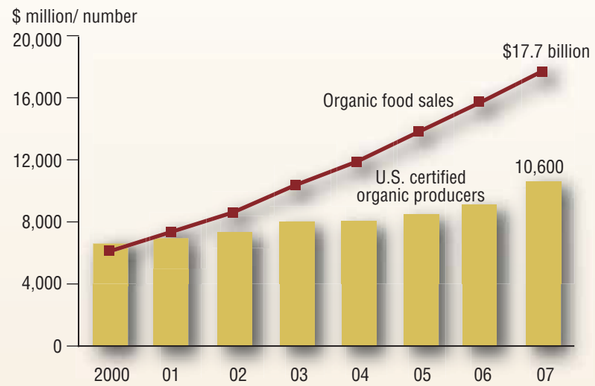
U.S. Demand for Organic Products Goes Global

A production system that is managed in accordance with the Organic Foods Production Act and regulations to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.

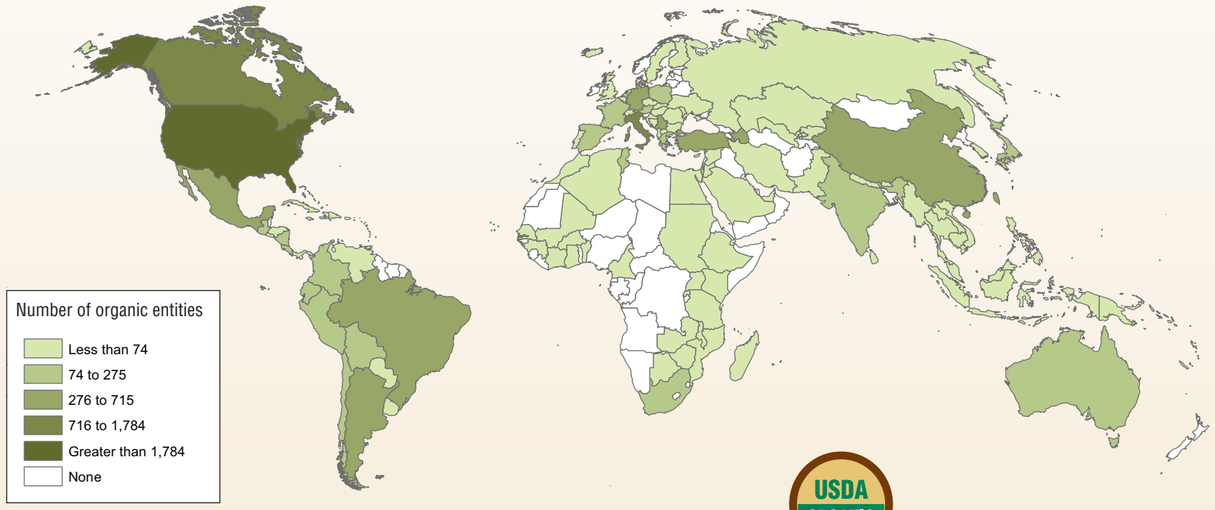
USDA definition of organic production

Organic products have shifted from being a lifestyle choice for a small share of consumers to being consumed at least occasionally by a majority of Americans. While the consumption of organic food and beverages internationally is concentrated in Europe and the United States, the production of certified organic products is scattered worldwide.

U.S. organic food sales are increasing faster than domestic producers



In 2007, USDA-accredited groups certified 27,000 producers and handlers worldwide to the U.S. organic standard, with approximately 16,000 in the U.S. and 11,000 outside the U.S.

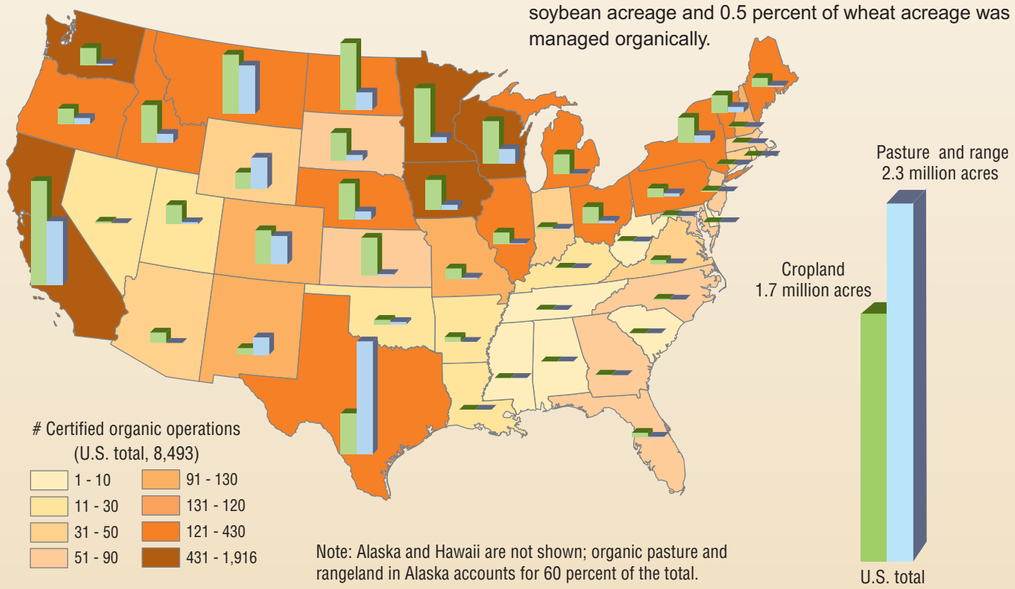


USDA Organic

The National Organic Program in USDA's Agricultural Marketing Service administers Federal regulations on organic standards and certification (www.ams.usda.gov/NOP). Foreign producers and handlers must also meet U.S. organic standards.

