Chapter 4.9

U.S. Organic Agriculture

Catherine Greene

U.S. farmland under organic management has grown steadily for the last decade as farmers strive to meet consumer demand. By 2003, the United States had over 2 million acres of certified organic crops and pasture. USDA implemented an organic regulatory program in 2002, and Federal research and education activities have also emerged.

Introduction

Farmers have been developing organic farming systems in the United States since the 1940s, and organic markets have emerged and expanded greatly since then. USDA implemented national standards for organic production and processing in October 2002, following more than a decade of development, and the new uniform standards have facilitated further growth in the organic farm sector. USDA's organic standards incorporate cultural, biological, and mechanical practices that foster cycling of resources, ecological balance, and protection of biodiversity—practices that have evolved over the last half-century.

An increasing number of U.S. farmers are adopting these systems in order to lower input costs, conserve nonrenewable resources, capture high-value markets, and boost farm income. Despite the time, costs, and effort required to meet these stringent requirements, USDA estimates that farmers and ranchers added more than a million acres of certified organic land for major crops and pasture between 1995 and 2003, doubling organic pasture and more than doubling organic cropland for major crops. Total certified organic cropland and pasture now encompasses 2.2 million acres in 49 States. Organic livestock, which require access to organic pasture, have grown more numerous since USDA lifted restrictions on organic meat labeling in late 1999. Food crops and other animal foods (eggs and dairy) are regulated by the Food and Drug Administration and were allowed to carry an organic label throughout the 1990s.

Consumer demand for organically produced goods has risen for over a decade, providing market incentives for U.S. farmers across a broad range of products. Organic products are now available in nearly 20,000 natural food stores and nearly 3 of 4 conventional grocery stores. Organic sales account for approximately 2 percent of total U.S. food sales, according to recent industry statistics. Farmers' markets and other direct-market venues have also grown in number over the last decade, and are especially popular among organic producers. Organic farmers are also finding ways to capture a larger segment of the consumer food dollar through onfarm processing, producer marketing cooperatives, and new forms of direct marketing, including agricultural subscription services.

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U.S. Organic Production Standards

Organic farming systems rely on ecologically based practices, such as biological pest management and composting; virtually exclude the use of synthetic chemicals, antibiotics, and hormones in crop production; and prohibit the use of antibiotics and hormones in livestock production. Under organic farming systems, the fundamental components and natural processes of ecosystems—such as soil organism activities, nutrient cycling, and species distribution and competition—are used as farm management tools. For example, crops are rotated, food and shelter are provided for the predators and parasites of crop pests, animal manure and crop residues are cycled, and planting/harvesting dates are carefully timed.

Organic livestock production systems attempt to accommodate an animal's natural nutritional and behavioral requirements, ensuring that dairy cows and other ruminants, for example, have access to pasture. The 2002 USDA livestock standards incorporate requirements for living conditions, pasture and access to the outdoors, feed ration, and health care practices suitable to the needs of the particular species.

The national organic standards address the methods, practices, and substances used in producing and handling crops, livestock, and processed agricultural products. Although specific practices and materials used by organic operations may vary, the standards require every aspect of organic production and handling to comply with the provisions of the Organic Foods Production Act of 1990. Organically produced food cannot be produced using genetic engineering, sewage sludge, or irradiation. These standards include a national list of approved synthetic substances (such as insecticidal soaps and horticultural oils), and prohibited nonsynthetic substances (such as arsenic, strychnine, and tobacco dust) for use in organic production and handling. (See "National Organic Program" on USDA's Agricultural Marketing Service website.)

