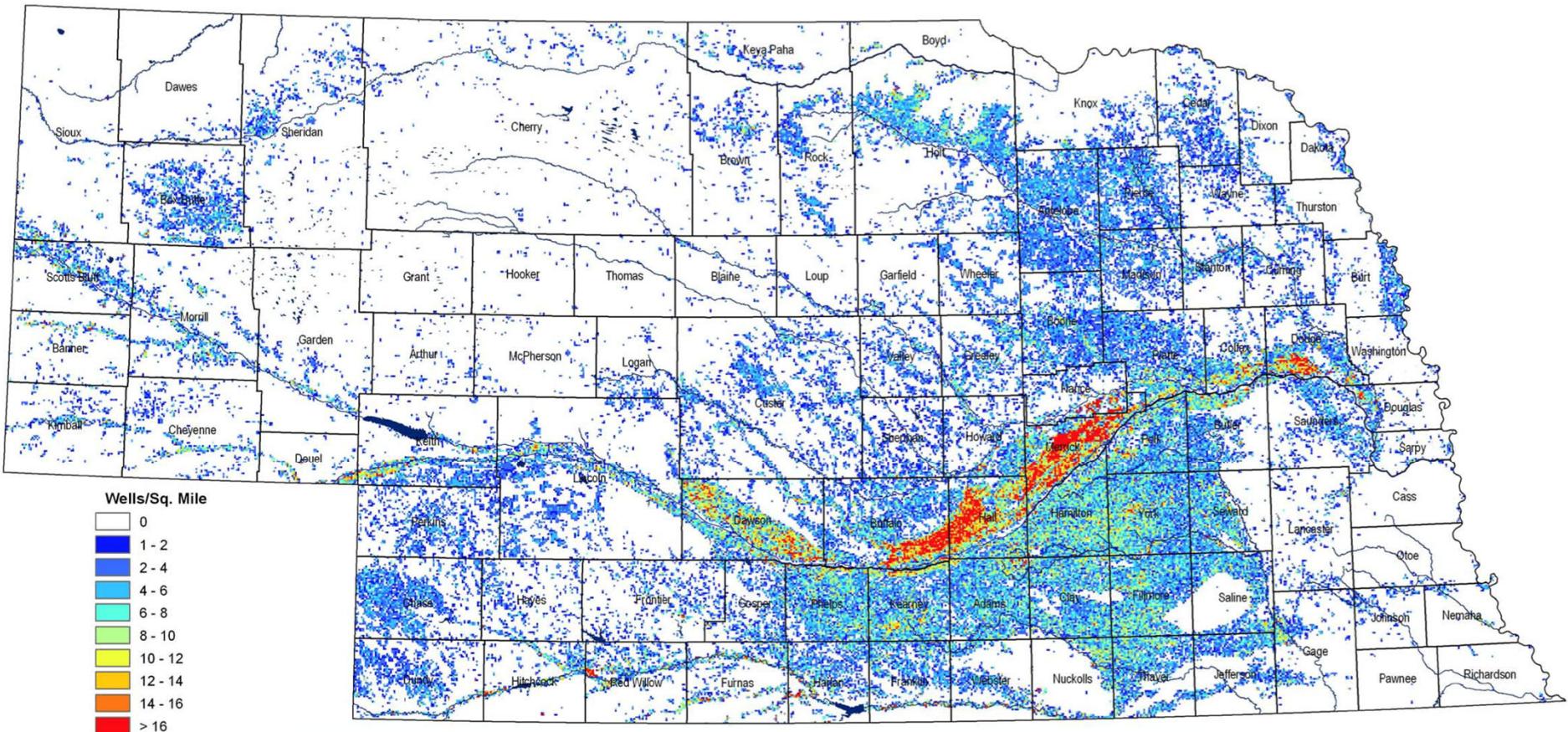




## Successful In-field Water Management in Nebraska

Jim Schepers  
USDA-ARS Soil Scientist (retired)  
University of Nebraska (emeritus)

