Digitization: The Next Revolution in Agriculture

David Fischhoff, Chief Scientist

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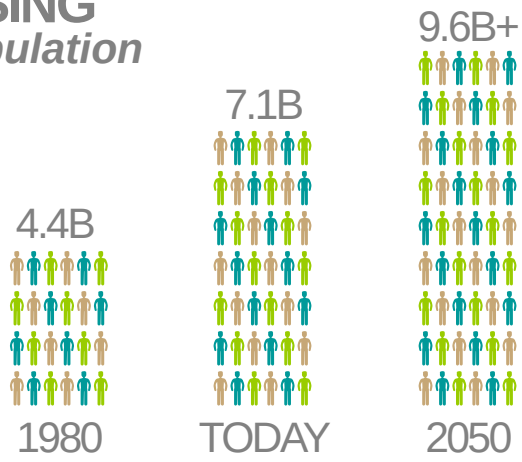
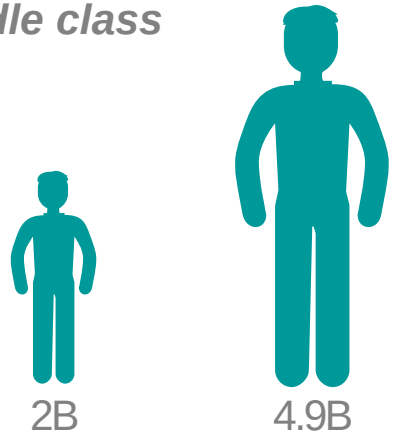
Challenges Facing Production Agriculture

RISING
population



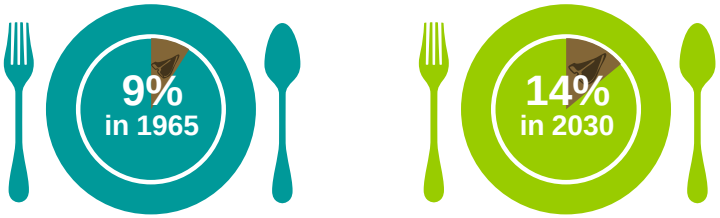
Source: http://esa.un.org/unpd/wpp

GROWING
middle class



Source: http://www.reuters.com/middle-class-infographic

RISING
animal protein consumption



Source: UN FAO Food Balance Sheet, World Health Organization Global and regional food consumption patterns and trends"

DECLINING
arable land

.4 HECTARE
per person in
1961

less than
.13 HECTARE
per person in
2050

Source: The World Bank, Food and Agriculture Organization of the United Nations (FAO-STAT), Monsanto Internal Calculations

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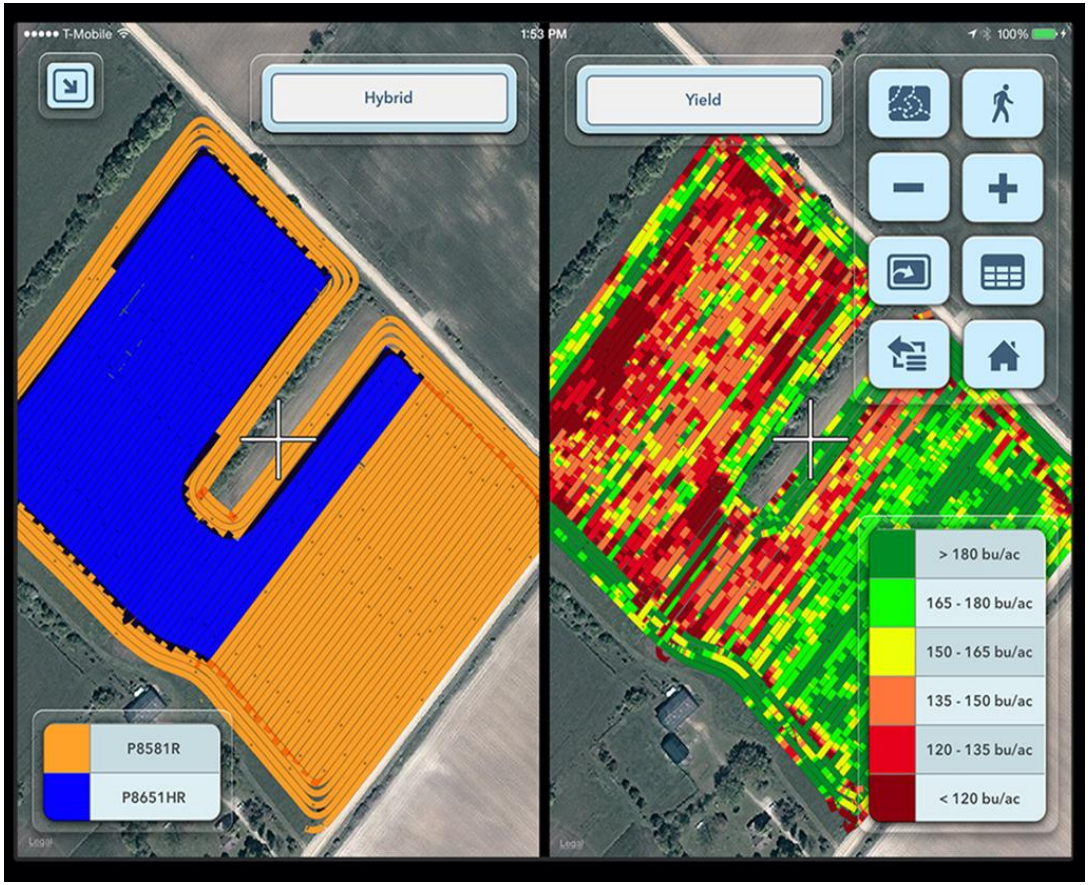
Digital Data Represents the Real World