U.S. certified organic acreage and operations, 2005

Nearly 5 percent of U.S. vegetable acreage and 2.5 percent of fruit and nut acreage was under organic management in 2005, but only 0.2 percent of corn and soybean acreage and 0.5 percent of wheat acreage was managed organically.



Note: Alaska and Hawaii are not shown; organic pasture and rangeland in Alaska accounts for 60 percent of the total.

Organic imports have played a significant role in the U.S. market expansion for organic products.

- In 2002, USDA estimated the value of U.S. organic imports was between $1.0 billion and $1.5 billion, while the value of U.S. organic exports was $125 million to $250 million. While more recent data are unavailable, it seems certain that the gap between the value of imports and exports has widened in recent years as U.S. consumer demand for organic products has grown faster than domestic production.
- Major organic imports include fresh fruits and vegetables, products not grown in the U.S. (such as coffee, tea, cocoa, and tropical produce), and raw ingredients, including soybeans.

ERS provides data and analysis on U.S. organic producers and markets.

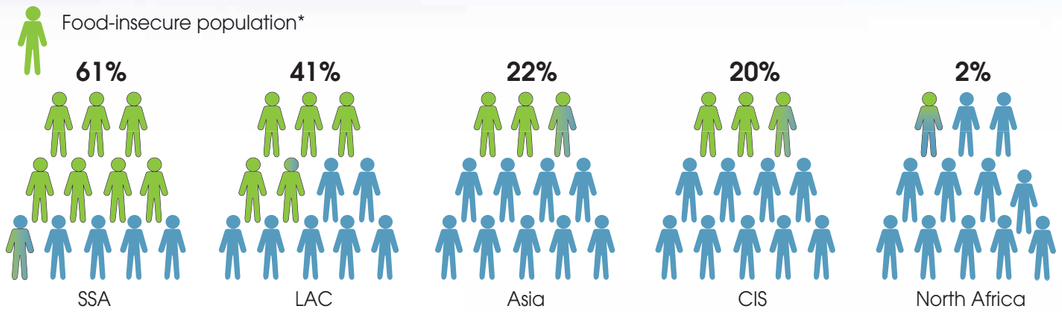
For more information, see the ERS Website:
Organic Agriculture Briefing Room, www.ers.usda.gov/briefing/organic/

Global Food Security

A Goal, A Challenge

USDA-ERS estimates food consumption and access in **70** developing countries.

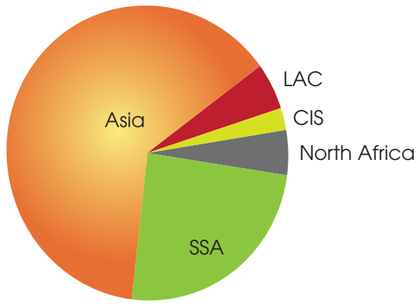
Share of food-insecure population relative to total population



*Those estimated to be consuming less than 2,100 calories per person per day.

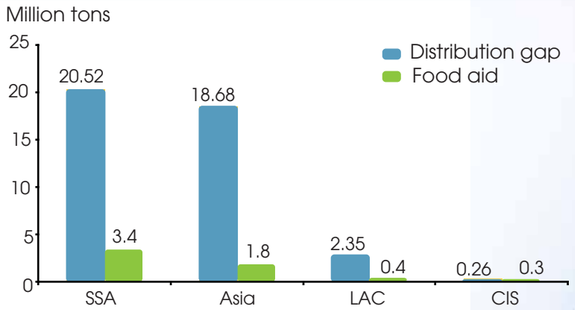
Total population for 70 countries exceeds 3 billion

SSA = Sub-Saharan Africa
LAC = Latin America and Caribbean
CIS = Commonwealth of Independent States



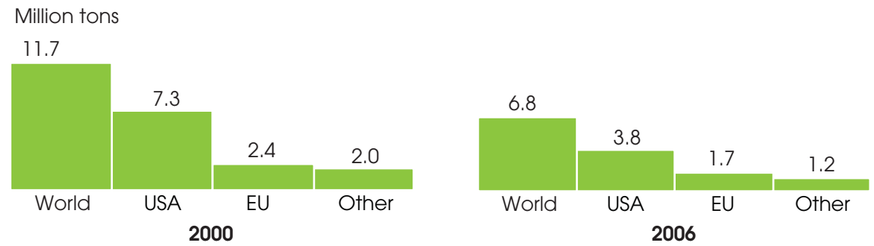
Regional shares of population

Food aid falls short of estimated food gap*



*Amount of food needed to raise consumption to 2,100 calories per person per day.