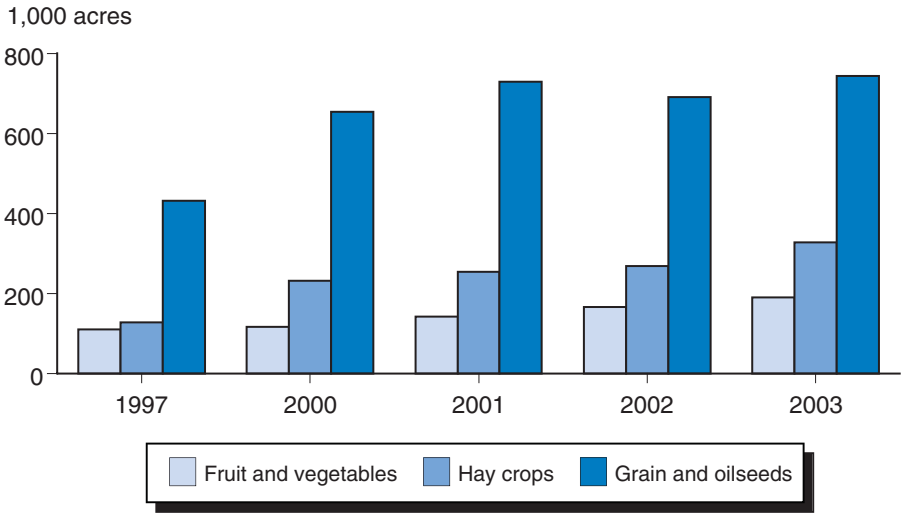
Adoption of Organic Farming Systems

U.S. farmland under organic management has grown steadily for the last decade as farmers strive to meet consumer demand in both local and national markets. U.S. certified organic crop acreage more than doubled between 1992 and 1997, and doubled again between 1997 and 2003 for many crops. Organic fruit and vegetable crop acreage, along with acreage used for hay and silage crops, expanded steadily between 1997 and 2003. However, most of the acreage increase for organic grain and oilseed crops took place early in this period (fig. 4.9.1), and organic soybean acreage has declined substantially since 2001.

Certified organic pasture (including ranchland) declined between 1992 and 1997, but increased 50 percent between 1997 and 2003 after USDA lifted restrictions on organic labeling for meat and poultry. Overall, U.S. farmers and ranchers in 49 States dedicated 2.2 million acres of cropland and pasture to organic production systems in 2003 (table 4.9.1). Many crop/livestock sectors and most States showed strong growth between 2002 and 2003. While certified organic cropland accounted for only 0.4 percent of

Figure 4.9.1

U.S. certified organic acreage, selected crops, 1997-2003



Source: Economic Research Service, USDA.

Table 4.9.1

U.S. certified organic farmland acreage, livestock numbers, and farm operations, 1997 and 2003

Item	1992	1997	2003	Change 1992-1997	Change 1997-2003
				Percent	
U.S. certified farmland:					
Total	935,450	1,346,558	2,196,874	44	63
Pasture/rangeland	532,050	496,385	745,273	-7	50
Cropland	403,400	850,173	1,451,601	111	71
		Number			
U.S. certified animals:					
Livestock--					
Beef cows	6,796	4,429	27,285	-35	516
Milk cows	2,265	12,897	74,435	469	477
Hogs and pigs	1,365	482	6,564	-65	1,262
Sheep and lambs	1,221	705	4,561	-42	547
Total livestock[1]	11,647	18,513	124,346	59	572
Poultry--					
Layer hens	43,981	537,826	1,591,181	1,123	196
Broilers	17,382	38,285	6,301,014	120	16,358
Turkeys	--	750	217,353	--	28,880
Total poultry[2]	61,363	798,250	8,780,152	1,201	1,000
Total certified operations*	3,587	5,021	8,035	40	60

[1]Total livestock includes other and unclassified animals.

[2]Total poultry includes other and unclassified animals.

*Number does not include subcontracted organic operations.

Numbers may not add due to rounding.

Source: Economic Research Service, USDA.

U.S. cropland in 2001, the share is much higher in some crops, such as fruits (over 2 percent), and vegetables (over 4 percent).

