

# Big Data/Modern Analytic Techniques

Presentation to Crawford Fund 2017 Annual Conference

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8 AUGUST 2017 - CANBERRA



THE CRAWFORD FUND

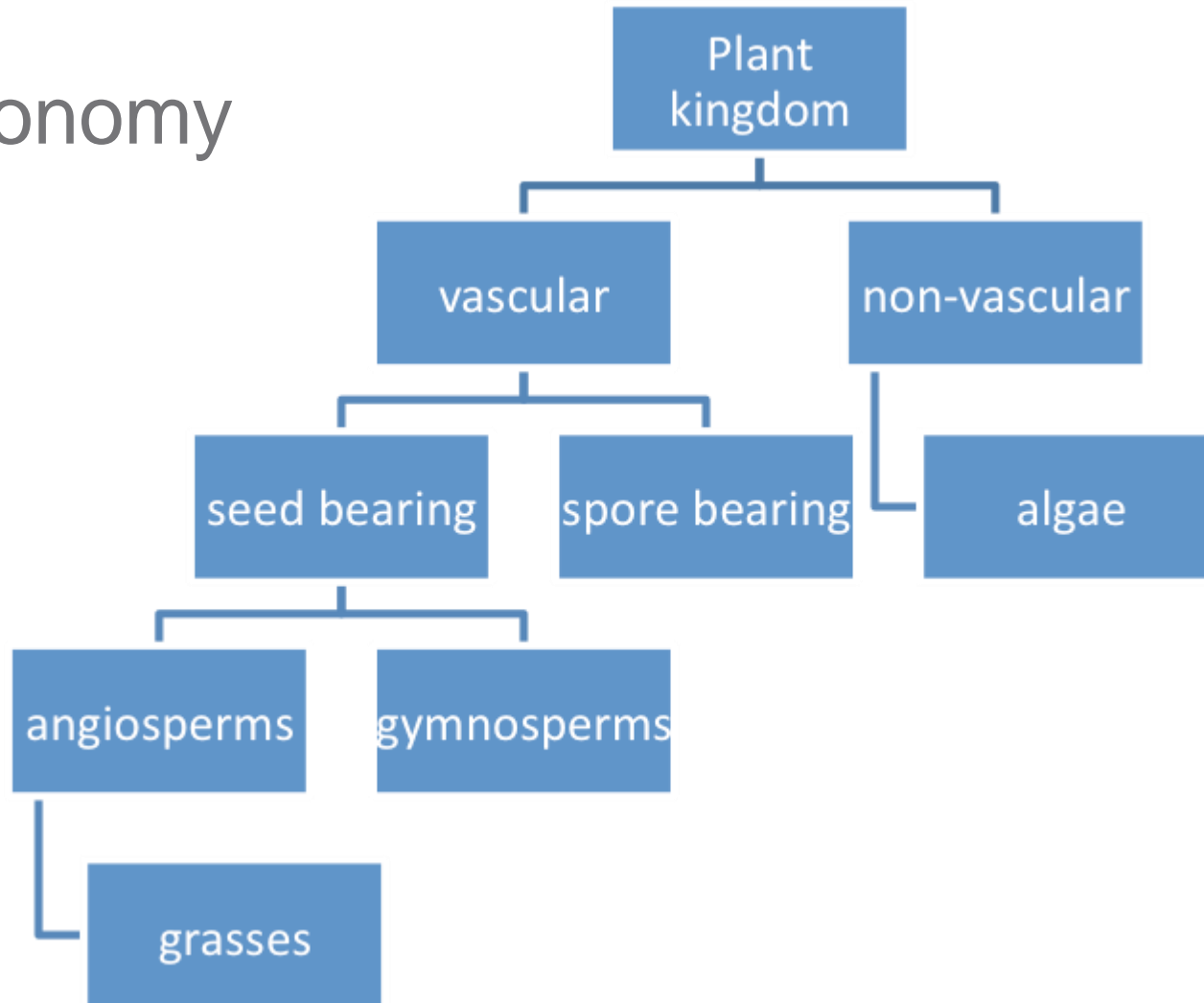
*For a Food Secure World*



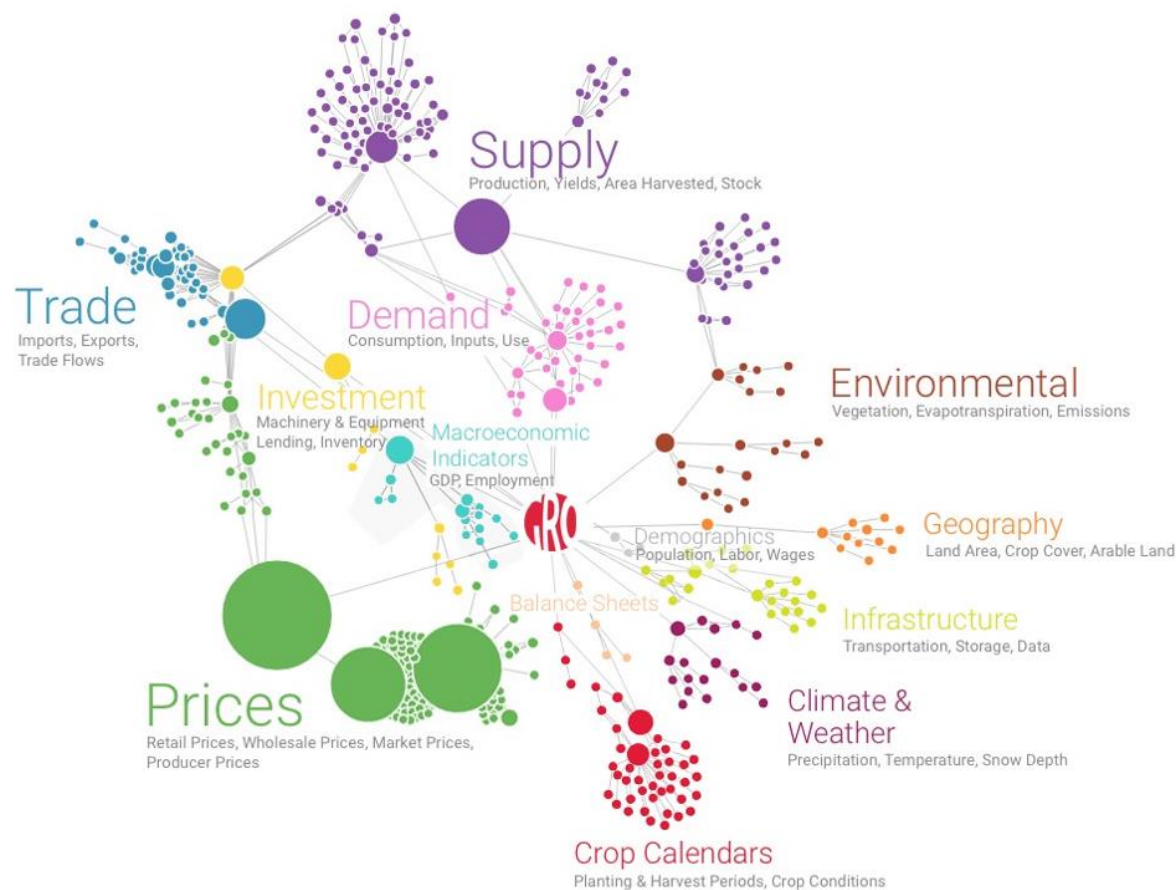
# McKinsey Global Institute Digitization Index

Sector	Over-all digitization <sup>1</sup>	Assets		Usage				Labor			GDP share %	Employment share %	Productivity growth, 2005–14 <sup>2</sup> %
		Digital spending	Digital asset stock	Transactions	Interactions	Business processes	Market making	Digital spending on workers	Digital capital deepening	Digitization of work			
ICT											5	3	4.6
Media		1									2	1	3.6
Professional services											9	6	0.3
Finance and insurance											8	4	1.6
Wholesale trade											5	4	0.2
Advanced manufacturing					4						3	2	2.6
Oil and gas		2									2	0.1	2.9
Utilities											2	0.4	1.3
Chemicals and pharmaceuticals											2	1	1.8
Basic goods manufacturing											5	5	1.2
Mining											1	0.4	0.5
Real estate	●										5	1	2.3
Transportation and warehousing	●									5	3	3	1.4
Education	●										2	2	-0.5
Retail trade	●			3							5	11	-1.1
Entertainment and recreation											1	1	0.9
Personal and local services											6	11	0.5
Government	●										16	15	0.2
Health care											10	13	-0.1
Hospitality	●	6									4	8	-0.9
Construction											3	5	-1.4
Agriculture and hunting											1	1	-0.9

