PRECISION AGRICULTURE & DRONES
2003-2021

Courtesy of Robert Blair and Three Canyon Farms
1903-2021 – Five Generations

12 Foot Header

40 Foot Header

Courtesy of Robert Blair and Three Canyon Farms
HOW I HAVE USED PA & DRONES

- Wildlife Thermal
- Livestock Thermal
- Soil Test Locations
- Aerial Seeding
- Aerial Spraying

Legend:
- Management Zones
- NDVI Values
- Field Boundary

Leave in or take out Sugarcane

Courtesy of Robert Blair and Three Canyon Farms
THE BOTTOM LINE IS D-A-T-A!

Courtesy of Robert Blair and Three Canyon Farms
PRECISION AG IS A WHOLE PACKAGE

25+ Years of Monitors

Invasive Species Mapping

Field Scouting

Pesticide Application

NITROGEN PRESCRIPTION MAP

Courtesy of Robert Blair and Three Canyon Farms
Data Volume is Increasing Rapidly

CONVENTIONAL
1948-2006

PRECISION
2004-Present

SURGICAL
2015-Present

SURGICAL
2020-Present

Conventional or traditional field management

Field
One rate

Optimised management

Sub-Field
Variable rate

Single plant management

Single plant
Individual rate

Leaf scale management

Leaf
Leaf rate

Courtesy of Robert Blair
and Three Canyon Farms
Precision Agriculture (PA) Impact

Estimated Yield Increase

- Using PA to close the Gap
  - Estimated yield gap ranges from 15%-30% of lost crop potential
  - Approximately 50% of yield gap is weather
  - Inefficient management is 50% of yield gap

- Based upon research, interviews, and experience, PA can reduce total yield losses caused by weather and management by 20% to 30% regarding “Yield Gap.”

Courtesy of Robert Blair and Three Canyon Farms
Management & Weather Gap

ON MY FARM

• 2008
  • Fertilizer record high
  • VR Fert. saved 20-25%
  • 2021 Similar Fert Costs

• 2015
  • Drought year
  • High protein SWW in PNW
  • VR produced low protein gaining a price premium

ON MY FARM

• 2008
  • Fertilizer record high
  • VR Fert. saved 20-25%
  • 2021 Similar Fert Costs

• 2015
  • Drought year
  • High protein SWW in PNW
  • VR produced low protein gaining a price premium

Courtesy of Robert Blair and Three Canyon Farms
Autonomous, Solar Powered, Weed Killing Robot

After Application

Six Hours Later

Two Days Later
From Concept to Reality in 2021

Courtesy of Robert Blair and Three Canyon Farms
AGRICULTURE TRENDS

Estimated Change in Net Farm Income from Precision Agriculture Technology Use (from Castle)

https://.agecon.unl.edu/cornhusker-economics/2017/precision-agriculture-adoption-profitability
1. Disconnect between urban and rural needs
2. Disconnect between tech providers and agriculture
   • Data analytics in the cloud
3. Poor rural connectivity infrastructure
   • Size & Amount of data (50-60 Gb/Day on my farm)
4. Infinite number of spectral signals
   • Crop types & varieties, Disease, Insects, weeds
5. Lack of local expertise
   • Universities, Extension, Government, Private
6. Grower learning curve & cost
7. AND THE BIGGEST CHALLENGE
GOVERNMENT REGULATIONS & POLICY
TAKEAWAYS!

1. Ag Needs Tech Due to Challenges!
2. Technology is not going away!
3. It’s About Data
   • Does it go into the cab?
   • Is it Timely, Useful, Efficient?
4. Too Many Restrictive Regulations!!!
5. Need Better Rural Infrastructure!!!

Courtesy of Robert Blair and Three Canyon Farms