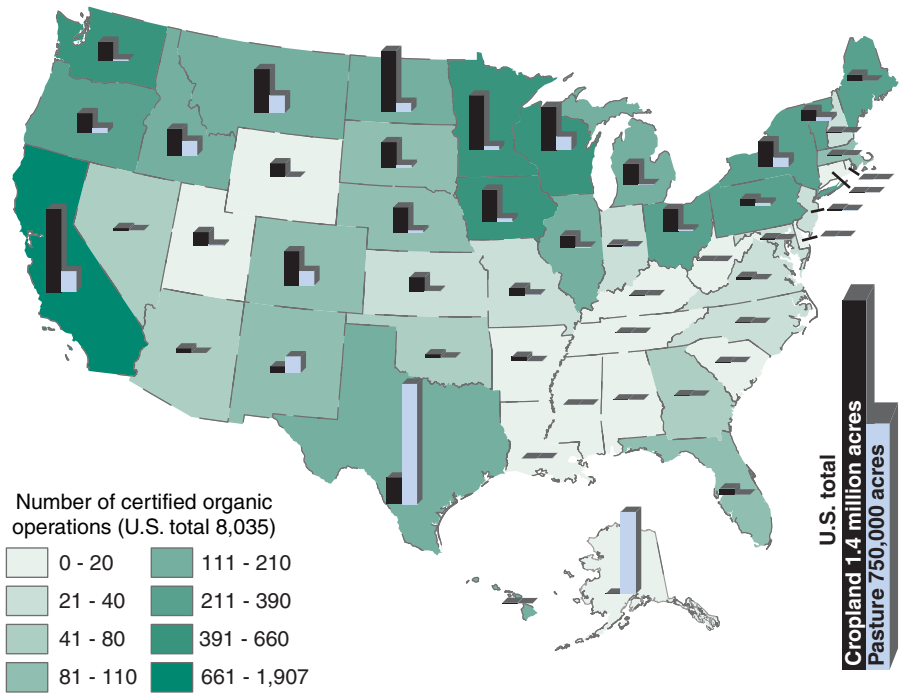
California was the leading State in certified organic cropland in 2003, with nearly 180,000 acres, mostly used for fruit and vegetable production. North Dakota followed with nearly 130,000 acres of cropland, mostly for wheat, soybeans, and other field crops. Minnesota, Montana, Colorado, and Iowa were other top States.

Nearly 40 States had certified pasture and rangeland in 2003, most with under 20,000 acres, although several States had over 100,000 acres and Texas had over 250,000 acres. The number of certified organic beef cows, milk cows, hogs, pigs, sheep, and lambs was up more than five-fold since 1997, and up 15 percent between 2002 and 2003. Dairy has been one of the fastest growing segments of the organic foods industry during this period, and milk cows accounted for over half of the certified livestock animals. Poultry animals raised under certified organic management—including layer hens, broilers, and turkeys—showed even higher levels of growth during 1997-2003.

California had more certified operations than any other State, with just over 1,900 operations in 2003, up 28 percent from the previous year (fig. 4.9.2). Wisconsin, Washington, Iowa, Minnesota, New York, Ohio, Vermont, Oregon, and Maine rounded out the top 10. Many of these States have a high proportion of farms with fruits and vegetables and other specialty crops. Also, some of these States, particularly in the Northeast, have relatively little cropland but a large concentration of market gardeners.

Figure 4.9.2

Certified organic acreage and operations, 2003



Source: Economic Research Service, USDA.

Although consumer demand for organic foods is expected to continue growing rapidly in the United States and other major markets, the competition for these markets is likely to increase considerably. Since 2002, USDA has accredited over 40 organizations in foreign countries, as well as approximately 50 groups in the United States, to certify producers and handlers. USDA's Foreign Agricultural Service estimates that the value of U.S. organic exports in 2002 was between $125 million and $250 million, while the value of U.S. organic imports was between $1.0 and $1.5 billion (U.S. Department of Agriculture, 2005). Cotton and soybeans are among the U.S. organic crops that have declined since 2001, despite the growth in retail sales of cotton and soy-based products. Import competition has likely played a role in the decline.

Economic Characteristics of Organic Systems

The rapid increase in organic crop and livestock production reflects the increase in consumer demand for organically produced food—20 percent or more per year throughout the 1990s. According to industry data, retail sales of organic food reached $10.4 billion in 2003, up 20.4 percent from the previous year, and accounting for nearly 2 percent of U.S. food sales.

Farmgate and retail price data, collected by private groups, have indicated substantial organic premiums for fruits, vegetables, and milk over the last decade, and recent government data show similar premiums at the wholesale level. Organic grain and soybean crops also enjoyed substantial price premiums during the 1990s, exceeding 50 percent for corn, soybeans, wheat, and oats during 1993-99, and continue to carry a substantial premium (Streff and Dobbs, 2004).

A number of studies have been conducted on the motivations of consumers who purchase organic foods, such as perceived health attributes and concern about pesticide residues and the environment (Dimitri and Greene, 2002). Potential benefits from organic farming systems include improved soil tilth and productivity, lower energy use, and reduced use of pesticides (USDA, 1980; Smolik et al., 1993), and researchers are beginning to compare differences in the nutritive value of the foods produced from these systems as well (Gold, 2000).