# Taxonomy



# Gro's Proprietary Ontology



# The Problem

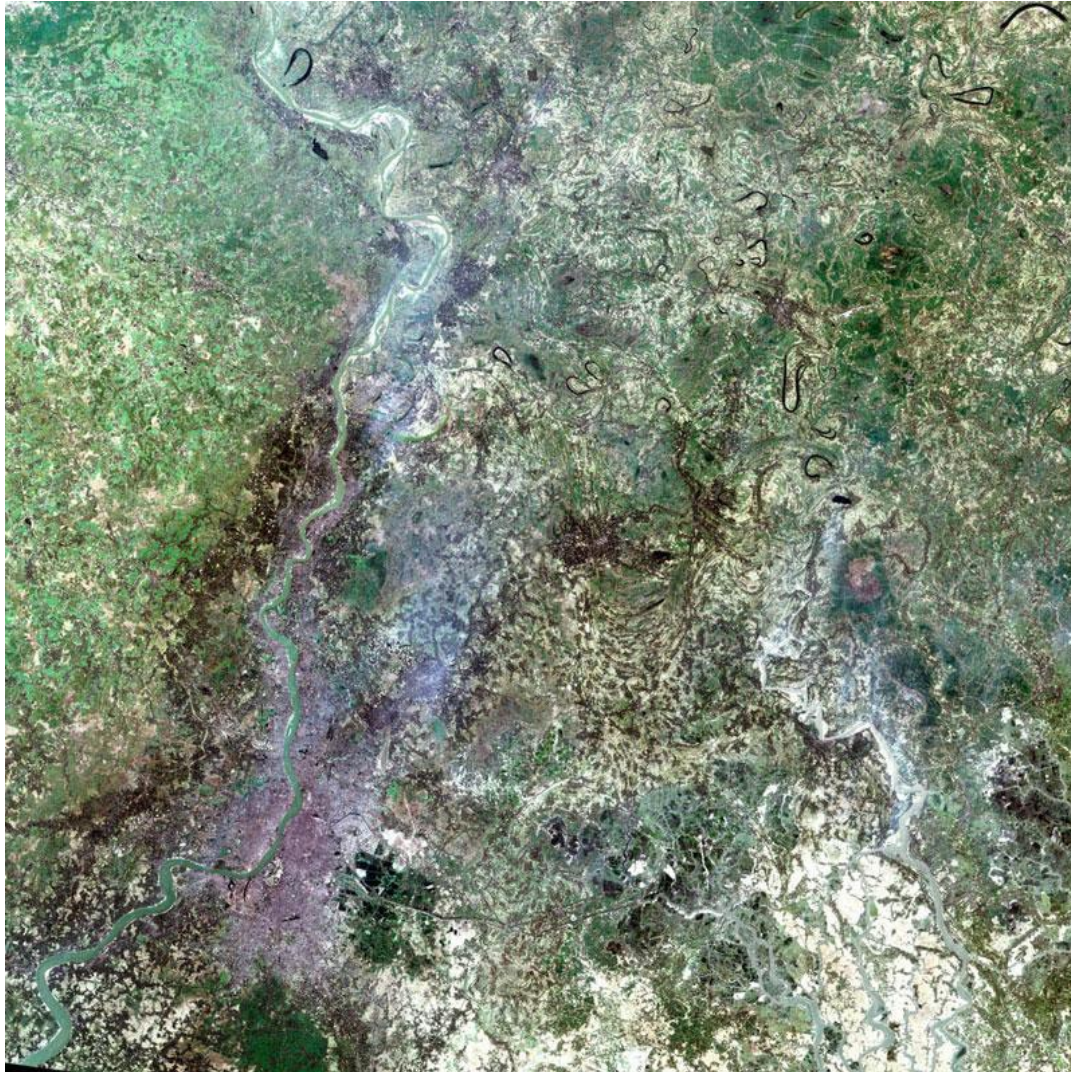
Lack of normalized, reliable, and real-time information makes agricultural markets inefficient and risk management difficult.



Agriculture market participants suffer from **significant amounts of information asymmetry**.

