



**Rice and Greenhouse Gas Opportunities:
A Farmer's Perspective**

Mark Isbell

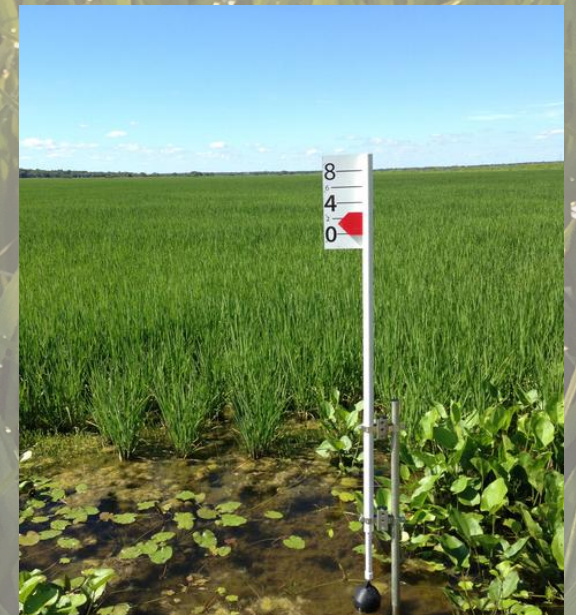
Zero Grade Farms

Zero Grade Farms

- 5 Generations
- 3200 Acres
- Continuous Rice
- Zero Grade
- Collaborate
- Optimize Water Use



- **Interconnected Canal System with float switches (Electric)**
- **Maximize use of Surface and Ground Water**
- **Water depth monitoring and water re-use**



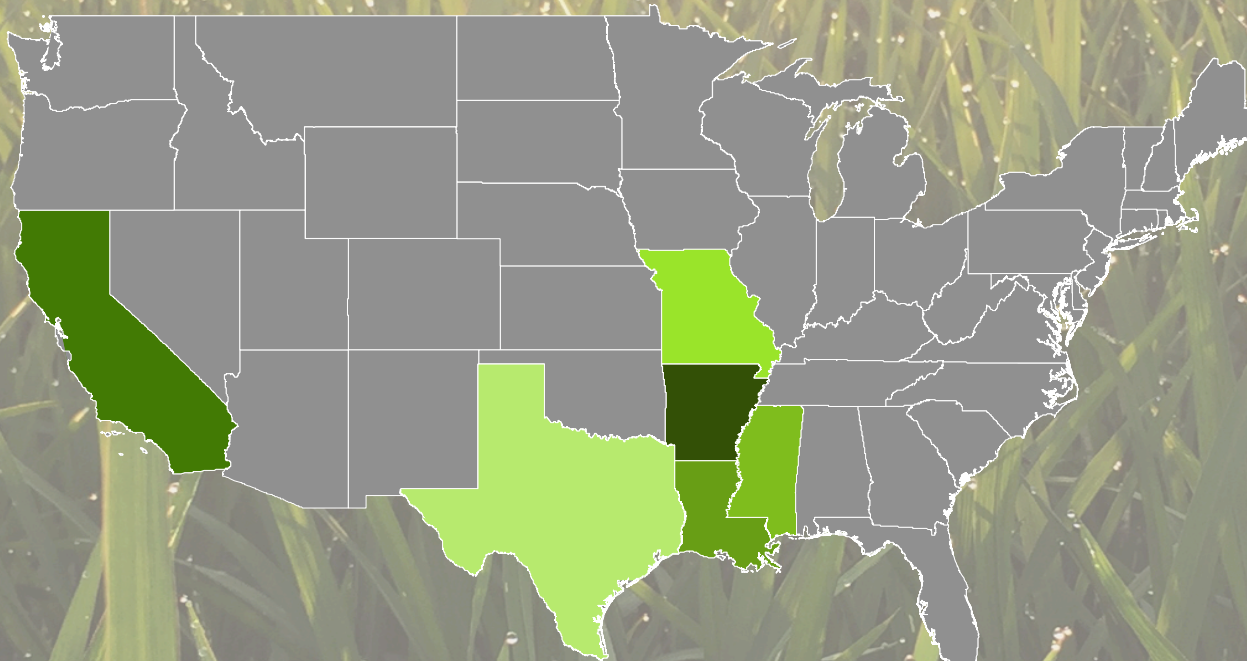
Efficiencies:

