Irrigation and Conservation Practices Used by Wisconsin Potato and Vegetable Growers

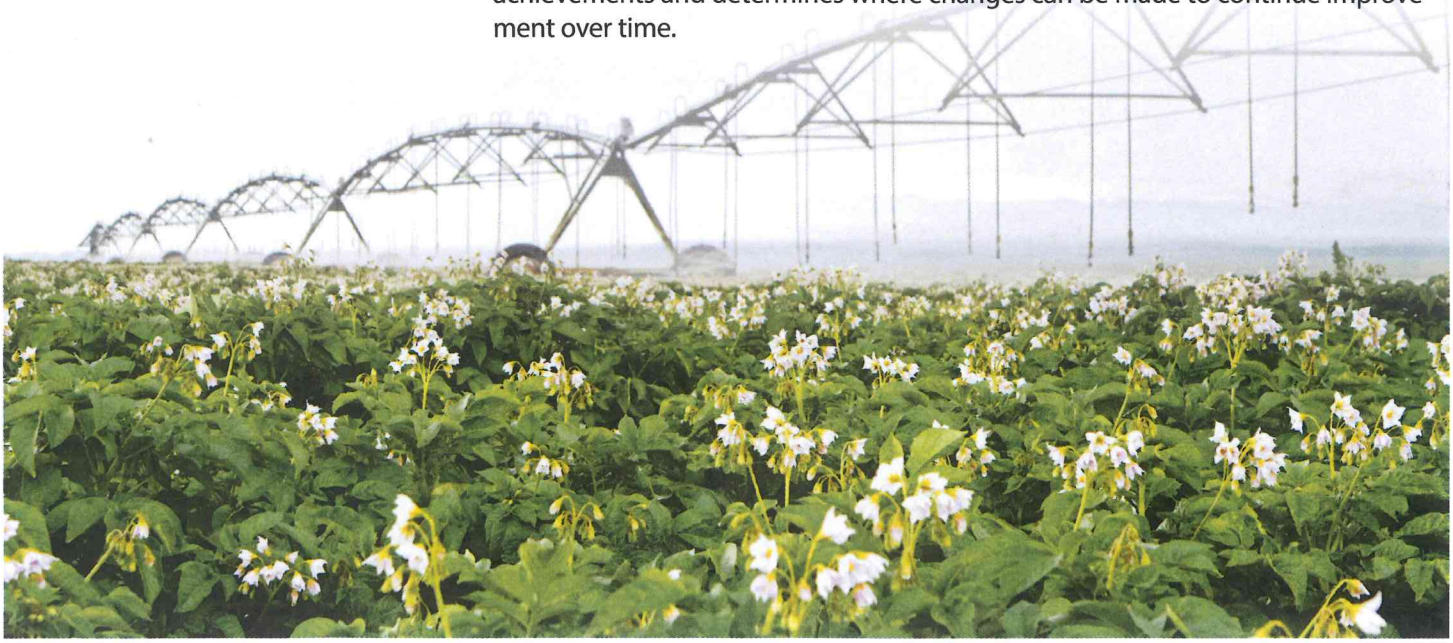
Highlights from a baseline assessment – November, 2014

Irrigated vegetable production in Wisconsin is an important component of the agricultural economy. Wisconsin is ranked in the top five nationally in production of potatoes, sweet corn, green beans, peas, carrots and many other processed vegetables. The Central Sands area, where much of this production is centered, is one of the most productive growing areas in the U.S.

This high level of productivity is dependent on our ability to irrigate, and water is a vital resource for the potato and vegetable industry. The Central Sands is underlain by an abundant groundwater aquifer that is recharged annually by precipitation. In recent years, however, increases in irrigated acreage, changing weather patterns, and an extended growing season have combined to stress this important resource.

> ***The future of our irrigated vegetable industry is ultimately dependent on our ability to balance long term conservation of our water resources with the continuing productivity that is needed for economic survival. Increasing the efficiency of our irrigation practices and adopting conservation practices that use less water are key components to achieving this balance.***

To determine a baseline of the irrigation and conservation practices used by Wisconsin growers, an online assessment was conducted in November 2014. The Wisconsin Potato and Vegetable Growers Association (WPVGA) led this process in collaboration with University of Wisconsin Specialists, using a sustainability model developed by FieldRise. Data was collected from 90% of irrigated vegetable growers representing 185,375 acres. This information helps recognize existing grower achievements and determines where changes can be made to continue improvement over time.



Data highlights

A summary of the percentage of growers using practices that are contributing to more efficient water use and conservation efforts.