Hybrid planted vs. yield

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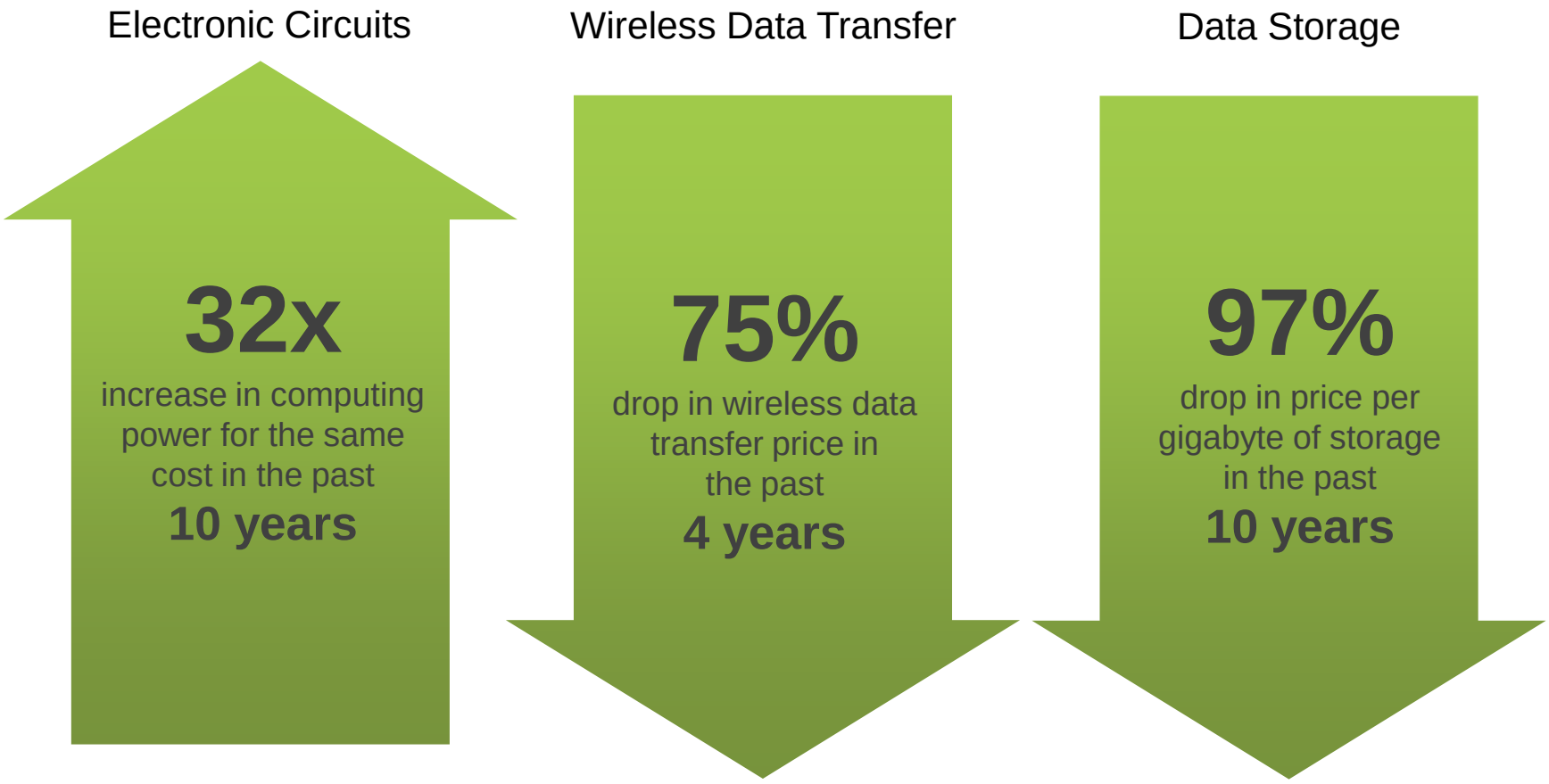
Technology Advancement Enables Data Science