**There is no common language** that the industry uses to understand and analyze all data related to agriculture.

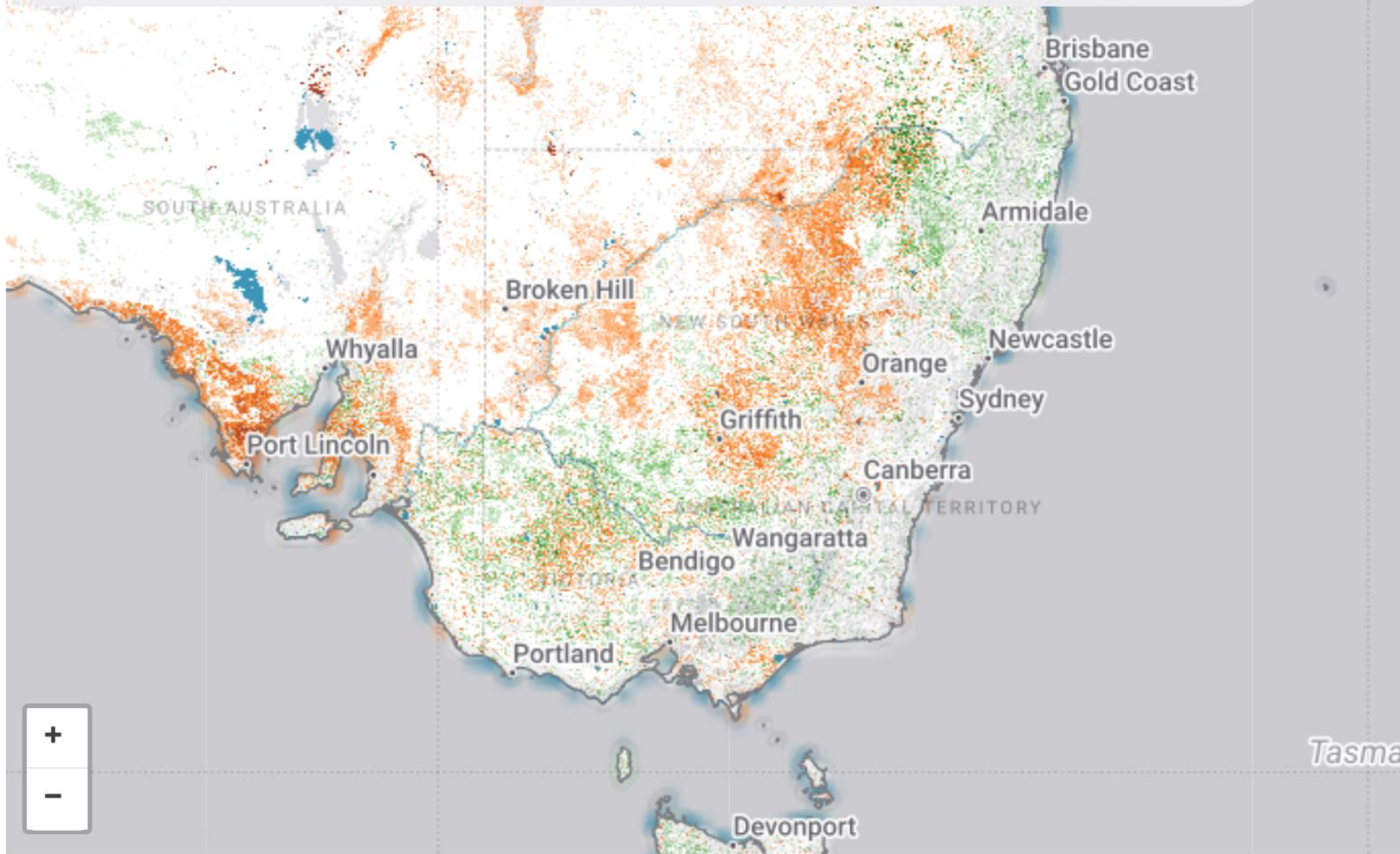




