

GROWING HIGH YIELDING RICE THROUGH EFFICIENT IRRIGATION SOLUTIONS

HIGH YIELDS... LOW COSTS...
PRECISION APPLICATION



Utilizing Mechanized Sprinkler Systems to Reduce Water Use in Rice Production

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Rice – Why Mechanized Sprinkler Systems

The potential to save:

- Water
- Energy
- Labor
- Fertilizer
- Other Input Expenses

Research on rice production under mechanized sprinkler systems dates back more than 30 years, but has seen renewed interest because of water scarcity and food security issues.

This research has shown:

REDUCED WATER CONSUMPTION WITHOUT SACRIFICING YIELD OR QUALITY

- Up to 50% water savings compared to flood¹
- Reduced pumping costs = energy savings
- Comparable yields to paddy rice

¹ Source: Based on Brazilian field trials ² Source: Greenhouse Gas <http://www.ghgonline.org/methanerice.htm>
This information should be used as a guide and is not intended to be a guarantee on cost of ownership or yield improvement. Actual results may vary due to soil make-up, water quality, chemigation, fertigation, regional climate, management practices, seed selection and irrigation techniques.

EXPANSION OF RICE PRODUCTION TO AREAS UNSUITED TO PADDY PRODUCTION

- Mixed and light-textured soils
- Sloped and undulating fields
- Upland areas

PRODUCTION COST SAVINGS

- Better control of chemicals/fertilizers
- No land repair, heavy tillage
- No field leveling required
- No canal construction
- No dike construction and maintenance

POTENTIAL TO REDUCE POLLUTION AND IMPROVE HEALTH

- Reduce greenhouse gas emissions from flooded fields (est. to be 50-100 million MT methane/yr)²
- Less habitat for mosquitoes

Water Use of Different Grain Crops

World average water used by evapotranspiration of grain crops (L/kg grain)*			
Wheat	Maize	Barley	Rice
1,480 ¹	1,150 ¹	1,000 ¹	625 - 1,667 ³
1,300 ²	900 ²		500 - 1,000 ⁴

* After Bouman. 2009. How much water does rice use? Rice Today. p. 29
¹ Falkenmark and Rockstrom. 2004. Balancing water for humans and nature: the new approach in ecohydrology. Earthscan. p. 247
² Chapagain and Hoekstra. 2004. Water footprint of nations. Value of water research report series No. 16. UNESCO-IHE. p. 76
³ Zwart and Bastiaansen. 2004. Review of measured crop water productivity values for irrigated wheat, rice, cotton and maize. Agric. Water Management 69:115-133
⁴ Haefele et al. 2008. Transpiration efficiency of rice (Oryza Zativa L.). Field Crops Research (In Press)

Results

Side by Side Comparison			
Measure	Levee rice RRVP field	Pivot Irrigated Rice Field	
Water Use	23.2 in (588 mm)	18.2 in. (463 mm)	21% Savings
Power	\$46.37/ac (\$114.53/ha)	\$29.28/ac (\$72.33/ha)	37% Savings
Yield	199 bu/ac (10.0 MT/ha)	192 bu/ac (9.68 MT/ha)	4% Reduction
Total Expense	\$477/ac (\$1,179/ha)	\$362/ac (\$896/ha)	24% Savings
Net Return	\$717/ac (\$1,771/ha)	\$798/ac (\$1,950/ha)	10% Increase

Yield Monitor Data

(One of two combines)



Source: Dr. Gene Stevens, University of Missouri

Average Rice Yield by Soil Type

- Tunica silty clay – 190 bu/ac (9,583 kg/ha)
- Sharkey-Steele complex silty clay/loamy sand – 196 bu/ac (9,886 kg/ha)
- Commerce silt loam – 202 bu/ac (10,189 kg/ha)
- Convent fine sandy loam – 210 bu/ac (10,592 kg/ha)



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Additional information and case study available at www.ecorice.net
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Summary of Benefits to Growers

- Water/energy conservation
- Expansion of rice production without expensive land development
- Utilization of lighter textured soils and undulating fields
- Rotation of rice with other crops to improve soil fertility/condition
- Early season rains less likely to drown germinating rice (direct seeded)
- Fields will dry earlier – harvest can begin sooner



New South Wales, Australia



New South Wales, Australia
70-acre (28 ha) pivot shown with two local varieties in Mid-October 2009



Arkansas, USA



Arkansas, USA

Essentials for Successful Pivot Rice

IMPROVED RICE GENETICS

- Use of blast-resistant varieties is critical
- Carefully monitored herbicide and fungicide programs

IMPROVED SPRINKLERS

- Larger droplet size, better uniformity and overlap
- Lower application rates

NEW TRACKING SOLUTIONS FOR BETTER FLOATATION

- Three-wheel tower structures
- Z-TRAX for optimum floatation

FIELDNET™ WEB-BASED IRRIGATION MANAGEMENT

- Pivot control from computer or cell phone
- Provides precise control of irrigation and chemigation

CHEMIGATION/FERTIGATION

- Liquid Nitrogen fertilizer can be applied as needed throughout growing season
- Minimizes fertilizer loss and improves plant utilization
- Reduced application costs

FLEXIBILITY IN CROP ROTATION

- Rotation to other crops essential to soil health

For more information on rice and other crop specific irrigation solutions, visit www.zimmatic.com/keycrops/ or talk with your Lindsay dealer.



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