Source: Wikipedia.org, anandtech.com, Intel, CNET.com, processortimeline.info, thocp.net

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

Source: Wayback Machine (Statistic Brain)

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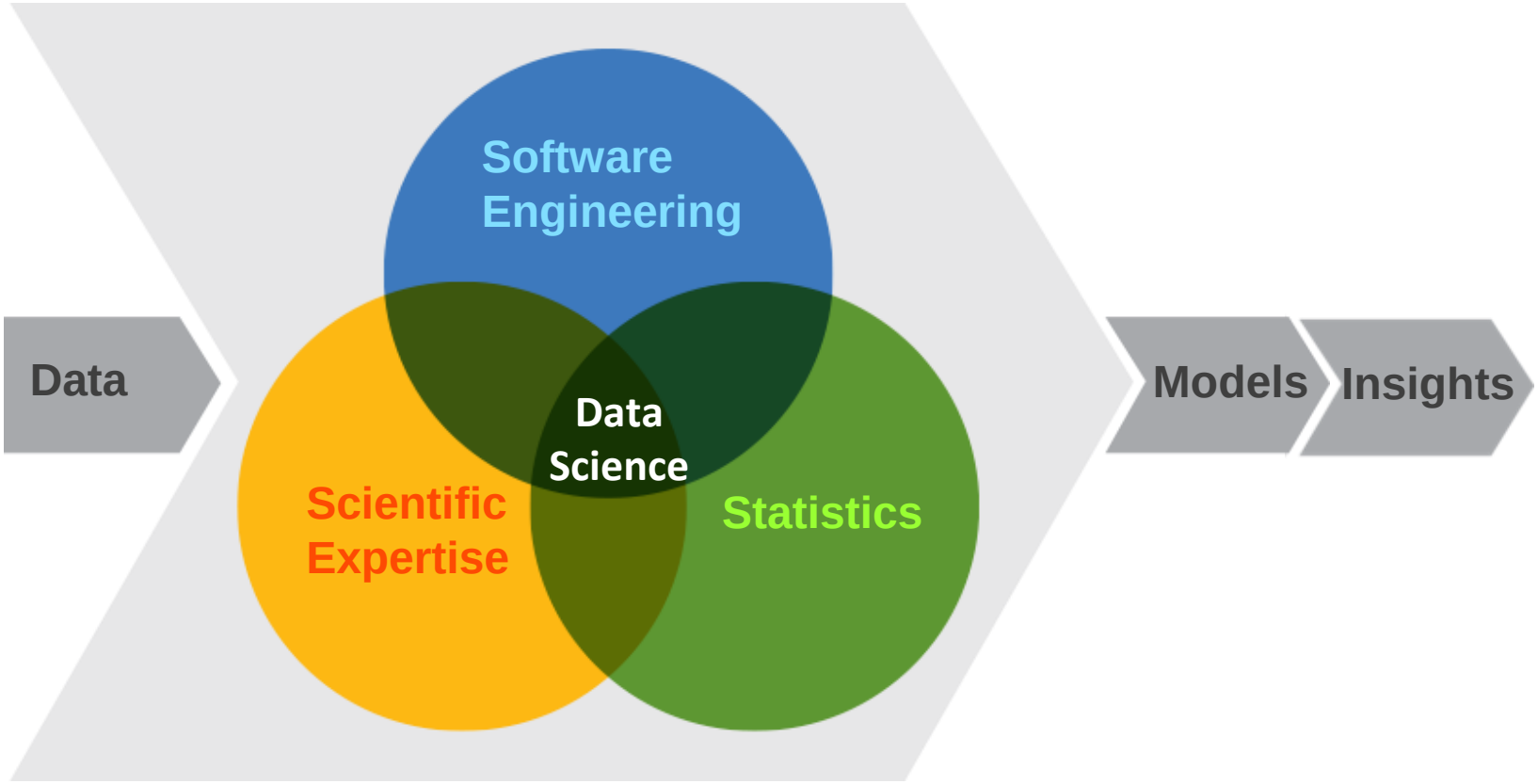
How Data Science Works