- Less labor
- Less water use (>50%)
- Continuous rice (56 years)



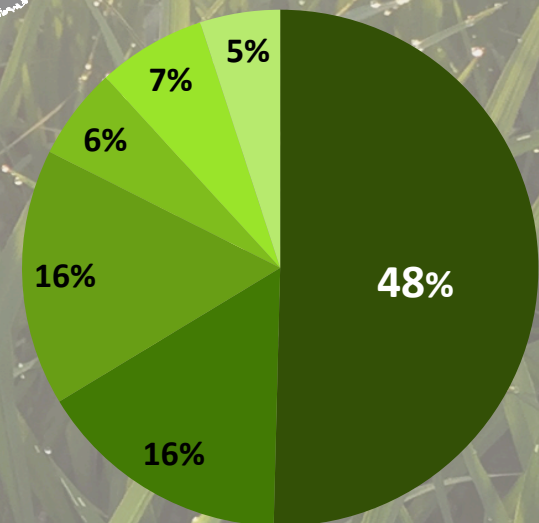
United States Rice Production

*% of the six major rice-producing states



Land Planted to Rice*

■ AR ■ CA ■ LA ■ MI ■ MO ■ TX



Although the US produces <2% of the world's rice, it is among the top 5 rice exporting nations

(Slide Credit: Smith Et al. 2015)

USDA NASS Quick Stats, 2015



Rice

- **Rice provides 21% of global human energy (IRRI)**
- **Over the past 20 years, rice farmers have decreased land use by 35%, energy use by 38% and water use by 53%. (Arkansas Rice Federation)**
- **Rice responsible for 11% of global methane production (Smith et al.)**