Global food aid donations declined 58%



Low-income

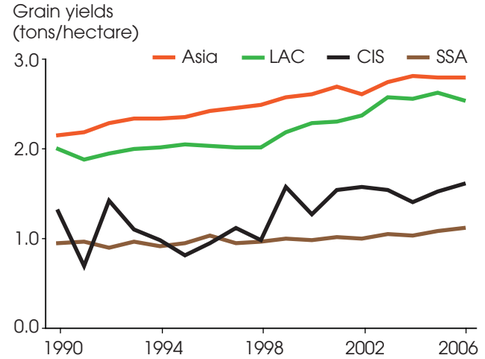
In the 70 countries studied:

- Average annual income is below **$700** per person
- The poorest **20%** of the population holds just **7%** of national income, on average.

Food Supply

- *Food supply consists of production and imports.*
- *Production depends on area and yields.*

Low and stagnant yields in Sub-Saharan Africa hinder grain production growth

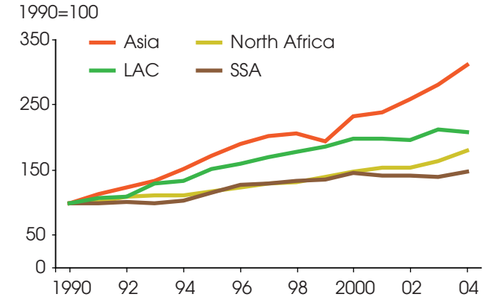


Commodity Prices

Increasing commodity prices constrain ability to import

Export Earnings

Export earnings can be used to pay for food imports



ERS analysts conduct an annual assessment of the food security situation in low-income countries around the world. The assessments analyze food availability and potential food gaps for 70 developing countries, and also examine issues underlying food needs, such as changes in food production and global commodity prices.

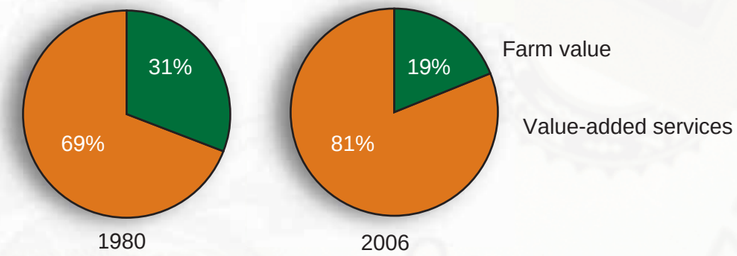
For more information, see the ERS Website:
Global Food Security, www.ers.usda.gov/Briefing/GlobalFoodSecurity/

Where Does Your Food Dollar Go?

What a Dollar Paid for in 2006

Value-added services 81¢

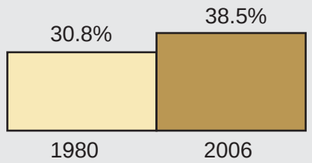
Consumers are demanding a greater variety of foods that are also convenient to eat, including more away-from-home foods. As more processing and other marketing services are added to foods, the total value of these services tends to become larger relative to the food's farm value.

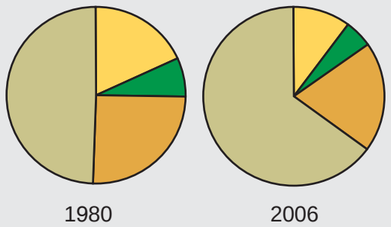


Labor

As the largest marketing cost component, labor exerts the greatest impact on food marketing costs. The restaurant sector employs the largest percentage of food industry workers, followed by foodstores, food manufacturers, and food wholesalers.