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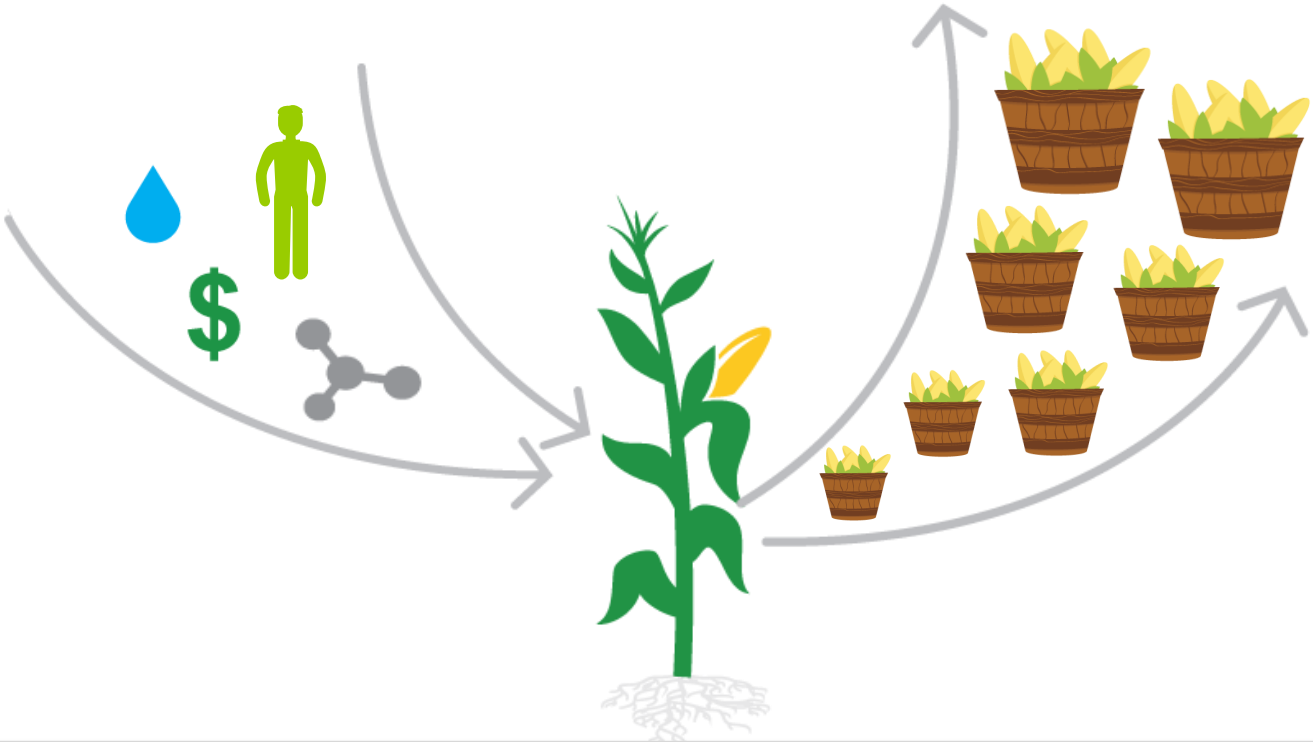
Data Science Delivered Through Digital Tools

