

# Agriculture's next revolution -- perennial grain -- within sight

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Earth-friendly perennial grain crops, which grow with less fertilizer, herbicide, fuel, and erosion than grains planted annually, could be available in two decades, according to researchers writing in the current issue of the journal *Science*.

Perennial grains would be one of the largest innovations in the 10,000 year history of agriculture, and could arrive even sooner with the right breeding programs, said John Reganold, Washington State University (WSU) Regents professor of [soil science](#) and lead author of the paper with Jerry Glover, a WSU-trained soil scientist now at the Land Institute in Salina, Kansas.

"It really depends on the breakthroughs," said Reganold. "The more people involved in this, the more it cuts down the time."

Published in *Science's* influential policy forum, the paper is a call to action as half the world's growing population lives off marginal land at risk of being degraded by annual grain production. Perennial grains, say the paper's authors, expand farmers' ability to sustain the ecological underpinnings of their crops.

"People talk about food security," said Reganold. "That's only half the issue. We need to talk about both food and ecosystem security."

Perennial grains, say the authors, have longer growing seasons than annual crops and deeper roots that let the plants take greater advantage

of precipitation. Their larger roots, which can reach ten to 12 feet down, reduce erosion, build soil and sequester carbon from the atmosphere. They require fewer passes of farm equipment and less [herbicide](#), key features in less developed regions.

By contrast, annual grains can lose five times as much water as [perennial crops](#) and 35 times as much nitrate, a valuable plant nutrient that can migrate from fields to pollute drinking water and create "dead zones" in surface waters.

"Developing perennial versions of our major grain crops would address many of the environmental limitations of annuals while helping to feed an increasingly hungry planet," said Reganold.

Perennial grain research is underway in Argentina, Australia, China, India, Sweden and the United States. Washington State University has more than a decade of work on perennial wheat led by Stephen Jones, director WSU's Mount Vernon Research Center. Jones is also a contributor to the *Science* paper, which has more than two dozen authors, mostly plant breeders and geneticists.

The authors say research into perennial grains can be accelerated by putting more personnel, land and technology into breeding programs. They call for a commitment similar to that underway for biologically based alternative fuels.

Provided by Washington State University

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