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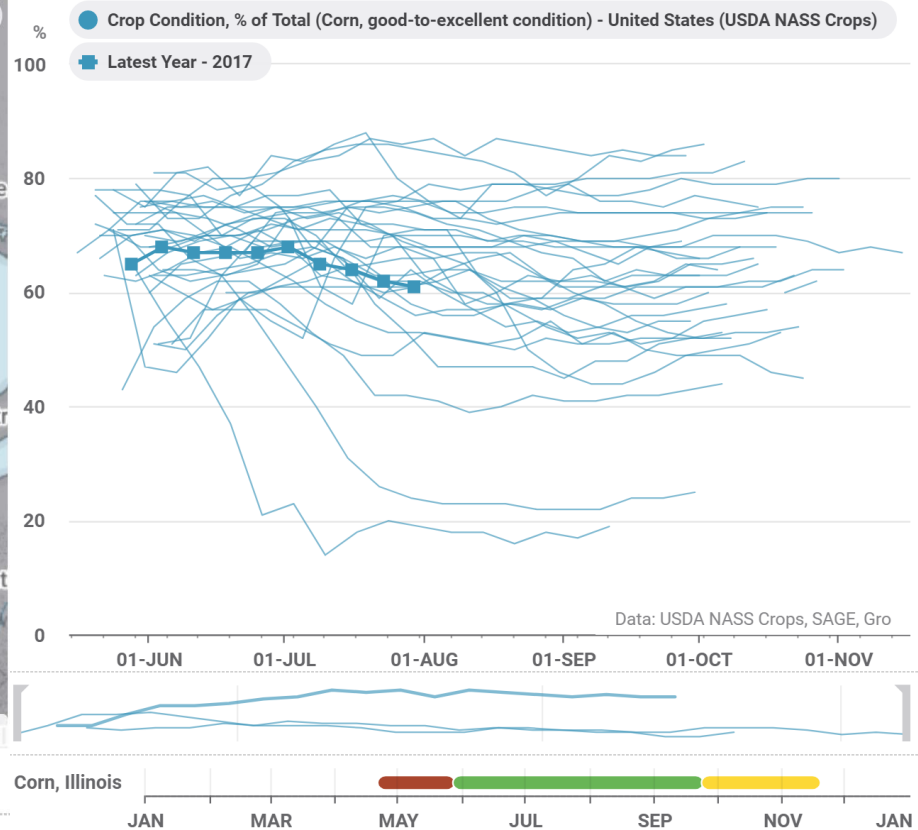
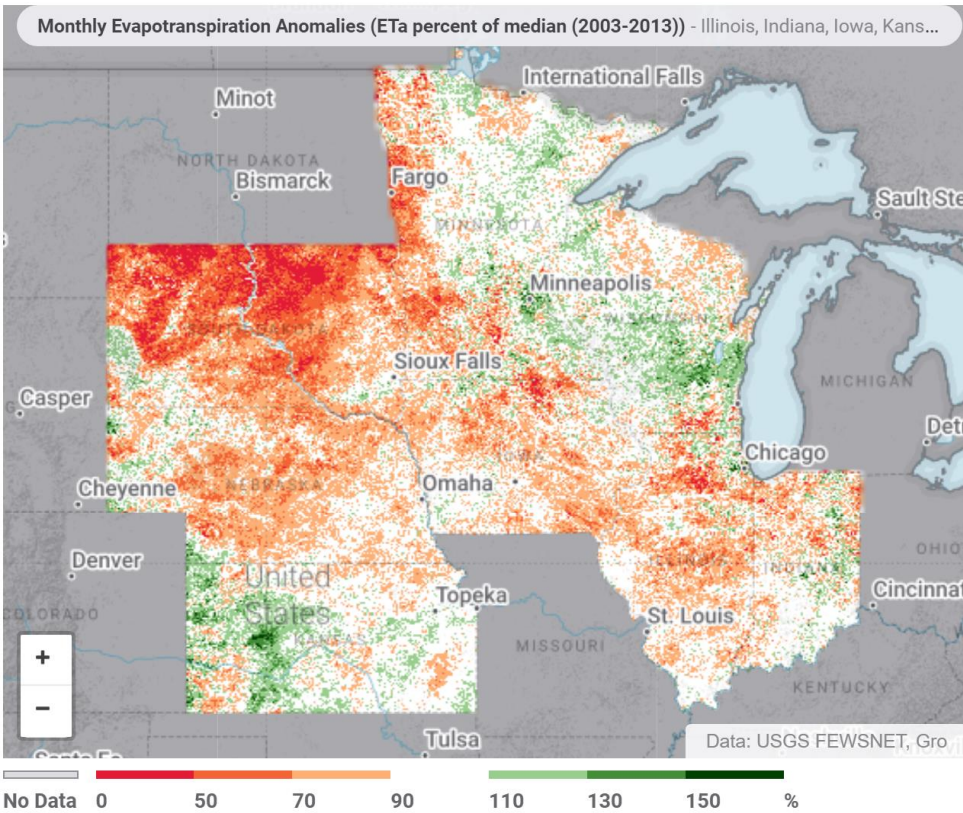