A growing number of studies in the United States have examined the yields, input costs, profitability, managerial requirements, and other economic characteristics of organic farming. A 1990 review of the U.S. literature at Cornell concluded that the "variation within organic and conventional farming systems is likely as large as the differences between the two systems," and found mixed results in the comparisons for most characteristics (see Chapter 4.8. for more information on conventional systems).

Several USDA and university studies during the 1990s in California, Ohio, and Texas indicated that organic price premiums are necessary to give organic farming systems comparable or higher whole-farm profits than conventional systems, particularly for crops like processed tomatoes and cotton. A Henry A. Wallace Institute of Alternative Agriculture review of university-based compar-

ative studies in the 1980s and early 1990s on Midwestern organic grain and soybean production found organic systems needed price premiums to be more profitable than conventional systems (Welsh, 1999). Several of these studies, however, found that organic grain and soybean production could be as profitable even without price premiums due to higher yields in drier areas or periods, lower input costs, or higher revenue from the mix of crops used in the system. Other recent studies have also found that some organic systems may be more profitable than conventional systems, even without price premiums (Swezey et al., 1994, Reganold et al., 2001).

Net returns to both conventional and organic production systems vary with factors such as soil type, climate, and proximity to markets, and help explain the wide variation in economic performance within each system. Factors not captured in standard profit calculations—such as convenience, longer-term planning horizons, and environmental ethics—can motivate rational adoption of a particular practice or farming system. Our understanding of the factors influencing net returns to organic farming systems remains imperfect.

Economic research on organic farming has tended to focus narrowly on profitability (Fox et al., 1991), but land-grant universities and others are increasingly examining the long-term economics of organic systems through replicated field trial research and a multidisciplinary systems approach (table 4.9.2).

According to the Organic Farming Research Foundation, 18 States had land-grant institutions with research acres under certified organic management in 2003, up from 6 States in 2001. Organic farming systems trials—in experiment stations and onfarm settings—seek to answer basic research questions about yields, profitability, and environmental impacts, as well as to address farmer-defined management and production obstacles to adoption of organic production systems.

USDA's national standards do not restrict additional eco-labeling of organic products, and some organic certifiers are developing standards on social aspects of agricultural production and food distribution—such as fair trade and local sourcing. The Florida Certified Organic Growers and Consumers organization, for example, recently developed a partnership program for food retailers and restaurants in North Florida to certify their level of commitment to local food sourcing (FOG/QCS, 2003). Most coffee sold in the United States that is certified as fair trade (indicating that farmers receive a fair price) also has a separate organic certification. Some certification groups are trying to improve the efficiency of their efforts by integrating these programs.

Federal Policy Initiatives

Government research and policy initiatives often play a key role in the adoption of new farming technologies and systems. Worldwide, adoption levels for organic farming systems are currently the highest in European Union countries. Governments there have been developing consumer education initiatives and providing direct financial support to producers for conversion since the late 1980s to capture environmental benefits and support rural development.

Table 4.9.2—Examples of U.S. multidisciplinary, long-term research projects with organic trials

Project	Date established	Farming system/Commodity focus
University of Nebraska-Lincoln *Long-Term Experiment Trials*	1975	Compare conventional and organic systems (Rotations include corn, wheat, and soybean)
Rodale Institute—Kutztown, PA *Farming Systems Trial™*	1981	Examine the transition process from conventional to organic farming (corn and soybeans)
University of California-Davis *Sustainable Agriculture Farming Systems Project*	1988	Compare conventional, low-input and organic systems; evaluate conservation tillage in these systems (tomato, safflower, bean, corn)
Iowa State Univ.—Leopold Center *Neely-Kinyon Long-Term Agroecological Research*	1988	Compare conventional and organic systems (corn, soybeans and alfalfa)
University of Minnesota-Lamberton Experiment Station *Elwell Agroecology Farm*	1989	Compare conventional and organic systems (corn, soybeans, alfalfa and oats)
Michigan Agricultural Experiment Station *Living Field Laboratory*	1993	Compare conventional, organic and other systems (corn, soybeans, and wheat)
USDA Agricultural Research Center-Beltsville, MD *Farming Systems Project*	1993	Compare organic systems typical in the mid-Atlantic region (corn and soybeans)
West Virginia University (WVU) *Horticulture Farm Project*	1999	Evaluate organic systems on the entire Horticulture Farm (market garden and field crop/livestock systems)
North Carolina State University *Farming Systems Trial*	2001	Compare conventional and transitional organic systems (grains, livestock and woodlots)
Ohio State University *John Hirzel Sustainable Agriculture Research and Education Site*	2001	Compare conventional, no-till, and high-and low-input organic systems (soybeans, corn, wheat, and vegetables)