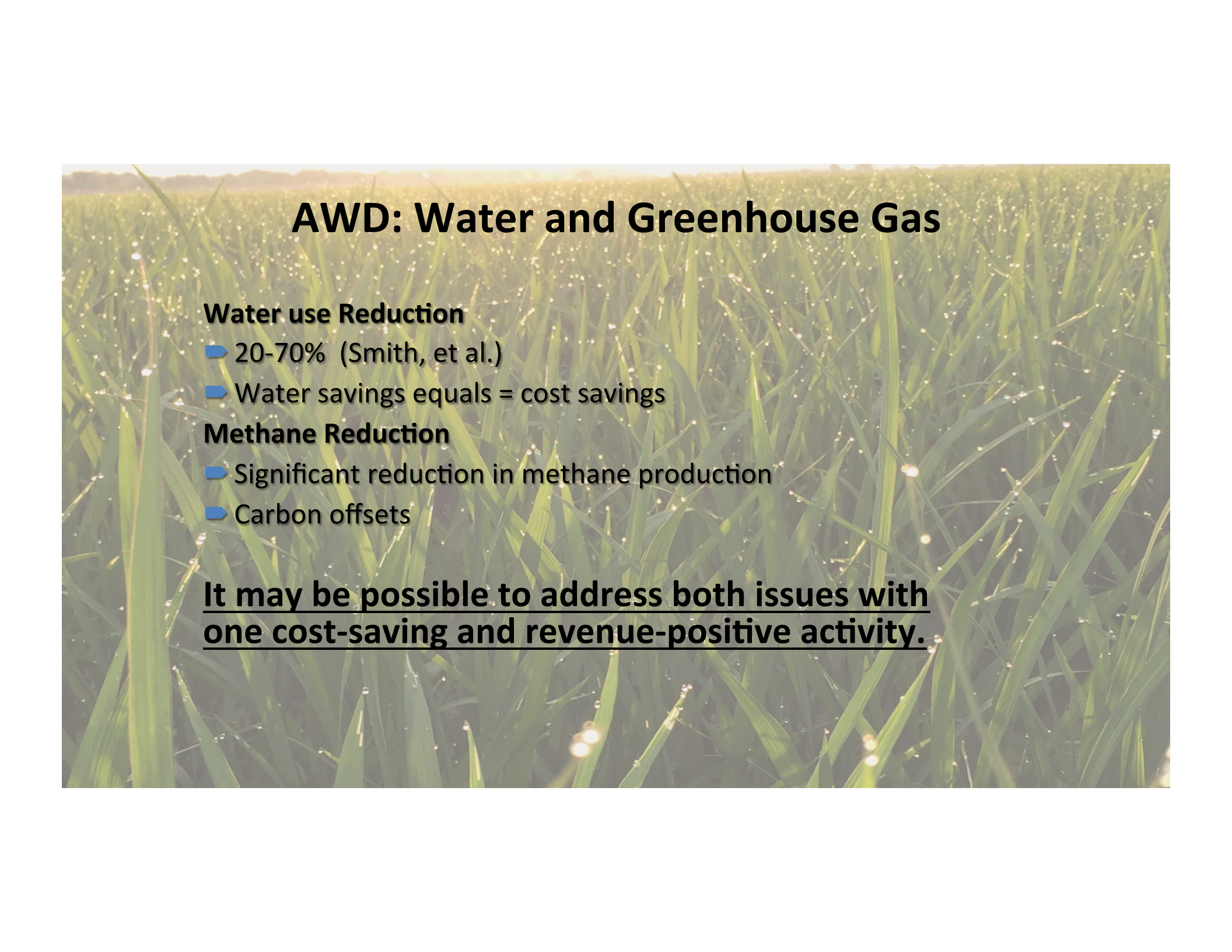




Water

Water in Arkansas

- “...under sustainable pumping conditions, only about 20 percent of the water demand can be met with groundwater in 2050.” (Arkansas Water Plan)
- “... a ground water gap as large as 7 million acre feet per year is projected for 2050.” (Arkansas Water Plan)
- California size water problem



AWD: Water and Greenhouse Gas

Water use Reduction

- 20-70% (Smith, et al.)
- Water savings equals = cost savings

Methane Reduction

- Significant reduction in methane production
- Carbon offsets

It may be possible to address both issues with one cost-saving and revenue-positive activity.

