AGRIBUSINESS AND FOOD PRODUCTION ARE AMONG THE GREATEST GROWTH INDUSTRIES OF OUR ERA

- World population to grow from 7.0 billion to 9.2 billion by 2050
- Global food production will need to increase 70% to meet higher demand
- Diets are improving with rapid growth of middle class

Source: United Nations Food and Agricultural Organization
GLOBAL DEMAND FOR ANIMAL PROTEIN CONTINUES TO GROW

Meat consumption per capita, kilograms, average 2010–12 (estimate), and 2022 (forecast), in the BRICS countries (Brazil, Russia, India, China and South Africa).

Source: Meat Atlas (CC-BY-SA Heinrich Boell Foundation, Friends of the Earth Europe)
CHALLENGE: LIMITED RESOURCES

• At most, only 12% more arable land is available globally – environmentally sensitive
• Only 5% more land is projected to be cultivated by 2050
• Demand for water will outstrip supply by 40% by 2030

*We must produce more food, with fewer resources and less environmental impact.*

Source: OECD-FAO, global water supply/demand model; agricultural production based on IFPRI computed general equilibrium model base case; A Daunting Task, Prof. Robert Thompson (2010)
OPTIMIZING YIELD THROUGH BIG DATA
WHY AND WHY NOW?

Mike Vande Logt
1) TECHNOLOGY DRIVING CROP YIELD

1960-2030 CORN YIELD

Yield (bu/A)

• Biotech

1960-1995:
1.5+bu/yr

1995-2007:
3.5+bu/yr

Genetics

6+

3.5+

1.5+

1960-1995:
1.5+bu/yr

1995-2007:
3.5+bu/yr

Insights

Source: Dr. Fred Below, University of Illinois
CORN YIELD HAS INCREASED
AND CORN PRICE HAS INCREASED
LIFE HAS BEEN GREAT FOR ALL AG-INDUSTRY PARTICIPANTS

Average U.S. Grower Per Acre Revenue

$225

$975
THE BIG SIX AG COMPANIES R&D SPEND CONTINUES TO ACCELERATE

2000 – 2005
1.7% CAGR

2006 – 2013
9% CAGR
CORE ASSUMPTIONS DRIVING MARKET PLACE CHANGE

1. Yield potential exceeding management level
2. Molecular plant breeding dramatically increasing high end yield potential. Yield monitors don’t lie. Seed now most expensive crop input. Coops must grow it!
3. Drought tolerance improving even faster than yield
4. Rainfall optimization will drive production practices
5. Cannot risk pre-plant placement of all inputs
6. Yield optimization enabled by data driven in season crop management – including weather
7. Enabled by innovations in application equipment.
Y DROP AND UNDERCOVER AT R1
2) THE WORLD IS GETTING DIGITIZED

Digital Data is a Representation About a Real World Condition
ELECTRONIC CIRCUITS ARE GETTING CHEAPER AND MORE POWERFUL

32x improvement in capability per spend in past 10 years

WIRELESS SENSORS...EVERYWHERE

100B sensors installed over next 4 years

Source: Semico Research, 2013
WIRELESS DATA TRANSFER IS GETTING CHEAPER

Source: Cisco (global wireless data use) and Statista (global carrier data revenue estimate)

75% drop in price over 4 years

Source: Cisco (global wireless data use) and Statista (global carrier data revenue estimate)
MORE CONNECTED MOBILE DEVICES THAN PEOPLE

Global Connections by Technology, 2008-2017

Source: GSMA Wireless Intelligence, Machina Research, A.T. Kearney Analysis
WIRELESS ACCESS...EVERYWHERE

US 3G Network Coverage Becoming Ubiquitous

Source: AT&T and Verizon Wireless
STORING DATA IS GETTING CHEAPER

Average Price Per Gigabyte, 1980-2013

97% drop in price per gigabyte over past 10 Years

Source: Wayback Machine (Statistics Brain)
AGRICULTURE IMPLICATIONS: ENVIRONMENTAL AND OPERATING DATA
“PEOPLE IN BOTH FIELDS (WALL STREET & BASEBALL) OPERATE WITH BELIEFS AND BIASES. TO THE EXTENT YOU CAN ELIMINATE BOTH AND REPLACE THEM WITH DATA, YOU GAIN A CLEAR ADVANTAGE.”

Michael Lewis, *Moneyball*
WHERE IS THE OPPORTUNITY FOR AG RETAIL
Every farmer makes an average of 40 decisions each year

SOURCE: Monsanto team – The above boxes refer to some of the decisions farmers face in growing their crops.
THREE TYPES OF DATA IN USE

Traditional Experimental Data (Answer Plot®)
- Controlled experimental design to test chosen agronomic factors
- Example; nitrogen levels, populations, etc.

Remote Sensing (R7® Satellite Imagery)
- Evaluating the current state of the crop

Predictive Modeling (Climate Pro™)
- Simulates and predicts final results based on management decisions
TRADITIONAL DATA DRIVEN PLOT WORK

- > 1.2M Plots
- LSDs < 2 bu.
- Largest applied ag research program in U.S.
OPTIMIZING GENETIC PERFORMANCE

Starts With the Seller & the **Grower’s** Field!

Answer® Plot Data

Characterized in First Year RTP, RTN, TCOC

Variable Rate Technology
OPTIMIZING PLANT NUTRITION

NutriSolutions® 360°
By WinField

In Season Imagery
7 to 14 images / year
CROP HEALTH MONITOR – DEFEND YIELD

- Daily crop insights
- Daily low resolution imagery
- Instantly see variability between fields, and yesterday versus today.
- Ground truth the issue
- Take action to protect and improve yields
2014 = 175 bu/ac x $4.25 = $744
2015 = 180 bu/ac x $3.65 = $657

Average U.S. Grower Per Acre Revenue

$225
$340
$975

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Getting the **Right Bushels is as Important as Getting the Right Price**!

Where and how do farmers get the right bushels?
BIG DATA CONCERNS

77.5% “Feared regulators and other government officials might gain access to their private information”

76% “concerned others could use their information for commodity market speculation”

82% “are unclear how companies will use my data” For example (Selling my yield information to landlords)
TRUST IN AIDED SOURCES

• Nearly two-thirds of growers trust their Crop Consultant to provide a product/service like the one described, followed by a Local Co-op.

Q1. Based on the description you just read, how much would you trust each of the providers listed to offer this new product/service?
What is the Data Silo?

- Locally Branded Cloud Storage & Backup
- Geospatial Transformation & Conversion
- OADA Cloud to Cloud Integration (Deere, Climate Corp, etc...)
- Security and Control of Data Sharing (Consultant, Cooperative, Winfield, Monsanto, individuals)
- Bi-Directional Local Retailer Access and Sharing of Data
- Basic Analysis and Dashboards
- Advanced Search

Grower Owned Data
Member Owned Solution
Access Control In Hands of Growers or Designees
Locally Branded
“Most Trusted” Solution

R&D in 2015
Thank You