Drip Irrigation Subsidies May Increase Consumption

Subsidies to encourage farmers to adopt more efficient drip irrigation may actually result in an overall increase in water use, reported scientists in a November issue of the Proceedings of the National Academy of Science.

Drip irrigation and other water-conserving irrigation technologies were believed to make more water available for cities and the environment. To test this hypothesis, researchers from New Mexico State University and the Polytechnic University of Valencia in Spain created a basin-scale hydroeconomic optimization model that links biophysical, hydrologic, agronomic, economic, policy, and institutional dimensions of the Upper Rio Grande Basin from its headwaters in Colorado to 70 miles south of the twin border cities of El Paso, Texas, and Ciudad Juarez, Mexico. The model analyzed the effects of water conservation policies on water used in irrigation and water conserved.

Increasing a subsidy for drip irrigation encourages more farmers to implement the technology and increases the total acreage in production, the authors found. The total water applied in the modeled Elephant Butte Irrigation District fell from 364,000 acre-feet under a base case of zero subsidy to 342,000 acre-feet under a 100 percent subsidy. However, the net effect was greater water depletion from increased evapotranspiration and less water available for other uses, resulting in a negative balance of 36,700 acre-feet per year.

Under traditional flood irrigation, water that is not consumptively used by crops becomes available for environmental use, downstream surface-water use, or as aquifer recharge. Drip irrigation applies water directly to a plant’s root zone, significantly reducing runoff or infiltration and increasing crop yield. However, that crop-yield increase is supported by an increase in consumptive use of water, even when less water is being applied than would be under flood irrigation. The increased depletions reduce the amount of water available downstream and may impair the water rights of others.

As subsidy levels increase, so does net farm income, as a result of increased yields, reduced capital costs, and reduced energy and pumping costs. The subsidies therefore do not offer economic incentives to farmers to reduce depletions. If the hydrologic realities of a river basin were reflected in water regulations, wrote the authors, the right to farmed acreage and water applied would be reduced after adoption of more efficient irrigation technology.


continued on next page

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Photo courtesy of the Yucca Mountain Project
Lake Powell Capacity Rises with Drought

Lake Powell’s capacity to hold usable water increased during a period of prolonged drought, researchers reported in the November issue of Geology. Three bathymetric surveys of the reservoir bottom conducted during the very dry years of 1999 to 2005 indicated massive amounts of sediment were transferred from the perimeter of the reservoir into its deepest sections.

Because the deep sections are below the reservoir’s outtake channels, the capacity lost there is not usable. However, the shallow edges of the reservoir—from where the sediment moved—can hold usable water. The total mass of sediment transferred from the lake perimeter to its bottom equaled approximately one cubic kilometer, or 22 years of average sediment input.

During the period studied, inflow to the lake from the Colorado, San Juan, and other rivers was halved, and the lake level fell more than 144 feet, exposing poorly consolidated delta deposits. The diminished river flows crossing the deltas became so choked with sediment that they periodically entered the lake as submarine avalanches. Researchers tracked one underwater avalanche using acoustic imaging as it spilled down from a delta into the lake.


Pesticides in Salton Sources

Researchers have known for years that the rivers flowing into the Salton Sea are laden with pesticides, and a new U.S. Geological Survey report found no shortage of the pollutants.

The Alamo and New rivers originate in Mexico and flow north through the Imperial Valley to the Salton Sea, accumulating agricultural drainage along the way. In 2006, 1,200 tons of active ingredients in pesticides were applied to 60 different crops in the watershed.

Water and suspended sediment samples were collected from the rivers during periods of peak pesticide application. Twenty-four samples were analyzed for 61 pesticides in water and 87 pesticides in suspended sediments.

USGS detected 25 pesticides in the water samples, with concentrations as high as 8.9 micrograms per liter. Dissolved concentrations of four currently used pesticides exceeded EPA aquatic life benchmarks.

USGS detected 34 pesticides in suspended sediment samples with concentrations as high as 174 micrograms...
Bottled Water: What Are We Paying For?

The quality of some bottled water brands is no better than tap water, according to a report released in October by the Environmental Working Group (EWG). Laboratory tests conducted for EWG found that 10 popular brands of bottled water purchased in nine states and the District of Columbia contained 38 pollutants altogether, with an average of eight contaminants in each brand. The contaminants included disinfection byproducts, caffeine, pharmaceuticals, heavy metals, and fertilizer residue.

All brands tested met federal standards, but EWG pointed out that the high price of bottled water—at a typical cost of $3.79 per gallon—leads to customers’ expectations of purity that go beyond what comes out of the tap: expectations that may not be justified.

Two brands violated California standards. Walmart’s Sam’s Choice bottled water contained the disinfection byproduct trihalomethane at levels higher than California’s bottled water standard. It also contained bromodichloromethane at levels that exceed California’s Safe Drinking Water and Toxic Enforcement Act of 1986.

The same chemicals found in Sam’s Choice were also found in Giant’s Acadia brand at levels exceeding California’s safety standards, but this brand is not sold in California.

The California standards are more strict than the U.S. Food and Drug Administration standards for bottled water and the U.S. EPA limit for tap water, but Sam’s Choice and Acadia also exceeded the bottled water industry’s own voluntary limits.


Woody Brush Is No Water Hog

Woody plants such as juniper and mesquite that encroach into historic grasslands may not consume as much water as previously thought, reported Jim Heilman, a Texas AgriLife research scientist, at the American Geophysical Union meeting last May. Heilman’s data show only small increases in the amount of water consumed after brush encroachment. However, he says, encroachment of juniper has led to a six-fold increase in carbon sequestration. This means bulldozing the brush to save a small amount of water may not be wise compared to the benefits of countering global warming.

Visit agnews.tamu.edu.

River Otters Return To NM

After a 55-year absence, river otters were released in New Mexico last fall. The first release of five otters trapped in Washington took place in October on the Rio Pueblo de Taos. A larger release occurred on the Upper Rio Grande in November.

The reintroduction program was organized by Taos Pueblo, the New Mexico Department of Game and Fish, the U.S. Bureau of Land Management, and the New Mexico Friends of River Otters, a coalition of government agencies and conservation organizations.

River otters are believed to have once inhabited the Gila, Rio Grande, Mora, San Juan, and Canadian river systems in New Mexico. The last confirmed sighting in the state was in 1953.