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Saving water a waste?

By Lauren Monaghan
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Water

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SYDNEY: Measures to conserve water in irrigation may actually increase overall water usage, new research from North America suggests.

While using an irrigation method more efficient in water usage considerably reduces water needed for farming, it actually increases overall water use, report researchers from New Mexico State University in the US and the Technical University of Valencia in Spain.

"Our findings suggest re-examining the belief widely held…that increased irrigation efficiency will relieve the world's water crisis," wrote researchers Frank Ward and Manuel Pulido-Velazquez.

The duo, who used mathematic modelling of water use in North America's Upper Grande Rio Basin, have come up with a finding that seemingly flies in the face of conservation logic.

They highlight an apparent downfall in water conservation policy, which encourages farmers to use efficient irrigation practices, saying that increased water efficiency in agriculture - the world's largest user - will not free up water for environmental uses, as is the widespread belief.

Instead, it will lead to irrigators investing the water they save back into producing higher crop yields on greater acreages.

Large scale problem

The researchers analysed water use in 'drip irrigation', a farming measure widely believed to conserve water, and which is being increasingly used in Australia's own Murray-Darling Basin.

Drip irrigation allows water to be supplied precisely where it is needed - at the root area of a plant - rather than being spread all over huge areas of farming land ('flood irrigation').
In theory this sounds good - and indeed, depending on the crop, about half the amount of water is needed for drip irrigation compared with flood irrigation, the researchers said.

However, while much more water is needed in flood irrigation, the excess ultimately returns into the basin as runoff, wending its way back into the original flow to be shared among other users.
"One user's water inefficiency often serves as the source of another user's water supply," the researchers wrote.
But with the apparently more efficient drip irrigation technique, water no longer leaks back into the system, which means users downstream need to take water they might otherwise siphon.
Furthermore, much more water is irretrievably lost through 'evapotranspiration' (the process of plants using water to grow).
Ward and Pulido-Velazquez conclude that while "drip irrigation is important for many reasons, including water productivity and food security, [it] does not necessarily save water when considered from a basin scale."

Murray-Darling connection

Peter Smith, an irrigation officer from the NSW Department of Primary Industries, believes these findings may hold some relevance to water conservation efforts in Australia's own Murray-Darling Basin.
"Improvements in irrigation systems and management do not necessarily lead to water savings," he said.
"The real issue is that improvements in efficiency result in [farmers] being able to grow more with their water, so the savings don't automatically revert to environmental or other uses."
So rather than growing one field inefficiently, a farmer may instead use every drop available more efficiently in order to grow two successful fields.
Along with this greater water use, there may be other "hidden dangers" of improving water efficient irrigation, adds Smith's NSW-based colleague Kelvin Montagu, from the national oraganisation, Cooperative Research Centre for Irrigation Futures.
"The build up of salt as well is becoming a major problem, particularly in the very light soils of South Australia," he said.
"When we become more water-efficient, like with drip irrigation, we end up with not enough water running through the soil to take away the natural salt that builds around the root zone of plants."
This can wreak havoc with the soil and crops, he said, and is already making some of our wines overly salty.
But Montagu suggests water management in the Murray-Darling Basin is heading in the right direction.
The Federal Government has committed funds to buy back water entitlements from willing farmers, limiting additional water use, he said. The initiative will assist farmers to employ more water efficient techniques, with the proviso that half of the water saved is returned to the environment.