State and Federal support for organic farmers and handlers is also beginning to emerge in the United States. Minnesota and Iowa, for example, began subsidizing conversion to organic farming systems in the late 1990s as a way to capture the environmental benefits of these systems. In 2003, the National Association of State Departments of Agriculture released a policy statement on organic agriculture expressing support for a wide range of activities that would expand public-sector organic research and education and provide technical assistance to organic and transitional farmers.

USDA agencies have started or expanded programs on organic agriculture during the last several years, and the Farm Security and Rural Investment Act of 2002 (the 2002 Farm Act) contains several first-time research and technical assistance provisions to directly assist organic producers. Recent programs and initiatives include:

- *Certification Cost-Share Support.* In 2001, USDA established a certification cost-share program to help farmers defray certification costs in 15 States. The 2002 Farm Act allocated $5 million in cost-share assistance funds for this program and expanded eligibility to growers and handlers in all States.
- *Research and Technical Assistance.* The 2002 Farm Act contains an Organic Agriculture Research and Extension Initiative that authorizes $3 million per year in new mandatory appropriations in fiscal years 2003-07. These funds are being used to administer competitive research grants

focused on organic agriculture production, breeding, and processing methods, as well as the marketing and policy constraints.

- *Conservation Initiatives*. The 2002 Farm Act provided funding for the Conservation Security Program, which provides payments to producers for adopting or maintaining land management and conservation practices to address resource concerns. This new program may interest organic farmers who commonly adopt these types of practices as part of their organic farming systems. (See Chapter 5.1 for a general discussion of Federal conservation initiatives and Chapter 5.4 for a discussion of working-land programs.)
- *Exemptions From Marketing Assessments*. Another provision in the 2002 Farm Act specifies that certified organic producers who produce and market only organic products and do not produce any conventional or nonorganic products will now be exempt from paying an assessment under any commodity promotion law. In December 2003, USDA published a proposed rule to exempt producers from paying assessments associated with its marketing order programs, and in January 2005 a similar proposed rule was published to cover exemptions for its research and promotion programs.
- *Export Promotion, Crop Insurance, and Other Initiatives*. USDA's Risk Management Agency has provided insurance coverage for organic farming practices as good farming practices by written agreement since 2001, and made organic farmers eligible for a wider range of coverage options in 2004. USDA's Foreign Agricultural Service (FAS) is helping design protocols for working with foreign nations to keep organic trade moving as more countries develop organic standards.

References

Dimitri, Carolyn, and Catherine Greene (2002). *Recent Growth Patterns in the U.S. Organic Foods Market*, AIB-777, U.S. Dept. Agr., Econ. Res. Serv., Sept.

FOG/QCS (2003). *Certification Manual of North Florida Local Food Partnership, 2003-2004*, Florida Organic Growers & Consumers/Quality Certification Services. Gainesville, FL.

Fox, Glenn, Alfons Weersink, Ghulam Sarwar, Scott Duff, and Bill Deen (1991). "Comparative Economics of Alternative Agricultural Production Systems: A Review," *Northeastern Journal of Agricultural and Resource Economics,* Vol. 20.

Gold, Mary (2000). *"Organically Produced Foods: Nutritive Content,"* Special Reference Briefs Series SRB 2000-03, Alternative Farming Systems Information Center, National Agricultural Library, U.S. Dept. Agr., Agricultural Research Service.

Greene, Catherine, and Amy Kremen (2003). *U.S. Organic Farming in 2000-2001: Adoption of Certified Systems*, AIB-780, U.S. Dept., Agr., Econ. Res. Serv., June.

National Association of State Departments of Agriculture. 2003. *Organic Agriculture*, NASDA Policy Statement. Sept. 11.