16-day Vegetation Anomalies (NDVI difference from 10-yr trailing mean) - Australia (GIMMS MODIS NDVI) (27-JUL '17)



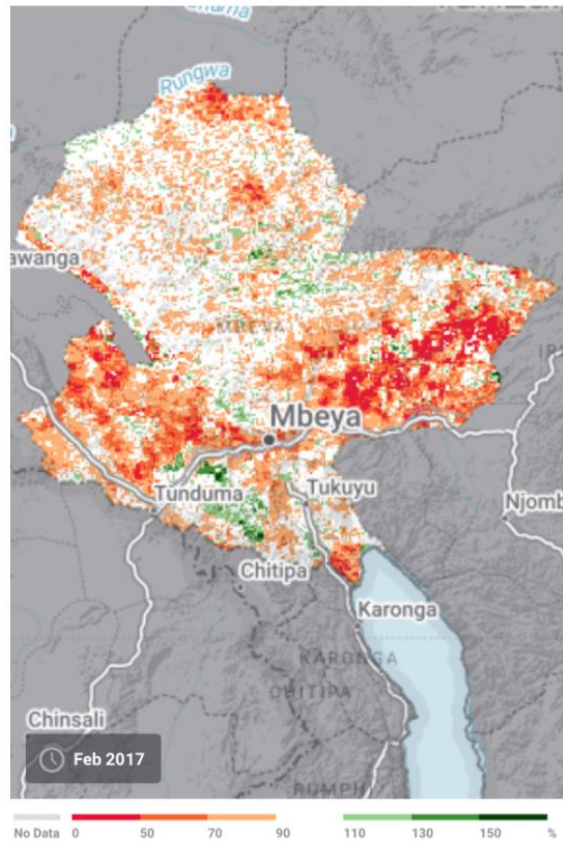
No Data -1 -0.5 -0.4 -0.3 -0.2 -0.1 -0.05 0.05 0.1 0.2 0.3 0.4 0.5 1 index

# Satellite Pictures to Actionable Indices



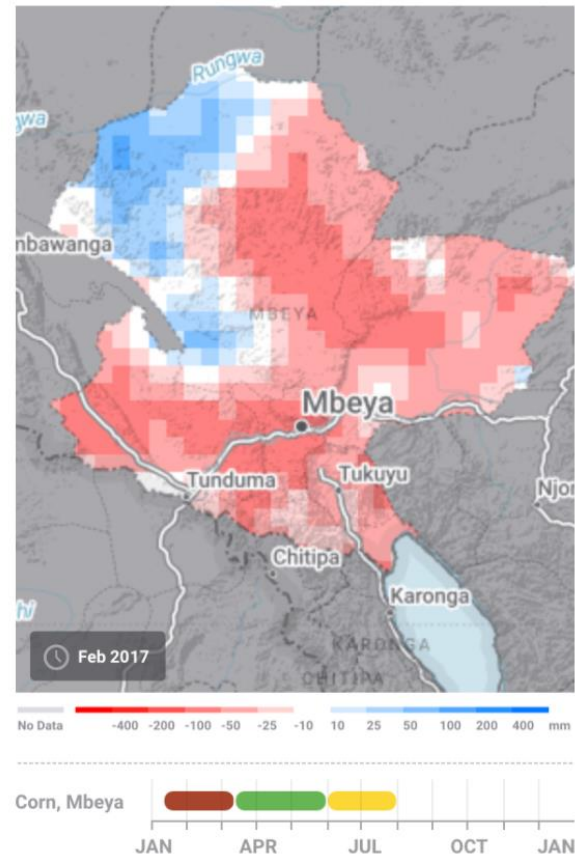


# Mbeya, Kenya: 2017 Drought



Monthly Evapotranspiration Anomalies  
(ETa percent of median (2003-2013)) - Mbeya