# Density of Registered Irrigation Well in Nebraska



8.56 million acres irrigated

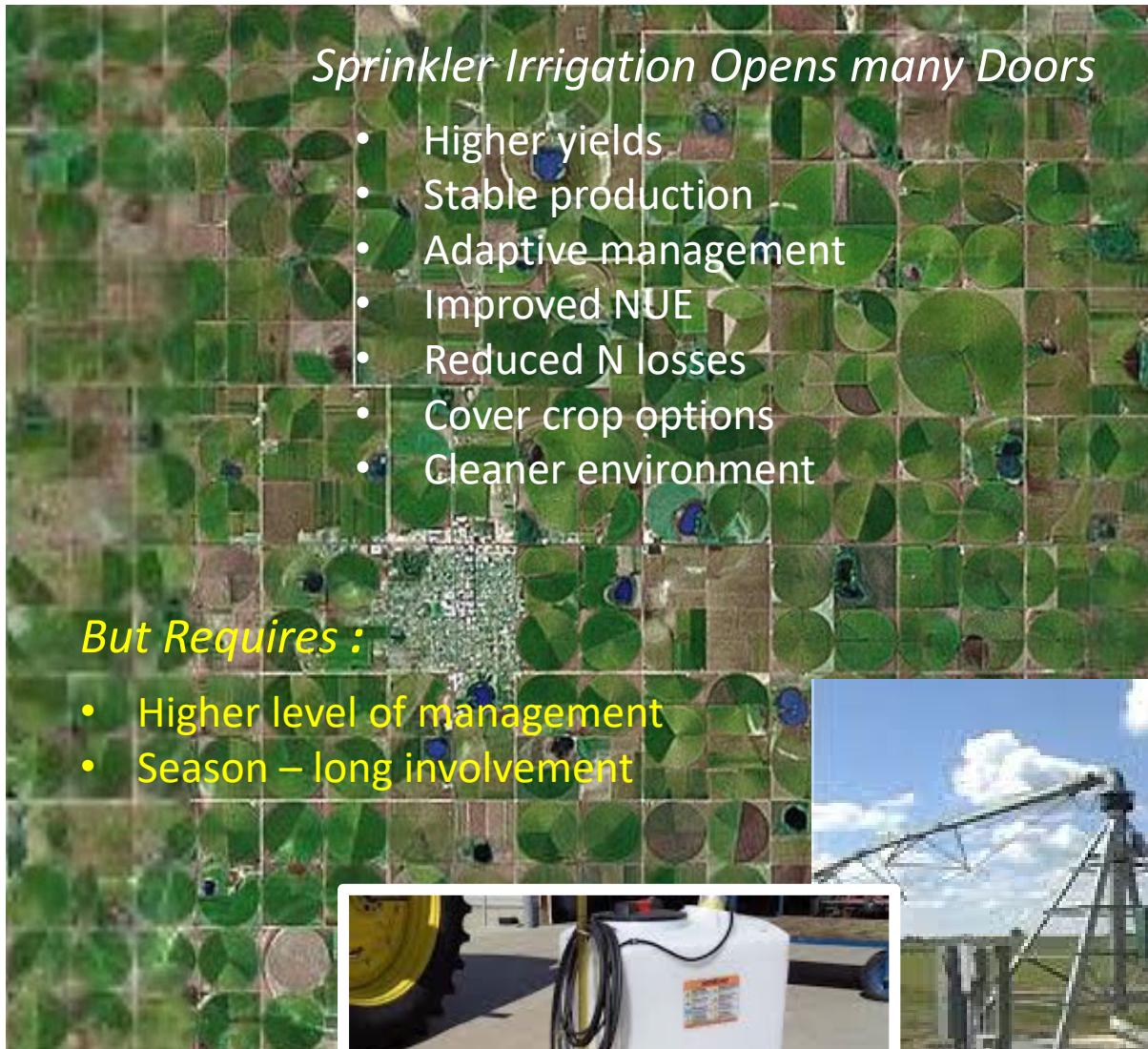
**>100,000 irrigation wells**

80 % under center-pivots

**~55,000 pivots**

**End – to – End**

> 10,000 miles