Labor as a percent of consumer food expenditures





Food industry employees by sector

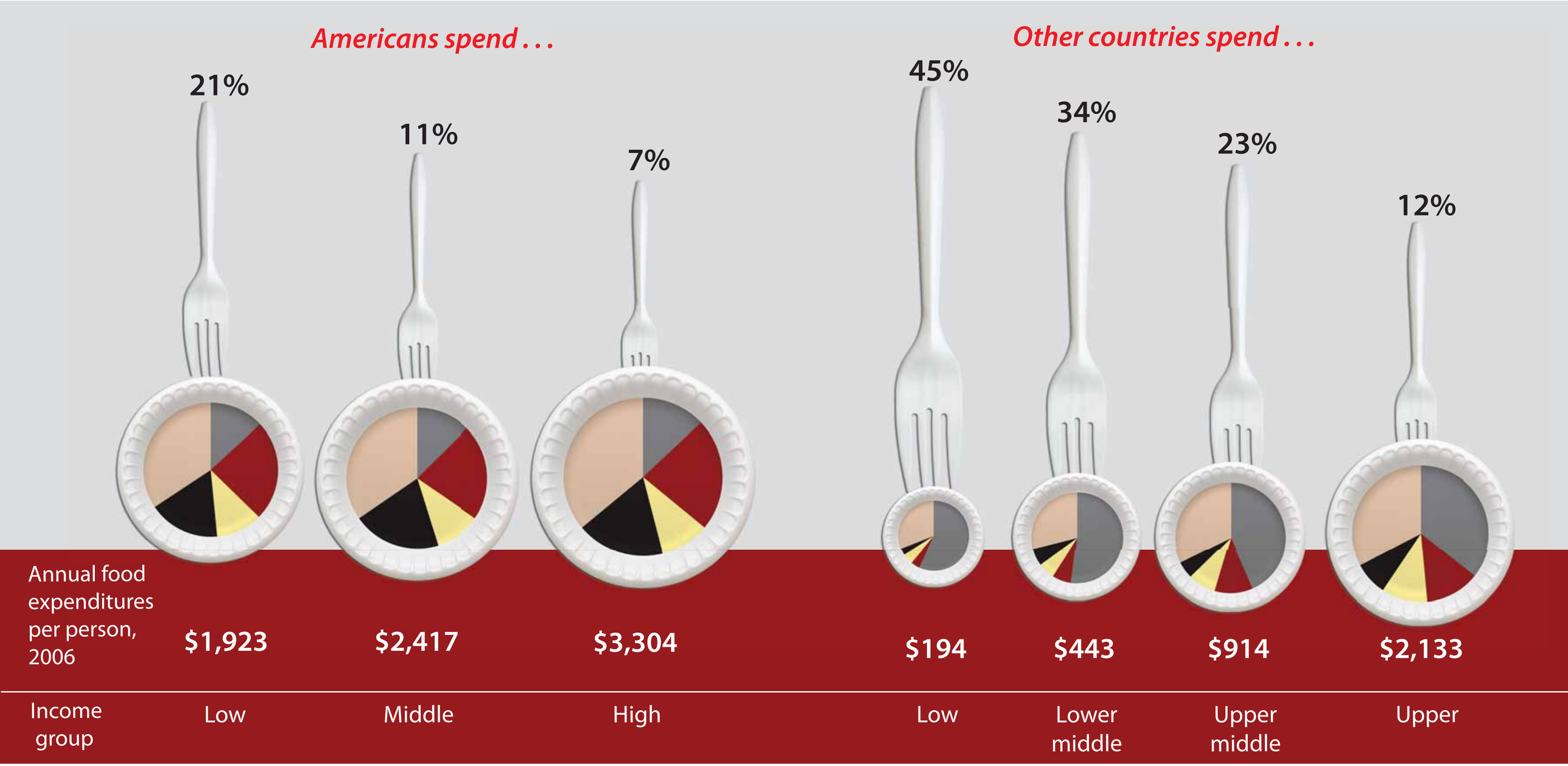
- Manufacturing
- Wholesale
- Retail
- Eating & drinking

ERS monitors developments in the Nation's food marketing system, which links farms to consumers via food manufacturing, wholesaling, and retailing. Analyses focus on economic issues affecting the competitiveness of the U.S. food sector, including factors related to performance, structure, and marketing.

For more information, see the ERS Website:
Food Marketing System in the U.S., www.ers.usda.gov/Briefing/FoodMarketingSystem/

The amount spent on food rises with income. . .

. . . while the proportion falls. . .



. . . and diet composition shifts, particularly in other countries

Other | Fruit & vegetables | Dairy | Meat | Cereals

ERS monitors food consumption around the world as part of its research on global food security. This research includes estimates of current and future food gaps and analysis of international food aid. ERS also estimates food expenditures to inform research on food markets, including research on demand and supply trends.

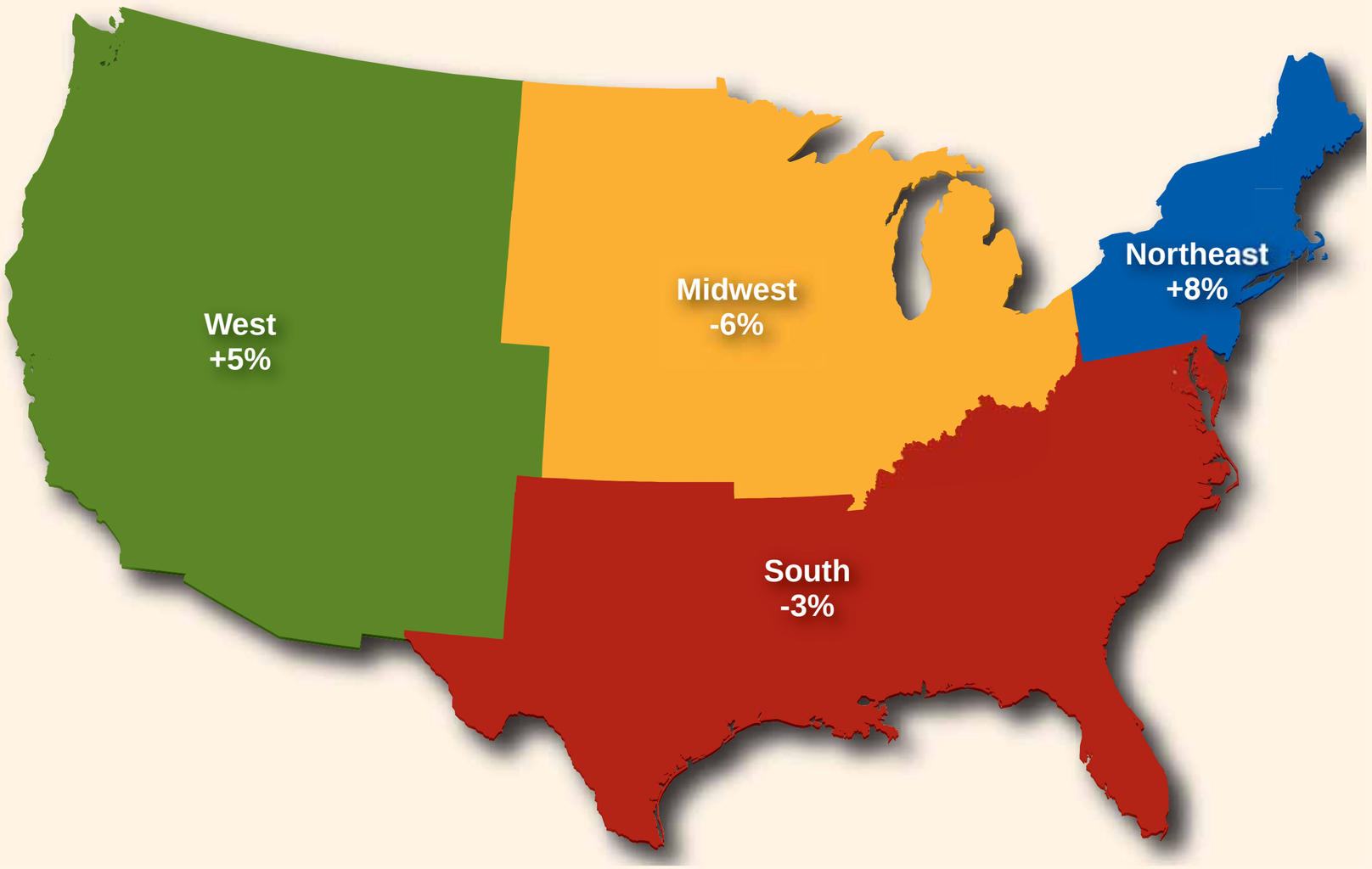
For more information, see the ERS Website:
Food CPI, Prices, and Expenditures, www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/,
Web Briefing Room: Global Food Security, www.ers.usda.gov/Briefing/GlobalFoodSecurity/