Data: NOAA CPC, SAGE, USGS FEWSNET, Gro Intelligence

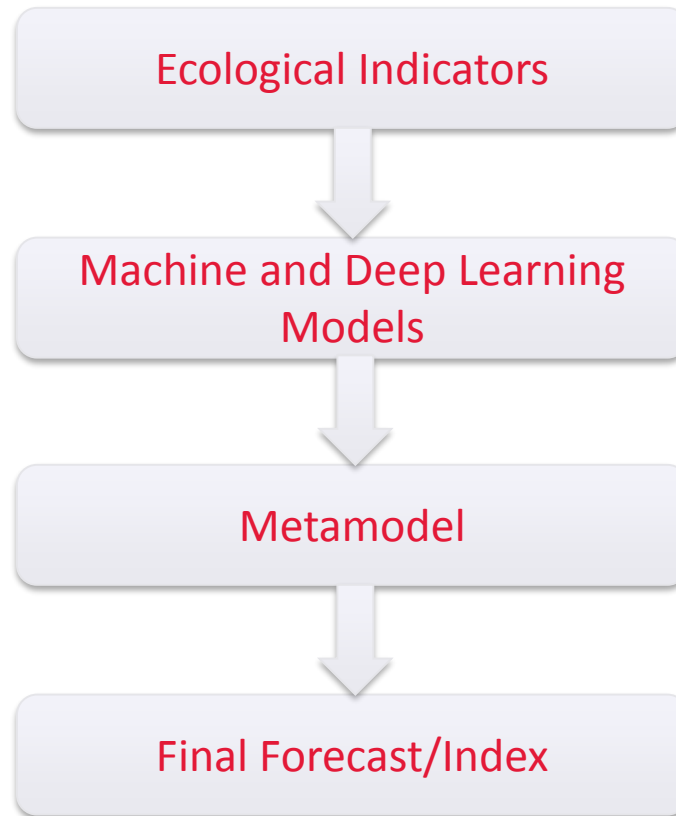


Monthly Precipitation Anomalies  
(Modeled rainfall difference from 5-yr trailing mean) - Mbeya