Chemigation  
Pump



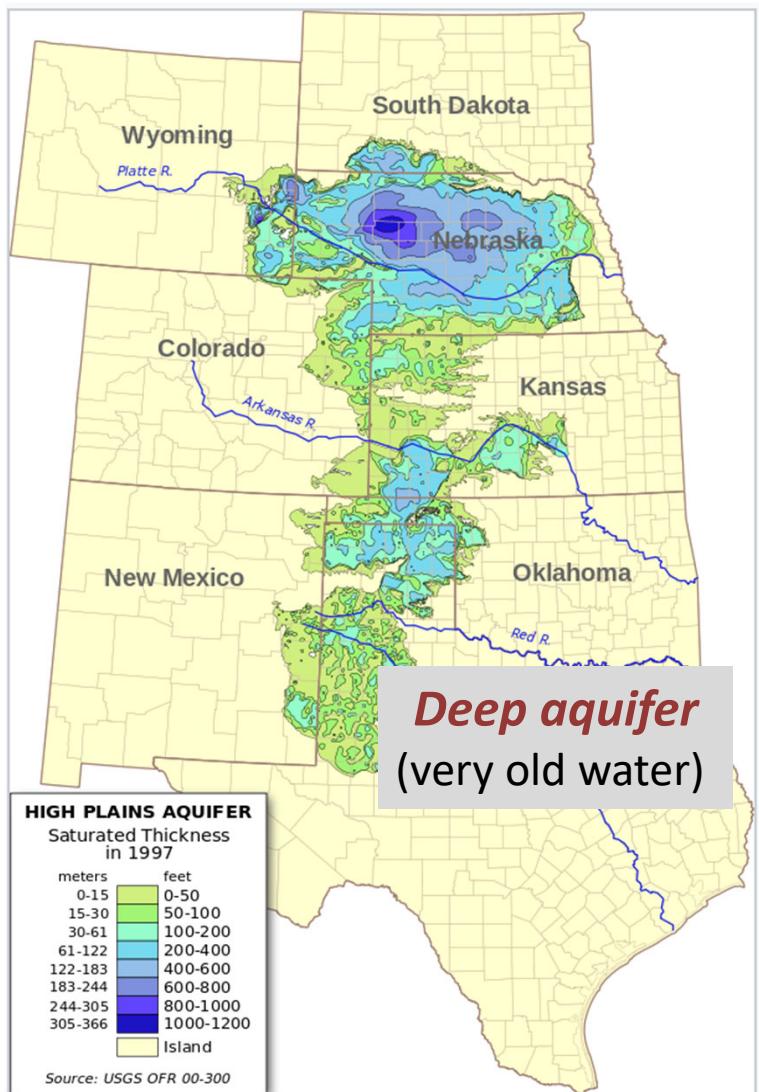
### Fertigation

- Nitrogen
- Sulfur
- Fungicides

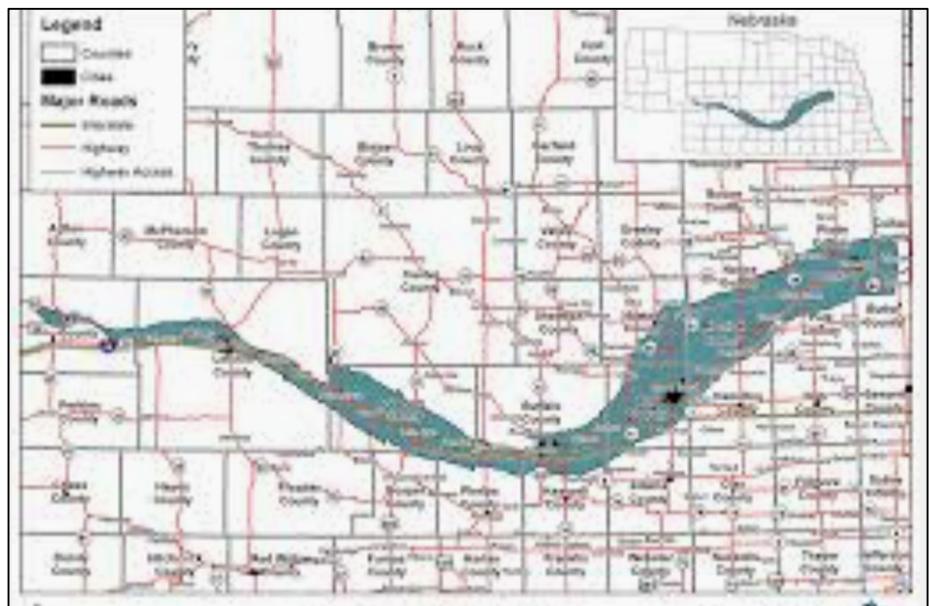


# Sources of Irrigation Water

## *High Plains Aquifer (Ogallala)*

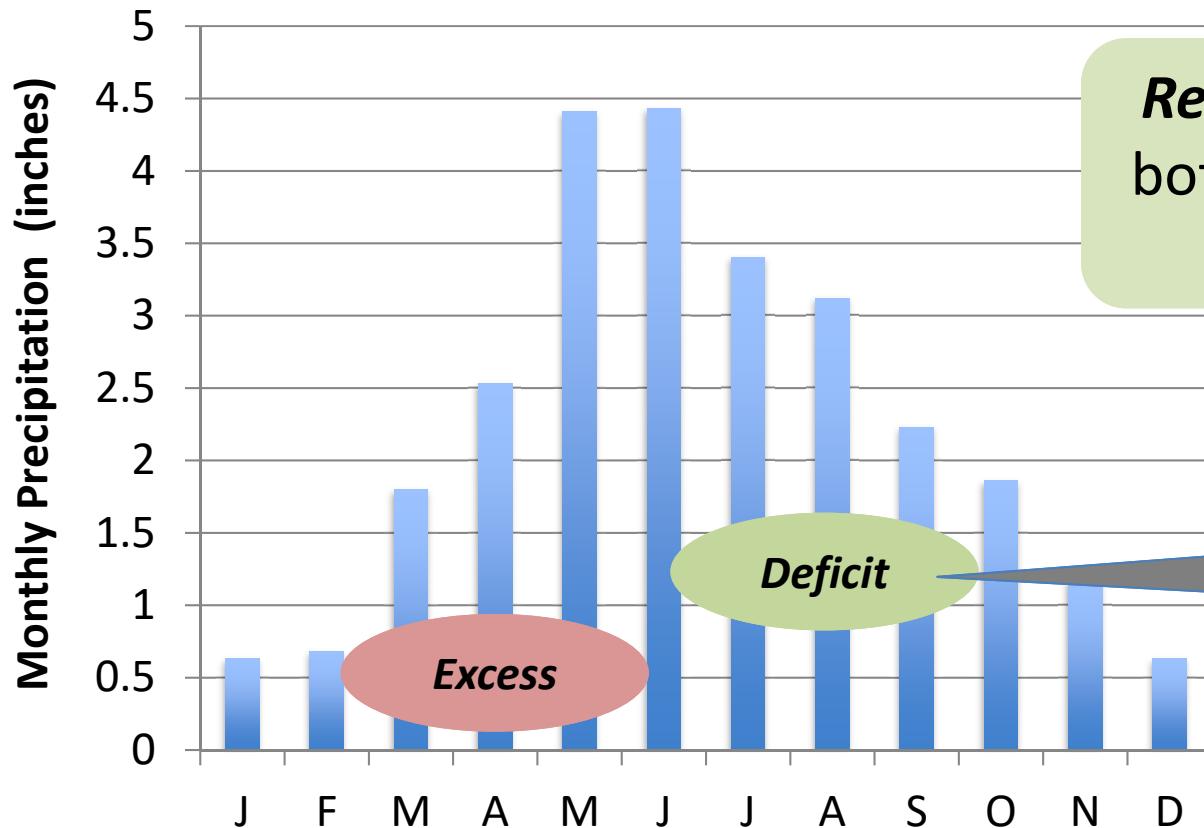


## *Platte River Aquifer*



Highly permeable soils  
Depth to water table (10 – 15 ft)  
High NO<sub>3</sub>-N (10-30 mg/L)  
Age of aquifer water (months – 20 yr)