Equipment used

99% use center pivot systems (**25%** also use traveling guns)

49% use drop nozzles with **82%** of those operated at low or medium pressure

58% of pivots can be operated remotely

96% are monitored during operation

Accuracy

64% have checked flow rates in the last 5 years

53% have checked application uniformity in the last 2 years

Energy conservation

83% irrigate during off-peak hours

59% have variable frequency drive motors

Record keeping

82% record water applications by field

62% maintain records at least 3 years (**18%** for 10 yrs, **15%** longer than 10 years)

Irrigation: factors growers use to determine how often to irrigate

1 Crop water need

73% use predicted or estimated evapotranspiration (ET) rates

96% consider growth stage, **84%** variety, **75%** canopy, **67%** rooting depth

2 Rainfall

97% monitor in-field rainfall: **89%** use short-range forecasts, **41%** long-range

3 Soil moisture, whole field applications

89% monitor individual fields

77% monitor daily using the following methods:
83% hand feel, **64%** visual (wet/dry areas), **40%** soil probes

4 Soil moisture, site-specific (variable rate) applications

30% use site-specific application

48% use soil maps or visual methods to determine moisture holding capacity

23% use landscape observation (high/ low spots)

10% turn sprinklers on/off with zone controls

5 Irrigation Scheduling (using crop need, canopy, ET, rain, soil moisture)

47% use an irrigation scheduling aid:
12% WISP (**8%** online), **25%** paper checkbook method, **3%** commercial software

Water conservation practices

In-Field

- **82%** limit compaction to encourage deeper rooting and more efficient water use
- **70%** plant cover crops to hold water for recharge
- **61%** use conservation tillage to increase organic matter
- **60%** add organic matter to increase water holding capacity
- **24%** use deficit irrigation to promote deeper rooting
- **22%** use in-row surfactants to limit nutrient loss

Whole farm

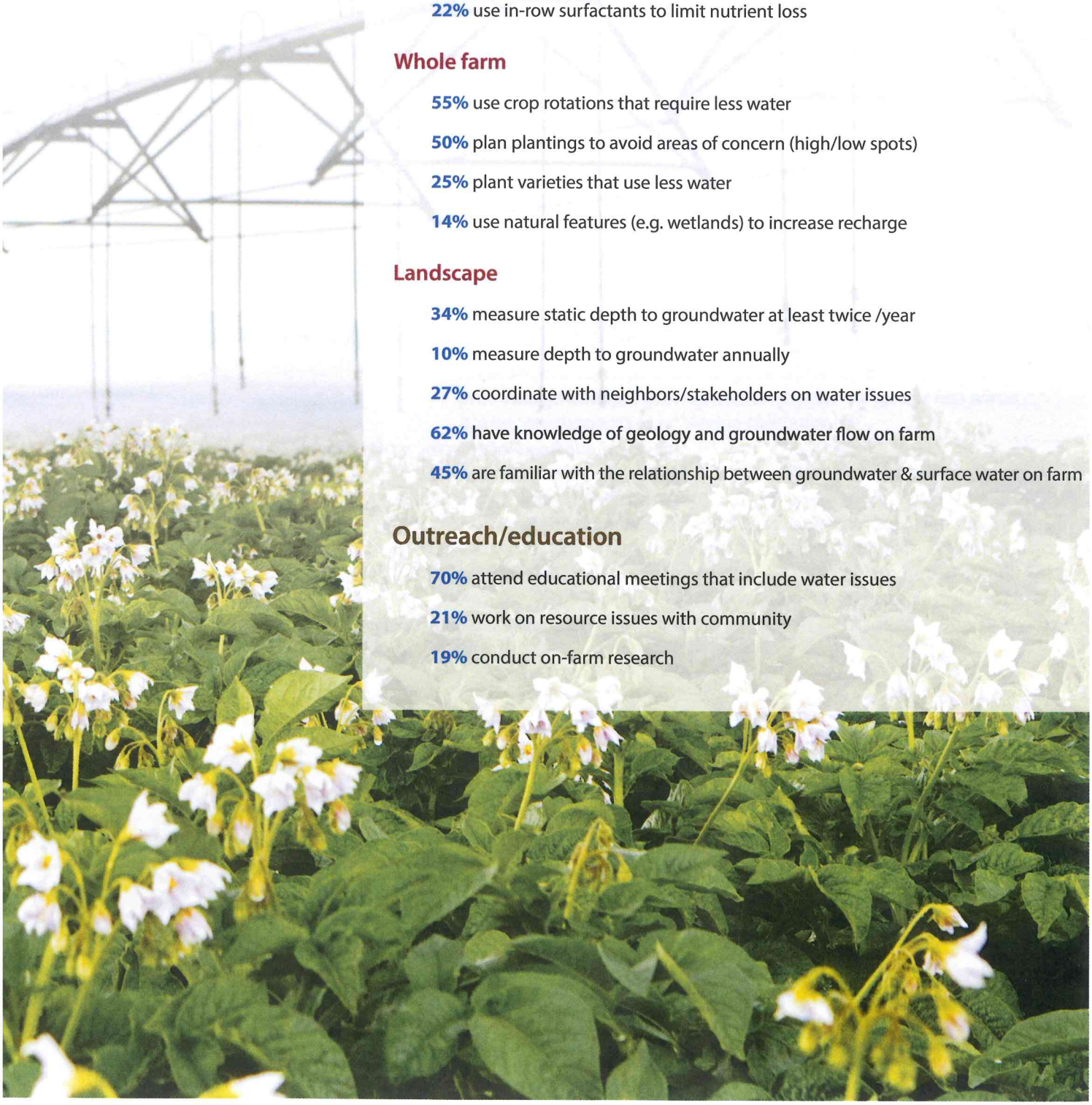
- **55%** use crop rotations that require less water
- **50%** plan plantings to avoid areas of concern (high/low spots)
- **25%** plant varieties that use less water
- **14%** use natural features (e.g. wetlands) to increase recharge

