



Water, Energy and Agriculture Initiative

Benchmarking Corn Water Productivity in Nebraska Irrigated Cropping Systems

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ABSTRACT. Improving corn water productivity is the key to meet the challenge of ever tightening water resources for irrigation and greater demands for food, feed and fuel. Corn grain yield per unit of water supply must therefore be increased dramatically in Nebraska and globally. In Nebraska, $\approx 80\%$ of the irrigated land is for corn production. At present, there is a substantial exploitable gap between actual farm yields and attainable yields. This reflects, in part, inefficient use of water supply, and/or other non-water related yield constraints. Boundary functions define the relationship of yield with water supply and are used to benchmark crop water productivity. When coupled with on-farm measurements, boundary functions offer a framework to quantify the gap between on-farm yield and attainable yield, and to identify management options for improvement. In this proposal, we will define corn boundary functions using both existing data and computer simulations. We will select 20 farms across eastern and central Nebraska and measure their corn yields and water supply. We will also identify yield constraints, including nutrient deficiencies, sub-optimal hybrid maturity, planting date, soil compaction, weeds, pest and diseases. We will develop a decision tree to help farmers quantify their corn water productivity, identify yield constraints and measures for their corrections. We expect a yield increase of 10%, along with a 10% saving in irrigation water. This would translate into an annual impact of $\approx \$70$ million or more extra farm profit, assuming a 20% adoption rate of results from this project.

The Water, Energy and Agriculture Initiative funds research to maximize the efficiency with which water and energy resources are used to sustain economic development and water conservation in Nebraska agriculture.

The Nebraska Center for Energy Sciences Research administers the initiative, which was created in 2008 through a partnership of the center, the Nebraska Public Power District, the Nebraska Corn Board, the Nebraska Soybean Board and UNL's Agricultural Research Division