Reganold, J.P., J.D. Glover, P.K. Andrews, and H.R. Hinman (2001). "Sustainability of three apple production systems," *Nature*, 410: 926-930.

Smolik, James D., Thomas L. Dobbs, Diane H. Rickerl, Leon J. Wrage, George W. Buchenau, and Thomas A. Machacek (1993). *Agronomic, Economic, and Ecological Relationships in Alternative (Organic), Conventional, and Reduced-Till Farming Systems*, B718, Agricultural Experiment Station, South Dakota State University, Sept.

Streff, Nicholas, and Thomas L. Dobbs (2004). *'Organic' and 'Conventional' Grain and Soybean Prices in the Northern Great Plains and Upper Midwest: 1995 through 2003,* South Dakota State University Economics Pamphlet 2004-1, Brookings, SD, June.

Swezey, Sean, Jim Rider, Matthew Werner, Marc Buchanan, Jan Allison, and Stephen Gliessman (1994). "Granny Smith conversions to organic show early success," *California Agriculture*, Vol. 48, No. 6.

U.S. Department of Agriculture (2000). "National Organic Program, Final Rule," *Federal Register* 7 CFR Part 205, Dec. 21.

U.S. Department of Agriculture (2005). "U.S. Market Profile for Organic Food Products," Commodity and Marketing Programs—Processed Products Division, International Strategic Marketing Group, Feb. 22.

U.S. Department of Agriculture, USDA Study Team on Organic Farming (1980). *Report and Recommendations on Organic Farming*, U.S. GPO No. 620-220/3641, July.

Welsh, Rick (1999). *The Economics of Organic Grain and Soybean Production in the Midwestern United States*, Policy Studies Report No. 13, Henry A. Wallace Institute for Alternative Agriculture, May.

Chapter 5.1

Conservation Policy Overview

Roger Claassen and Marc Ribaudo

USDA implements a broad range of conservation programs intended to protect natural resources and the environment. The Farm Security and Rural Investment Act of 2002 sharply expanded funding for conservation programs, focusing much of the increase on programs for working agricultural lands, e.g., cropland and grazing land.

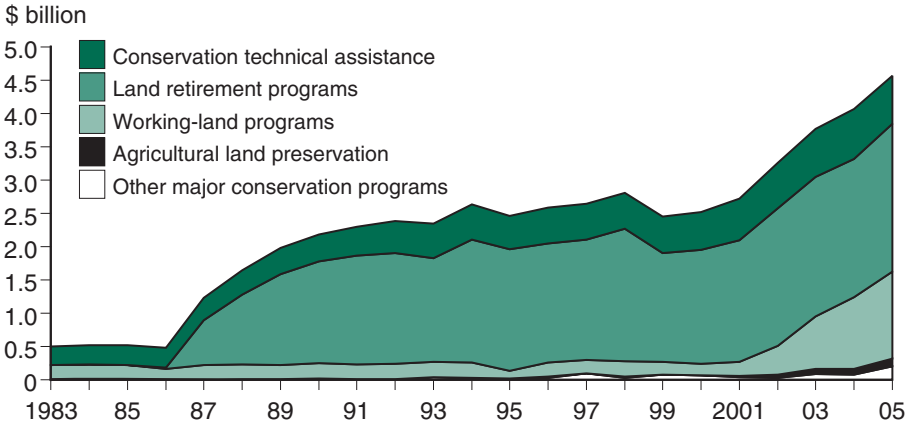
Introduction

Some farming practices (excess fertilization and manure, for example) can degrade our Nation's natural resources while others (such as land reservation for wildlife) can enhance our natural heritage. Policymakers have been devoting more attention and funding to conservation programs that support environmental enhancement and reduce the potential for environmental harm. Until 2002, the bulk of conservation funds went toward land retirement: paying farmers to remove environmentally sensitive land from crop production for a specified time. With the 2002 Farm Security and Rural Investment Act (2002 Farm Act), policymakers substantially increased conservation funding, especially on lands used for crop production and grazing (fig. 5.1.1).

By 2007—if authorized levels are realized—conservation funding will be double the level under the previous farm bill (1996-2001), with about two-thirds of the new funds going to programs emphasizing conservation on working lands.

Figure 5.1.1

Trends in USDA conservation expenditures, 1983-2005



Source: ERS analysis of Office of Budget and Program Analysis data.

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