Optimizing inputs…

To maximize production



Farmer drives decisions

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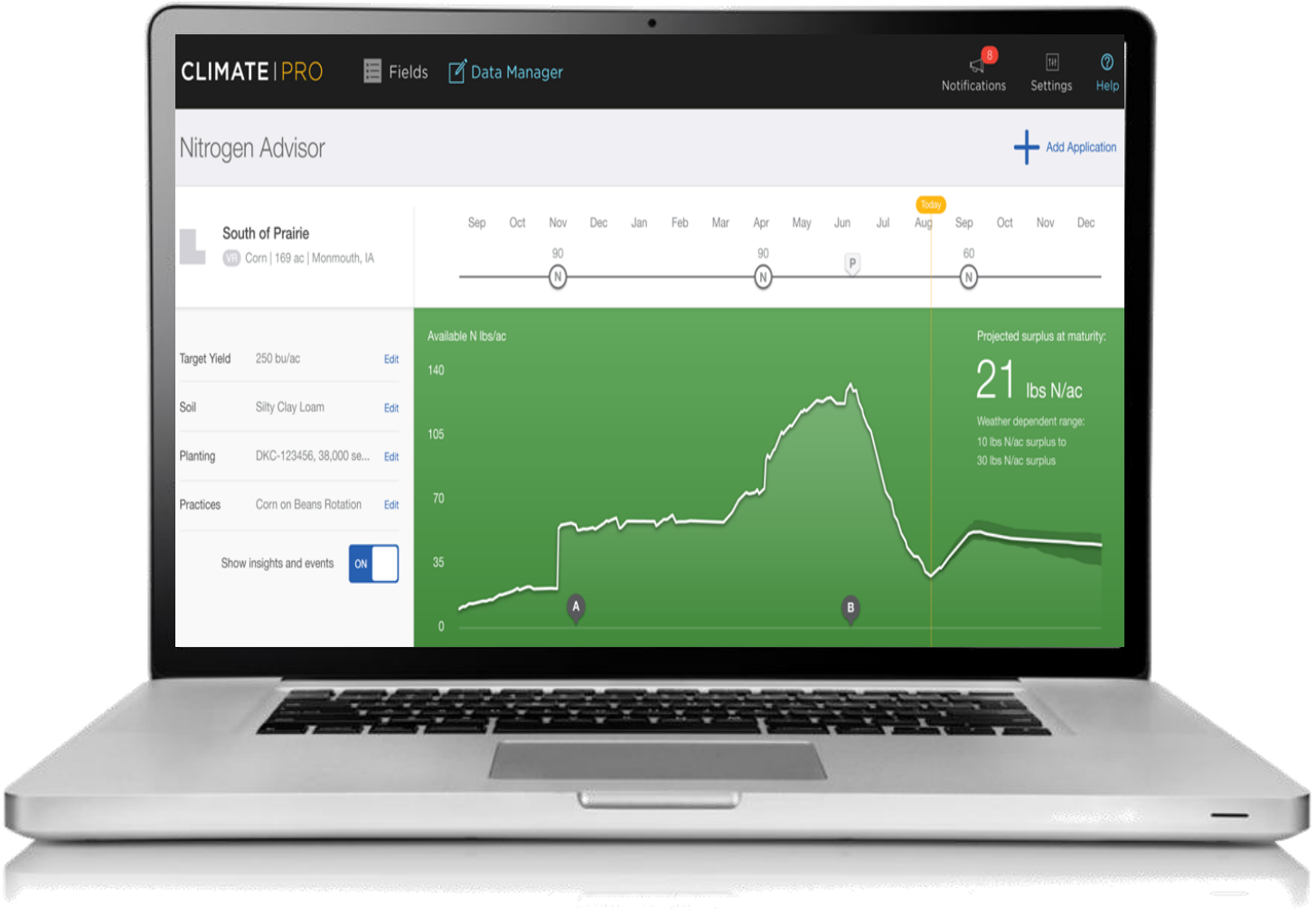
Nitrogen Management



Note: Image is for illustrative purposes only.

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Opportunity for Proactive Fertility Management Through Modeling

Sample of >3,800 Fields[1]

− Nitrogen Shortfall

>10% of fields[1] experienced yield loss due to insufficient nitrogen

Average impact of yield loss £89/hectare (£36/acre)

+ Nitrogen Surplus

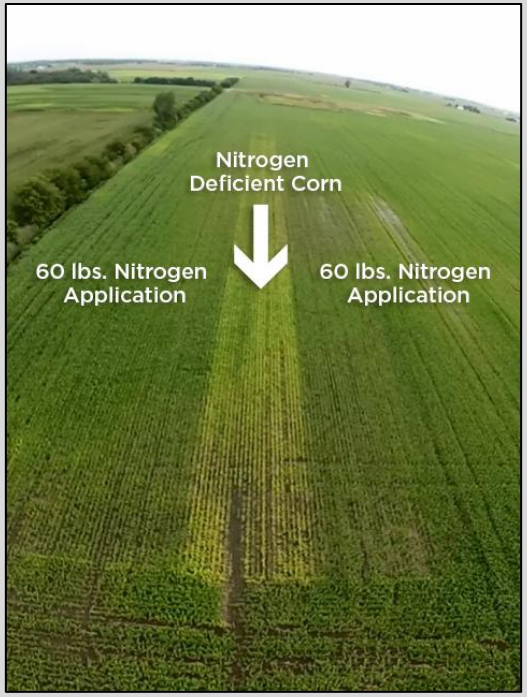
>40% of fields[1] could benefit from optimizing inputs