Regional Variation Nearly Double Inflation Rate for Food Prices

Regional food price variation, which can vary as much as 25% for similar products, dwarfs the annual changes in food prices, which averaged less than 3% per year from 1998-2008.

Food prices—variation from national average

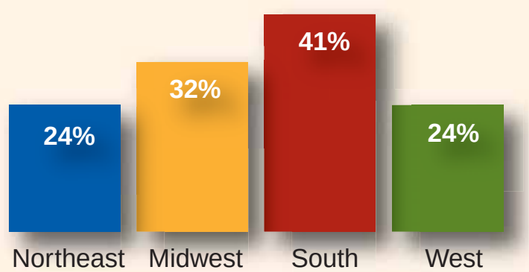
Retail food prices, on average, are highest in the East and lowest in the Midwest.



Why do regional prices vary so much?

- Differences in consumer food demand
- Differences in distribution costs
- Differences in operating costs
- Differences in competition at the retail level, for example, the presence of nontraditional retailers.
- Nontraditional retailers, like Wal-Mart and Costco, generally offer lower prices than traditional grocery stores.

Share of consumer food expenditures at nontraditional retailers, 2005



ERS monitors changing trends in retail food markets. Research focuses on economic issues affecting the prices paid by U.S. consumers for food and the factors impacting cost competition dynamics in the food industry.

For more information, see the ERS Website:
Food CPI, Price, and Expenditures, www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/

Can low-income Americans afford a healthy diet?

Could you feed your family on $136 per week?

USDA's Thrifty Food Plan demonstrates how low-income households can purchase a healthy diet at a minimal cost. Costs of the Thrifty Food Plan set the maximum benefit amounts for the Supplemental Nutrition Assistance Program (previously known as the Food Stamp Program). In June 2008, a four-person household with two children in elementary school needed $136 per week to purchase a healthy diet. ERS research shows that low-income households spend even less: the median low-income household spent only 95 percent of what was specified by the Thrifty Food Plan in 2006.

Do you spend almost half of your food budget on fruits and vegetables?

Households following the Thrifty Food Plan should spend 40 to 50% of their food dollars on fruits and vegetables. By contrast, ERS research shows that for an average household, fruits and vegetables account for 16 to 18% of food spending for at-home consumption in both low- and high-income households. Meats, poultry, fish, and eggs account for about a quarter of food spending. Placing more emphasis on fruits and vegetables helps ensure a healthy diet. These foods are a good source of nutrition for their price.

Could you spend more time in the kitchen?

ERS research (based on the American Time Use Survey) shows that low-income women who work full-time spend about 46 minutes per day on meal preparation (approximately 25 minutes less than nonworking women and 10 minutes less than women working part-time). Many households cut down on food preparation time by purchasing ready-to-eat foods. Benefits provided through the Supplemental Nutrition Assistance Program cannot be used to purchase hot ready-to-eat meals from grocery stores or foods from either dine-in or carryout restaurants.

Are healthy foods more expensive than other foods?

Many types of healthy foods are as affordable as popular snack foods. ERS research finds that inflation-adjusted prices for 11 basic fresh fruits and vegetables have been trending downward at about the same rate as those for chocolate chip cookies, cola, ice cream, and potato chips. ERS research also finds that low-income households may stretch their food dollars by purchasing more discounted products, less expensive branded foods, volume discounts, or the less expensive items within a type of food.