2015 Joint Project: University of Arkansas and USDA/ARS

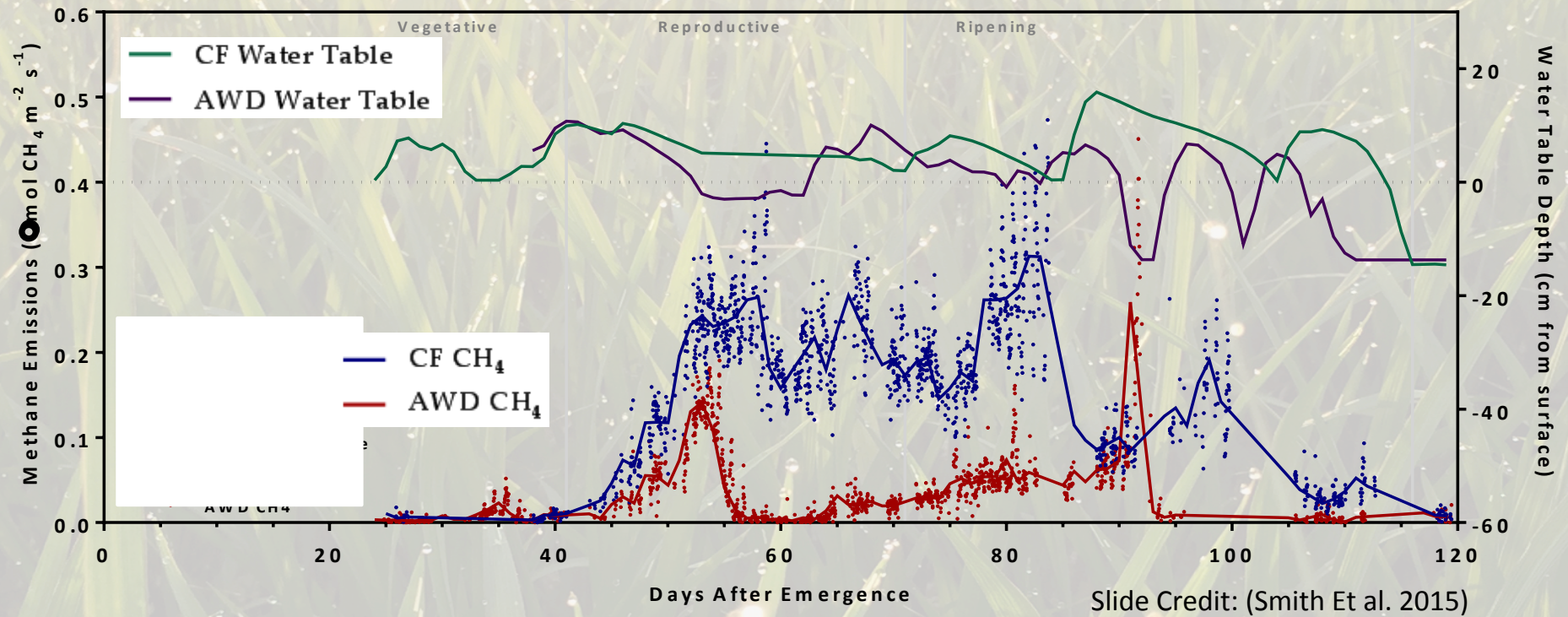


- Two fields, same management practices
- Eddy Flow Covariance (Methane Monitoring)
- Water use monitoring



Graphics: Smith et al.

Q1: Seasonal Methane Emissions





Findings

Benefits:

- **Water use reduction: Significant, but still being quantified**
- **Over 75% methane reduction over conventional irrigation (Smith et. al)**
- **Translates to roughly 1 ton of carbon offsets**
- **No observable yield impact**

Challenges:

- **Requires more management**
- **Opens to more risk: Over drying**
- **Offset verification and marketing**

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Select your region 
Region: UK

2 Select ACTIVITY



Flights



Driving



Home



Commute



CarbonNeutral® flights

Calculate your flight emissions by entering the airport pair. Only the main airports are listed, if you cannot find your airport then use the nearest airport or the QUICK FLIGHT option.

United States	▼
Little Rock, LIT, Arkansas	▼
United States	▼
Sacramento, SMF, California	▼

Distance: 5767 km

Flight class: Economy Business First

Flight type: One way Return

No. of people flying

3 Calculate EMISSIONS

Carbon EMISSIONS

0.56 
tonnes of CO₂e

Offset BASKET (tCO₂e)

	1.12 
	0.00
	0.00
	0.00
	0.00
Total	1.12 
Cost	£ 11.20



Practical Numbers

- **139 more flights to Sacramento**
- **70 Acres – 2% of production**
- **1 inch of Water – 1.9 Million Gallons (21+ Hours of Pumping)**

Opportunity

Dear Optimist, Pessimist & Realist,
While you all were arguing about the
glass of water, I drank it.

Regards,
The Opportunist

Opportunity

	Approx.	
Water Savings	\$20	(82% of Enterprise Budget)
Carbon Offsets	\$12	Poised to go up?
Sustainability	?	
Total	\$32?	

Millennials twice as likely to buy from brands engaged in sustainable practices. (Morgan Stanley, HBR)





Thank you

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