Average savings opportunity £21.60/hectare (£9/acre)

[1]Representative and random sample of >3,800 Nitrogen Advisor Fields where main Nitrogen application was mineral fertilizer. Assumes $4/bushel corn, $0.40 /lb-N fertilizer costs and average yield of 168 bushels per acre

Nitrogen Management Use Case: Yield Opportunity

Northern Illinois, July 2015



With additional nitrogen:
13.79 t/ha
(217 bu/acre)

Check strip – no additional nitrogen:
11.12 t/ha
(175 bu/acre)

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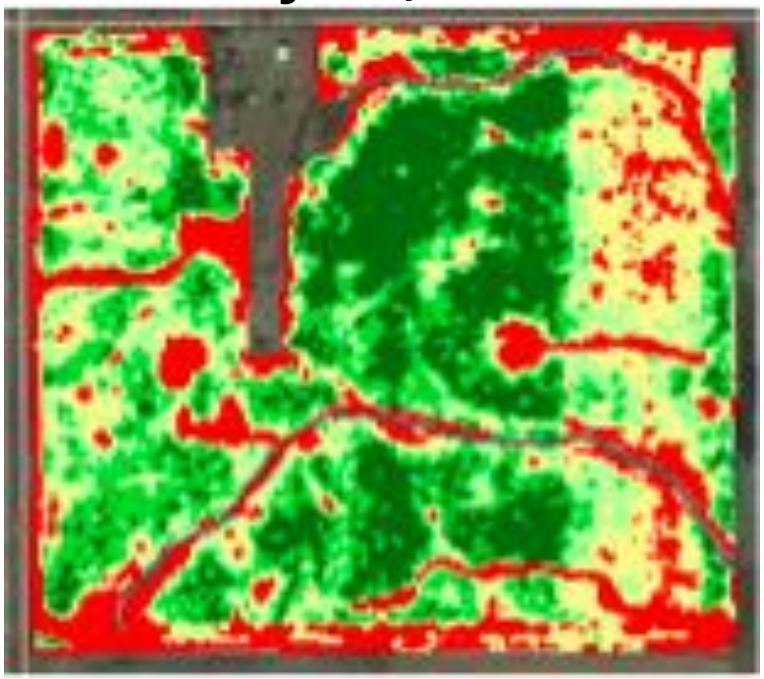
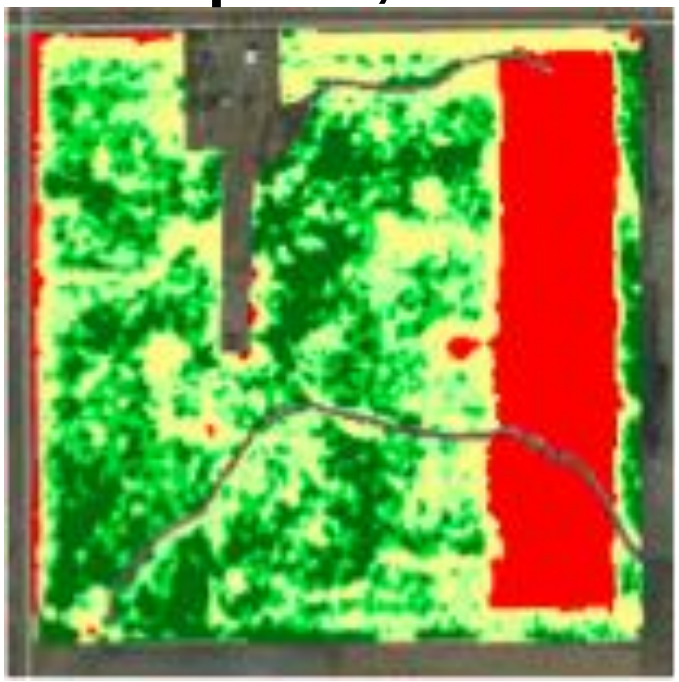
Satellite Imagery Use Case: Disease Management

Grey Leaf Spot

July 10, 2014



Sept. 14, 2014



Carroll, IA | Corn | 59 Hectares (145 Acres)

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The Future of Digital Ag

Increasingly customized insights

Sub-field insights

Expanded features

Expanded crops

Expanded geography

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