Are food prices high where you live?

ERS research shows that food tends to cost less in suburban communities, where large supermarkets dominate, than in central city communities where retail foodstores tend to be smaller. Because food prices vary across the United States, a given amount of money (and food assistance benefits) may buy less in some locations. Based on data from 1998–2003, ERS researchers also found that average prices for a representative mix of products, including meat, grain, and fruit and vegetable categories, were 8.0 and 11.1% above the national average in the East and West, but 7.0 and 5.2% below the national average in the South and Midwest.

Would a healthy-food subsidy help you eat better?

Americans' diets, particularly those of low-income households, fall short of Government dietary recommendations. Research, however, finds that a number of factors, not just prices and income, determine a household's food choices. ERS research estimates that reducing fruit and vegetable prices with a 10% subsidy would encourage low-income Americans to increase their consumption of fruits by 2.1-5.2% and vegetables by 2.1-4.9%. The annual cost of such a subsidy would be about $310 million for fruits and $310 million for vegetables. And most low-income Americans would still not meet Federal dietary recommendations. ERS research also finds that, if these households were to receive a small increase in income, they would likely spend more money on beef and frozen prepared foods, for example, rather than on fruits and vegetables.

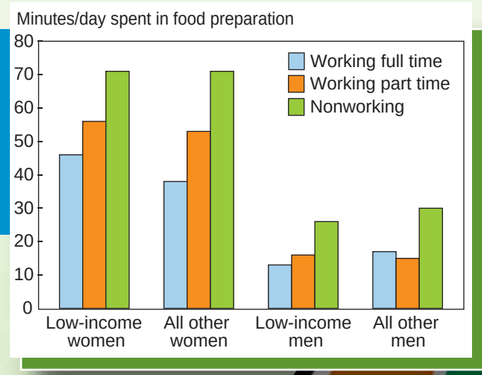
ERS investigates economic factors affecting the diet and health of the U.S. population, including factors such as food prices, food availability, income, and food assistance programs. This research aims to support the Department's mission to ensure equitable access to a wide variety of high-quality, affordable food.

For more information, see the ERS Website:
Diet Quality and Food Consumption, www.ers.usda.gov/Briefing/DietQuality
Food Assistance and Nutrition Programs, www.ers.usda.gov/Briefing/FoodNutritionAssistance/

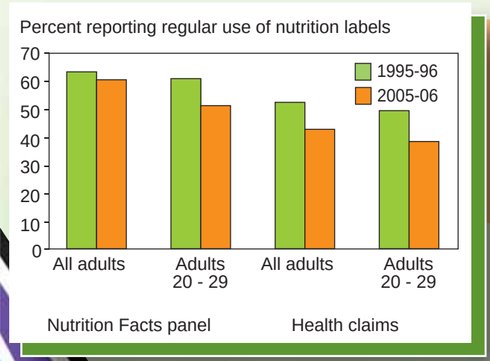
Why Do So Few Americans Choose A Healthy Diet?

Busy lifestyles increase need for convenience...

Women spend less time preparing food as time requirements of paid work increase; a smaller relationship is observed among men.



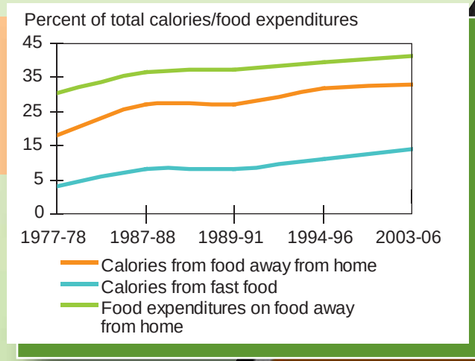
Consumers' use of food labels has declined...



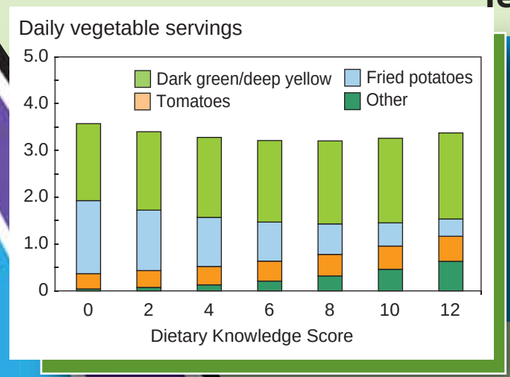
Use of nutrition labels when buying food has declined for the Nutrition Facts panel and information about calories, fats, cholesterol, and sodium. This decline is more pronounced among young adults.

...and food away from home

Food away from home, especially fast food, has become a bigger part of our diet and budget.



