

# The Australian

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## Agricultural scientists too thin on ground

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**AGRICULTURAL science, food and natural resource management have never been more important, argues Mark Adams, dean of the University of Sydney's faculty of agriculture, food and natural resources.**

"Carbon, water, food. This is what it is about," he says. "The world is going to be desperate for food, is desperate for food, and will be increasingly hard pressed to supply it."

Adams points out that some big food-producing nations, including Australia, are facing great changes in water availability. "In many cases the farmers are working with soils that are old," he says.

"They have adapted their techniques successfully in the past, but we are looking at a fairly big challenge to adapt again."

Agriculture these days means soil, water and the atmosphere. "The natural resource base is, like never before, at the forefront of our teaching, our research," Adams says.

The world's population is forecast to grow from 6.8 billion to more than 9 billion by 2050, but areas under cultivation are decreasing and water supplies are diminishing in some countries.

A recent a study by the International Water Management Institute and the UN Food and Agriculture Organisation warns that many Asian countries may need to import a quarter of their rice, wheat and maize or corn by 2050.

Last year the world faced a cereal crisis as wheat stocks dropped to a 30-year low. Demand for wheat and rice had outstripped supply for six of the previous seven years. Grain prices rocketed, resulting in civil unrest.

IWMI director general Colin Chartres warns that cereal prices will be higher and more volatile in the future. He says Asia's best bet "lies in revitalising its vast irrigation systems, which account for 70 per cent of the world's total irrigated land".

That will mean increasing water productivity through systems such as Rubicon's Total Channel Control. Rubicon, which developed its patented system in conjunction with University of Melbourne dean of engineering Iven Mareels, recently signed a memorandum of understanding with China, where it will install two pilot projects.

Rubicon chief executive David Aughton says its Total Channel Control system has achieved 90 per cent efficiency in Australia in gravity-run open channels. "Australia uses about 16,000 gegalitres for irrigation, whereas China delivers 560,000GL in its channel network, and they are running around about 50 per cent efficiency," Aughton explains.

Mareels says the first problem is water management: that means good information about water supply, demand and delivery. The Rubicon system replaces blokes in utes, opening channel gates with networked sensors and actuators, a fully automated network that precisely measures the flow.

Mareels says the next step is more crop per drop. A prototype that closes the information loop between crop water needs, measuring and predicting soil moisture deficits and the water supply, has been set up at the university's Dookie Farm.

Mareels says early results "indicate that on-farm economic productivity can be significantly improved while greatly reducing



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