## Grand Island, Nebraska



**Reality** : Water is both a CURSE and BLESSING

Irrigation to the rescue

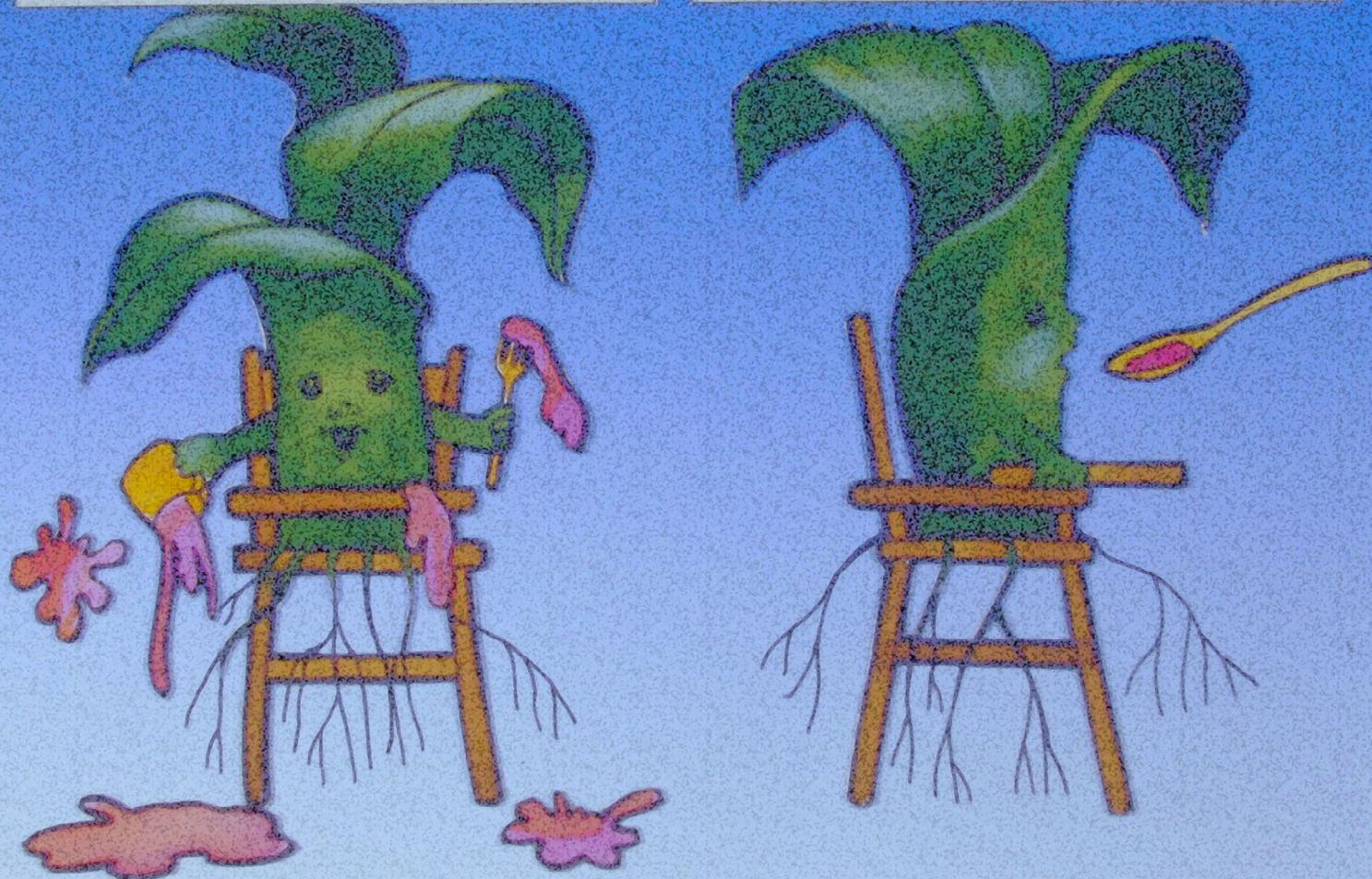
Long-term Annual Precipitation - 26.9 inches

Evapotranspiration (irrigated corn) - ~29 inches.