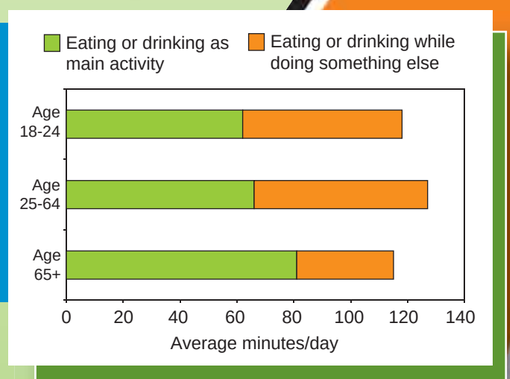
...and while dietary knowledge can impact choice, few are knowledgeable



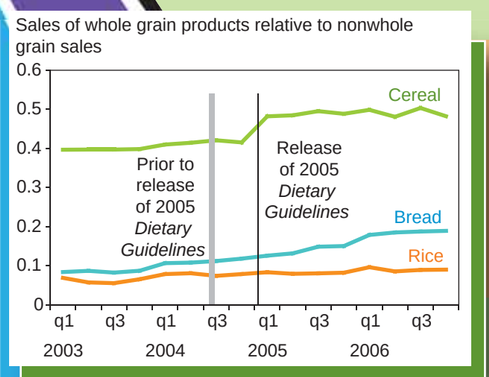
Those who are more informed choose a healthier mix of vegetables, but few adults score high on dietary knowledge surveys. Less than 2% of adults correctly identified how many servings they should consume from all food groups.

Situational cues influence eating behavior

People tend to eat more when dining out, when in social situations, and when going longer between meals. Distractions, such as eating while working or watching TV, can also inhibit how well we monitor what and how much we eat.



What we choose depends on what is available



Whole-grain purchases increased after the 2005 *Dietary Guidelines*. This was likely due to manufacturers' introducing new whole-grain products.

ERS provides in-depth economic analyses of dietary choices, which are influenced not only by prices and income, but also by family structure, time constraints, psychological factors, nutritional information, and Federal food and nutrition assistance programs.

For more information, see the ERS Website:
Diet Quality and Food Consumption, www.ers.usda.gov/Briefing/DietQuality/

America Eats More of Everything...

...and Too Much of Some Things

According to the 2005 Dietary Guidelines for Americans (see red highlights below)

DAIRY

Yogurt availability grew 1,213 percent between 1970 and 2006.

ADDED FATS AND OILS

Per capita availability of salad and cooking oils is up from **15.4 pounds** in 1970 to 44.5 pounds in 2006.

GRAINS

Whole wheat flour accounts for 4.1% of wheat production, a larger share than in 1970.

MEAT, EGGS, NUTS

Chicken availability trailed beef by 52 pounds in 1970, but is close to beef today.

1970		2006
563.9	DAIRY	up 8% 606.3
224.8	MEAT, EGGS, NUTS	up 8% 243.7
336.8	VEGETABLES	up 21% 406.4
52.5	ADDED FATS AND OILS	up 61% 84.5
136.5	GRAINS	up 41% 192.8
237.9	FRUIT	up 13% 269.6
119.1	ADDED SUGAR/SWEETENERS	up 17% 138.9

1,671.6
pounds of food per capita available for consumption

U.S. Food Availability
Up 16%
Per Person Since 1970

1,942.4
pounds of food per capita available for consumption

VEGETABLES

Three-quarters of the tomatoes available for consumption in 2006 were canned or used in tomato-based products such as salsa and pasta sauce.

FRUIT

Bananas and apples continue to be the top two fruit choices.

ADDED SUGAR/SWEETENERS

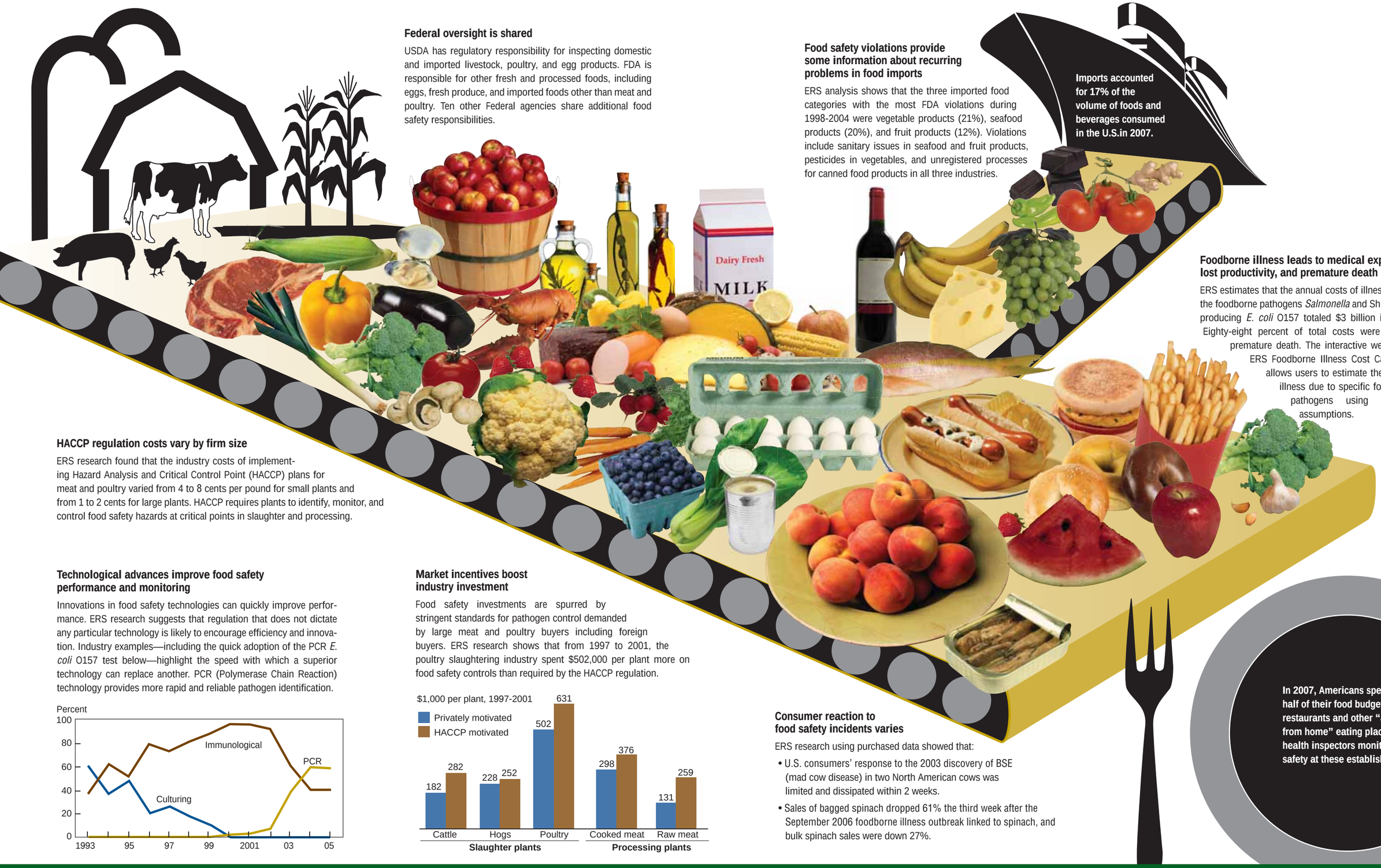
High-fructose corn syrup's share of caloric sweeteners grew from 0.5% in 1970 to 42% in 2006.

