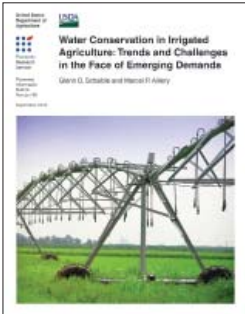


# ERS *Report Summary*

Economic Research Service

September 2012

U.S. Department of Agriculture



This is a summary  
of an ERS report.

Find the full report at  
<http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib99.aspx>

## Water Conservation in Irrigated Agriculture: Trends and Challenges in the Face of Emerging Demands

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### What Is the Issue?

Population and economic growth, changing social values about the importance of water quality and the environment, and Native American water-right claims will continue to drive growing U.S. demand for water resources. Expansion of the U.S. energy sector is expected to further increase regional demands for water. At the same time, projected climate change—through warming temperatures, shifting precipitation patterns, and reduced snowpack—is expected to reduce water supplies and increase water demand across much of the West.

These trends are placing greater pressure on existing water allocations, heightening the importance of water management and conservation for the sustainability of irrigated agriculture. How well irrigated agriculture adapts to growing constraints on water, particularly by increasing its water-use efficiency, will directly affect the economic health and sustainability of the sector.

### What Did the Study Find?

Irrigated agriculture, which accounts for 80-90 percent of consumptive water use in the United States, represents a significant share of the value of U.S. agricultural production.

- Based on the 2007 Census of Agriculture, irrigated farms accounted for roughly 40 percent (\$118.5 billion) of the value of U.S. agricultural production; nationwide, the average value of production for an irrigated farm was more than three times the average value for a dryland farm.
- Irrigated farms accounted for 54.5 percent (\$78.3 billion) of the value of all crop products sold and contributed to the farm value of livestock and poultry production through animal forage and feed production. Livestock/poultry products accounted for roughly a third of market sales for irrigated farms and 63 percent for nonirrigated (dryland) farms. Irrigated forage and feed production contributed to the livestock/poultry market sales for both irrigated and nonirrigated farm types.
- Nearly 57 million acres were irrigated across the United States in 2007, or 7.5 percent of all cropland and pastureland. Roughly three-quarters of U.S. irrigated agriculture occurred in the 17 Western States, although irrigation has been expanding in the more humid Eastern States.
- Based on the 2008 Farm and Ranch Irrigation Survey (a followup to the 2007 Census of Agriculture), irrigated agriculture across the Western States applied 74 million acre-feet (24

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trillion gallons) of water for crop production, with 52 percent originating from surface-water sources and 48 percent pumped from wells that draw from local and regional aquifers.

Demands on agricultural water supplies are likely to increase over time as alternative nonfarm uses of water continue to grow. Potential Native American water-right claims have been estimated at nearly 46 million acre-feet annually and could impact the distribution and cost of irrigation water in the West. For many States, the scope of water demands for the environment have expanded from a minimum instream flow to an “environmental-flows” standard (i.e., a concept requiring water to meet the needs for water quality, but to also rehabilitate ecosystem habitats). Energy-sector growth is expected to significantly increase water demands for an expanding biofuels sector, utility-scale development of solar power, innovation in thermoelectric generating capacity, and commercial oil-shale and deep shale natural gas development. Expansion in these competing water demands, especially with water supply/demand impacts expected with climate change, presents new challenges for agricultural water use and conservation, particularly in the arid Western States.

While substantial technological innovation has increased the efficiency of irrigated agriculture over the past several decades, significant potential exists for continued improvement. At least half of irrigated cropland acreage across the United States is still irrigated with less efficient, traditional irrigation application systems. In addition, most irrigators do not make use of the more efficient onfarm water-management practices that conserve the most water.

- Irrigators continue to make significant investments in new and improved irrigation systems. Approximately \$2.15 billion was invested in irrigation systems in 2008, a 92-percent increase over investments for 2003.
- Most onfarm irrigation investment is financed privately—less than 10 percent of farms reported financing irrigation improvements in 2008 through public financial assistance programs. Nearly 57 percent of the farms that received financial assistance for irrigation technology adoption did so through USDA’s primary working lands conservation program—the Environmental Quality Incentives Program (EQIP). Irrigated farms participating in EQIP, however, represented only about 4 percent of all farms making irrigation investments in 2008.
- Over time, EQIP funding has had an important impact on irrigation investments, amounting to \$1.4 billion from 2004 through 2010. Nationally, irrigation practices accounted for roughly a quarter of total EQIP funding obligations (\$5.7 billion) during 2004-10.
- Less than 10 percent of irrigated farms use advanced onfarm water management decision tools, such as soil- or plant-moisture sensing devices, commercial irrigation-scheduling services, or computer-based crop-growth simulation models. The sustainability of irrigated agriculture may depend partly on the willingness and ability of producers to adopt irrigation “production systems” that more effectively integrate improved water management practices with efficient irrigation application systems.
- Agricultural water conservation is both a farm and basin-level resource conservation issue. Integrating the use of improved onfarm irrigation efficiency with State and Federal watershed water-management tools (e.g., conserved water rights, drought water banks, option and contingent water markets, reservoir management, irrigated acreage and groundwater pumping restrictions, and irrigated acreage retirement) encourages producers to recognize and respond to differing values of water across competing uses, improving the potential for sustainable irrigation while facilitating water reallocation to other uses.

## How Was the Study Conducted?

This report draws on several USDA agricultural production and water-use analyses and surveys, as well as an extensive literature review, to describe the U.S. irrigated agriculture sector, existing and emerging water demands, trends in water-use efficiency in irrigated agriculture, and funding levels (private and public) for farm-level irrigation investments. USDA’s Censuses of Agriculture (1982-2007) and Farm and Ranch Irrigation Surveys (FRIS) for 1984-2008, together with the U.S. Geological Survey’s (USGS) water-use summaries, were used to assess the demand for U.S. water resources and the importance of irrigation to U.S. agriculture—where it occurs, what it produces, how much water agriculture uses, the water sources supplying irrigation, and the costs of irrigation. FRIS data are also used to analyze the efficiency of irrigated agriculture as of 2008 to demonstrate the potential for continued agricultural water conservation as producers more effectively integrate onfarm and off-farm water management practices with improved irrigation production systems. USDA’s FRIS and conservation program contract data are used to examine the current status of private and public investments in irrigated agriculture.