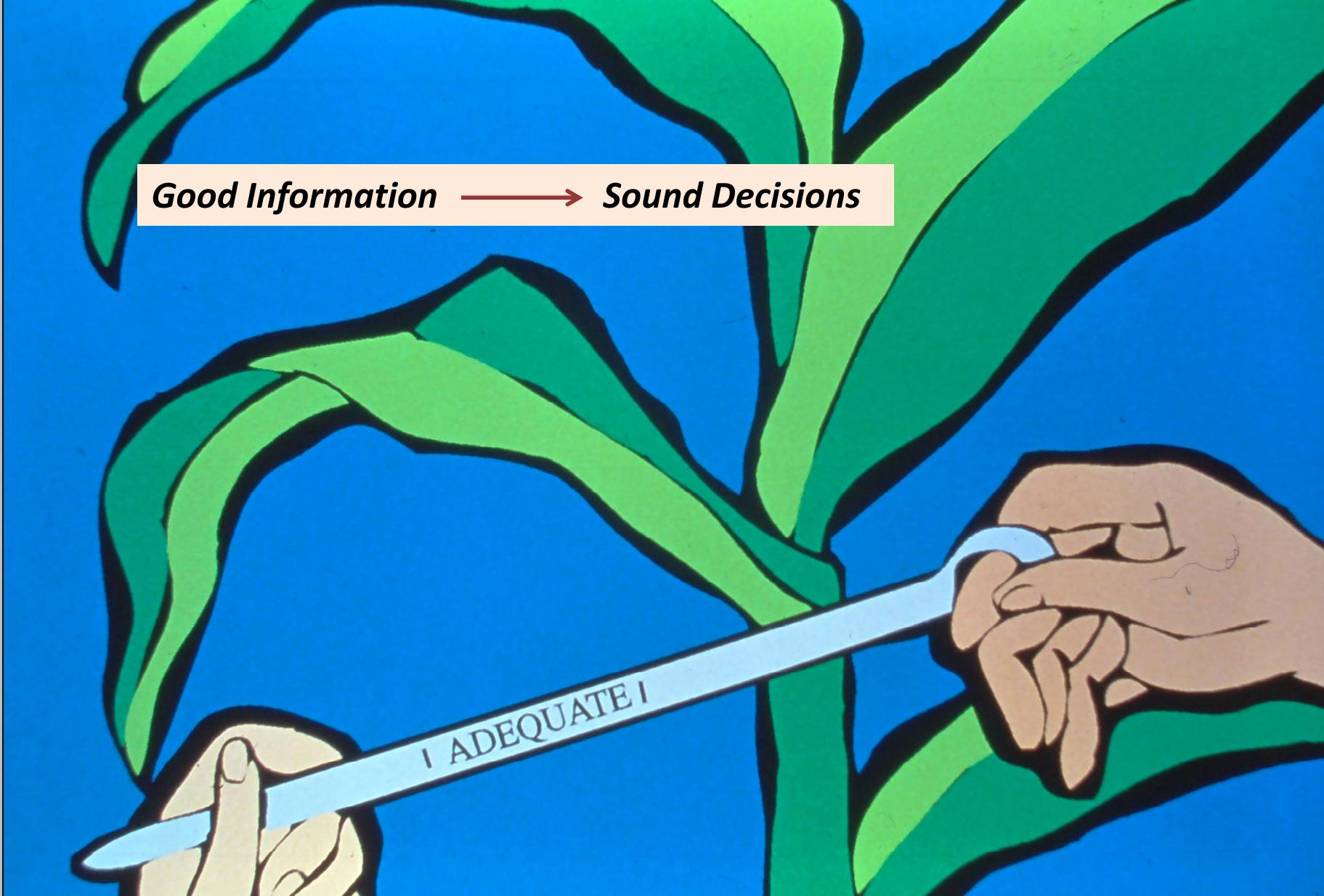
Annually & Seasonally Deficit

PREPLANT NITROGEN

N-FERTIGATION



SPOONFEEDING N = LESS LOSS



*Good Information* → *Sound Decisions*

I ADEQUATE I



Excess N can not be detected with sensors or remote sensing



-- Sensors can quantify N sufficiency --

# Extending Water / N Management Technologies

Where is the ....



Is there a ....



Consultants  
tell me to ...

*“Build on the Basics”*



*“Keep it Simple”*

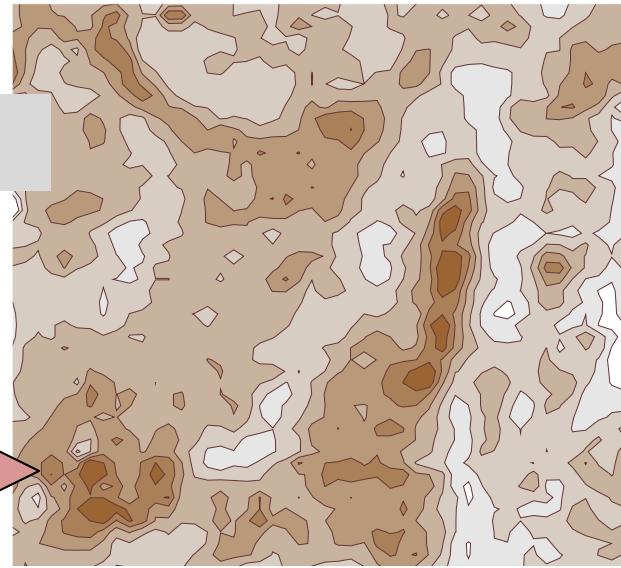
# Practical Approach #1 :



Bare Soil Aerial Photograph

Similar Patterns

Proxy



Organic Matter Map  
High Intensity Grid Sampling  
(40 x 80-ft)