Landscape

- **34%** measure static depth to groundwater at least twice /year
- **10%** measure depth to groundwater annually
- **27%** coordinate with neighbors/stakeholders on water issues
- **62%** have knowledge of geology and groundwater flow on farm
- **45%** are familiar with the relationship between groundwater & surface water on farm

Outreach/education

- **70%** attend educational meetings that include water issues
- **21%** work on resource issues with community
- **19%** conduct on-farm research



What Participating Growers are Saying about Water and Irrigation

Conservation

"Water conservation is important to our farm because we believe in promoting a sustainable environment, both for our farm as a whole and for the community around us."

"The more water we conserve now, the higher availability in the future.""

"Water conservation is important so we don't … waste groundwater, which everyone depends upon."

Production and economics

"Irrigation is a significant expense, and as such it only makes sense to use it wisely."

"It's important for our farm and every farm in the Central Sands area. Without irrigation, we couldn't grow vegetable crops."

Long term sustainability

"This is important to us all. We need to be stewards of the resources, so we can continue for generations to come."

"Sustainability is always an important goal on a family farm."

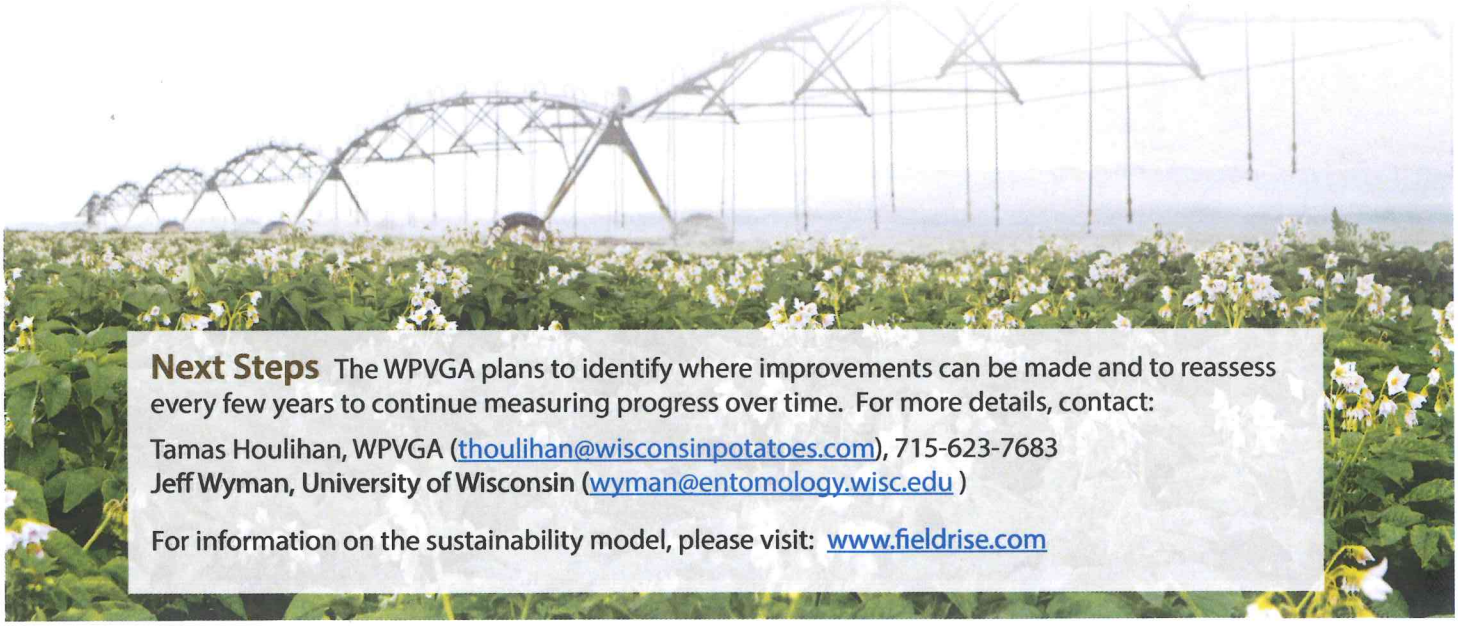
Using new technologies

"Use variable frequency electric motors and run our diesel motors at lower rpm."

"… using deficit irrigation."

"… variable rate irrigation with mapping."

"Turn end guns off when not needed, minimize over watering."



Next Steps The WPVGA plans to identify where improvements can be made and to reassess every few years to continue measuring progress over time. For more details, contact:

Tamas Houlihan, WPVGA (thoulihan@wisconsinpotatoes.com), 715-623-7683
Jeff Wyman, University of Wisconsin (wyman@entomology.wisc.edu)

For information on the sustainability model, please visit: www.fieldrise.com