Crop irrigation costs electrical consumers, says OSU study

Crop irrigation with Columbia River water has dramatically boosted farm productivity in Eastern Oregon and Washington, but not without cost to Pacific Northwest electricity consumers.

A new study at Oregon State University finds that water used for irrigation causes a loss of hydroelectric generating capacity. For example, expansion of irrigated areas in the East High district of Eastern Washington, using water from the lake formed by Grand Coulee Dam, could cost over $200 per developed acre to replace lost generating capacity. If this area were fully developed as proposed, it would cost electric ratepayers about $70 million per year.

However, there may be ways that farmers and hydroelectric producers could cooperate for mutual benefit and reduce these losses, according to Bruce McCarl and Mark Ross, who conducted the study.

"Historically, Columbia River water had not been highly valued because it was so abundant," said McCarl, an OSU professor of agriculture and resource economics. "It's different now. Virtually all of the river water passes through hydroelectric generating facilities, and with these fantastically expensive power plants being built for supplementary power, the cost of reduced river flow is substantial. New irrigation development can divert water from these dams, and the dams do not have 'water rights.'"

This research, conducted through the Water Resources Research Institute at OSU, has generally reconfirmed similar conclusions of a 1981 study done by researchers at Washington State University, which had been questioned because it did not consider enough of the variables involved. The new study considers many more variables, outlines the financial implications in several different scenarios, and offers some possible solutions to the problems involved.

One primary problem with hydroelectric power generation is that water flow fluctuates widely from year to year. Because of that, other facilities must be built to meet electric demands during peak periods and in low water years, when the hydroelectric supply is insufficient.

Because of that, McCarl said, substantial costs are incurred when farmers with irrigation rights to Columbia River water take all they're entitled to, even in low water years. In those low water years, other power sources, such as coal and nuclear generating plants, become particularly necessary for peak power demands. And the construction of those power plants is an expensive necessity dictated bythe current system.

"We definitely determined that there is a tradeoff between irrigation and generating capacity, and we were able to put some dollar figures on the losses involved," McCarl said. "New irrigation developed by the Bureau of Reclamation in the East High District, which does not involve substantial water fees or payment for the pumping costs to deliver it to the farm, can cost area electricity consumers the equivalent of $200 per acre each year. Columbia River water is not a valueless commodity."

McCarl noted that these costs would be offset by the positive effects of agricultural output, as its profits are recycled through the local communities. However, these benefits often appear to be less than the costs, he said.

There are several ways of reducing the costs to consumers of new irrigation development, McCarl said. One possibility is to encourage development of irrigated agriculture in downstream areas of the Columbia that have less hydropower potential. Some such land is available in Oregon and southern Washington, he said.

Another option would require farmers to pay the full costs of bringing water to their land, which requires expensive electrical pumping systems, rather than having these costs reduced by the Bureau of Reclamation or in subsidized power rates. In the East High district, this approach would reduce the cost of the water in terms of potential hydropower.

A big saver, however, would be a system of interruptible water access for agriculture, in which farmers would receive water only in years when water flow is not critically short. In about three years out of 40, they might be asked not to withdraw any water and would be paid a fair price by utility companies for the agricultural losses, McCarl said.

"It appears we could better afford to pay the farmers for their losses, rather than build power plants just for peak demand periods," McCarl said. "By our figuring, it might reduce power consumers' costs by 80 percent, just by paying the farmers not to farm in low water flow years. This wouldn't eliminate the costs to electricity consumers, but it would help."