Use color to guide  
*“smart”* sampling

Organic Matter Content



Variable-rate N fertilizer

Follow up as needed



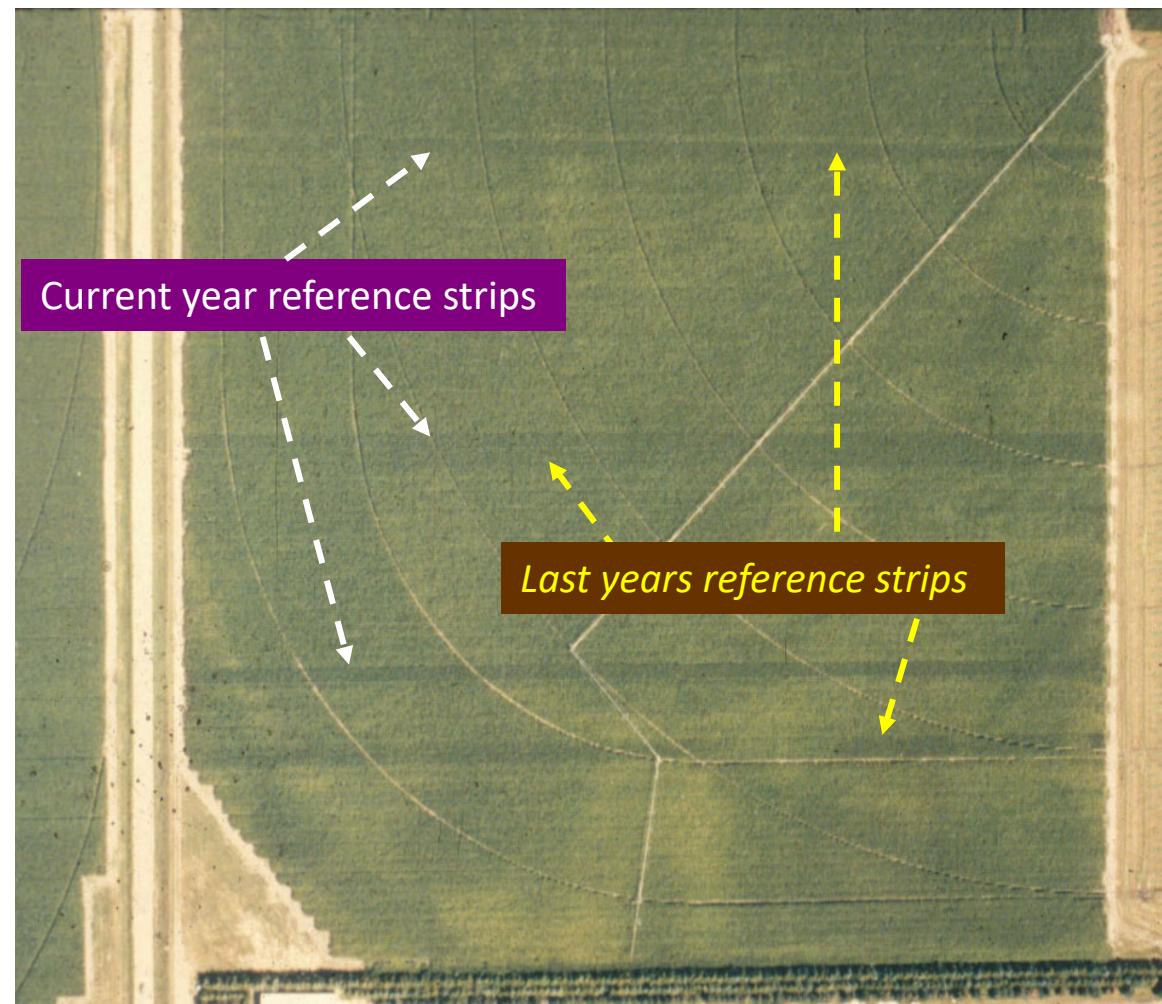
## Practical Approach #2 :

Reduced N Rate  
*with*  
N-Rich Reference

- Fertilizer
- Manure



N-Deficient Reference



## Nebraska Natural Resources Districts (NRDs)



**Taxing Authority** - up to ~\$3/acre

**Cost Sharing** - flow meters  
soil water sensors  
buried pipelines  
drip irrigation

<b>Imposed Restrictions</b>	-	No fall fertilizer Soil & water testing N recommendations N applied Irrigation amount Yield
<b>Require</b> Annual Report		