ERS maintains the only time series data on the amount of food available for consumption in the United States. For many commodities, the data series extends back to 1909. ERS builds on these data to provide estimates of per-capita consumption and nutrient availability.

For more information, see the ERS Website:
Diet Quality and Food Consumption: Dietary Trends from Food and Nutrient Availability Data, www.ers.usda.gov/briefing/dietquality/availability.htm

Food Safety From Farm to Fork

Policy, market incentives, and technology influence use and efficacy of safety controls throughout the food supply



Federal oversight is shared

USDA has regulatory responsibility for inspecting domestic and imported livestock, poultry, and egg products. FDA is responsible for other fresh and processed foods, including eggs, fresh produce, and imported foods other than meat and poultry. Ten other Federal agencies share additional food safety responsibilities.

Food safety violations provide some information about recurring problems in food imports

ERS analysis shows that the three imported food categories with the most FDA violations during 1998-2004 were vegetable products (21%), seafood products (20%), and fruit products (12%). Violations include sanitary issues in seafood and fruit products, pesticides in vegetables, and unregistered processes for canned food products in all three industries.

Imports accounted for 17% of the volume of foods and beverages consumed in the U.S.in 2007.

Foodborne illness leads to medical expenses, lost productivity, and premature death

ERS estimates that the annual costs of illness due to the foodborne pathogens *Salmonella* and Shiga toxin producing *E. coli* O157 totaled $3 billion in 2007. Eighty-eight percent of total costs were due to premature death. The interactive web-based ERS Foodborne Illness Cost Calculator allows users to estimate the cost of illness due to specific foodborne pathogens using different assumptions.

HACCP regulation costs vary by firm size

ERS research found that the industry costs of implementing Hazard Analysis and Critical Control Point (HACCP) plans for meat and poultry varied from 4 to 8 cents per pound for small plants and from 1 to 2 cents for large plants. HACCP requires plants to identify, monitor, and control food safety hazards at critical points in slaughter and processing.

Technological advances improve food safety performance and monitoring

Innovations in food safety technologies can quickly improve performance. ERS research suggests that regulation that does not dictate any particular technology is likely to encourage efficiency and innovation. Industry examples—including the quick adoption of the PCR *E. coli* O157 test below—highlight the speed with which a superior technology can replace another. PCR (Polymerase Chain Reaction) technology provides more rapid and reliable pathogen identification.

Market incentives boost industry investment

Food safety investments are spurred by stringent standards for pathogen control demanded by large meat and poultry buyers including foreign buyers. ERS research shows that from 1997 to 2001, the poultry slaughtering industry spent $502,000 per plant more on food safety controls than required by the HACCP regulation.

Consumer reaction to food safety incidents varies

ERS research using purchased data showed that:

- U.S. consumers' response to the 2003 discovery of BSE (mad cow disease) in two North American cows was limited and dissipated within 2 weeks.
- Sales of bagged spinach dropped 61% the third week after the September 2006 foodborne illness outbreak linked to spinach, and bulk spinach sales were down 27%.

In 2007, Americans spent almost half of their food budgets at restaurants and other "away from home" eating places. Local health inspectors monitor food safety at these establishments.

ERS provides analyses of economic issues that affect the safety of the U.S. food supply, including the effectiveness and cost of alternative policies and programs designed to protect consumers from unsafe food.

For more information, see the ERS Website:
Food Safety Briefing Room, www.ers.usda.gov/Briefing/FoodSafety/

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