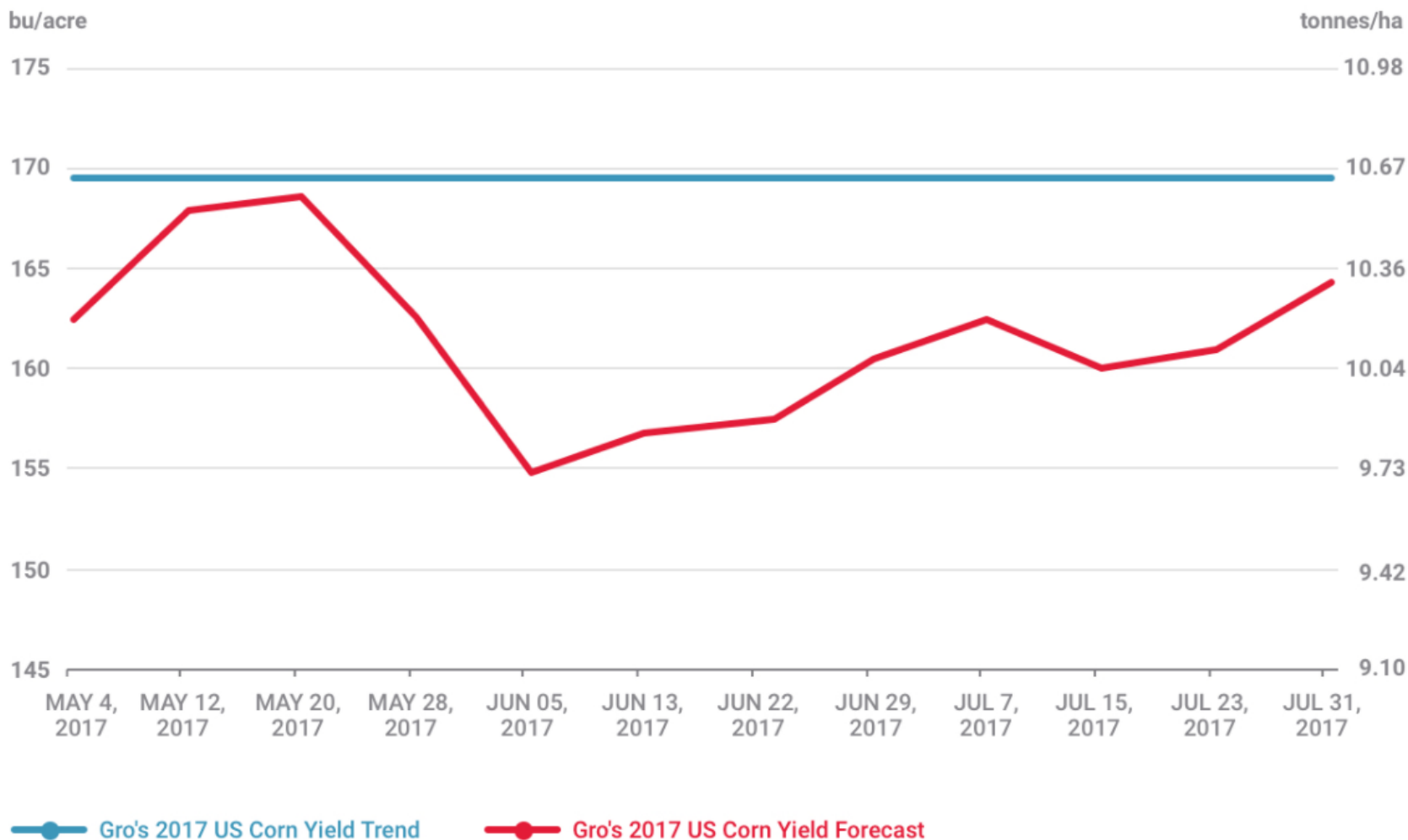
Planting/Growth/Harvest

www.gro-intelligence.com

# Yield Forecast and Drought Index Approach



# Gro's 2017 US Corn Yield Forecast Breaks Higher



Data: USDA NASS Crops, Gro Intelligence Yield Model

[www.gro-intelligence.com](http://www.gro-intelligence.com)



# Sub Saharan Africa Data Wishlist

Sample of data categories we believe would be critical to collect for African countries at a more frequent and granular level

Agronomy	Production	Supply	Use	Prices	Economics
Ag equipment in use (c)	Seed production (a)	Imports (m)	Upstream - Oilseed processing (m)	Inputs - fertilizers (a)	Land rent/water rights (a)
Fertilizer use per acre (a)	Acres Planted - County (a)	Stocks - Province/State level (q)	By type - maize, cornmeal (a)	Ag labor rates (a)	Total Input Costs (m)
Pesticide use per acre (a)	Acres Harvested - County (a)	Stocks by type - grain, silage (q)	By use - seed, food, industrial (a)	Farm-gate (w)	Producer Margin-by crop (a)
GMO seed use (a)	Yield - County (a)	Grain-Cold storage capacity (a)	Per-capita consumption (a)	Export prices (m)	Avg. farm size (c)
Soil conditions (a)	Crop Progress Reports (m)	Grain shipments-deliveries (q)	Domestic govt. tenders (w)	Domestic freight rates (m)	Avg. farm income (a)
Fallowed acres (a)	Harvest grading - ergot levels (a)	Grain handling capacity - port level (a)	Exports (m)	Byproducts - wholesale (d)	Avg. farm debt (a)
Irrigated acres (a)	Byproduct - meat, feed (m)	Obsolescence-Loss Rates - (a)	Retail expenditures (m)	Processed - retail (d)	Storage, insurance rates (m)

Frequency Code: C-census, A-annual, M-monthly , W-weekly, and D-daily.

Blue items may not be applicable to USDA reports.



# User Survey

Where are you located and what are you interested in?

## NORTH AMERICA

PERCENTAGE OF USERS

38%

REGIONS OF INTEREST



TOP COMMODITIES OF INTEREST

- 1st Corn
- 2nd Soybeans
- 3rd Wheat

## SOUTH AMERICA

PERCENTAGE OF USERS

4%

REGIONS OF INTEREST



TOP COMMODITIES OF INTEREST

- 1st Soybeans
- 2nd Sugar
- 3rd Corn

## AFRICA

PERCENTAGE OF USERS

35%

REGIONS OF INTEREST



TOP COMMODITIES OF INTEREST

- 1st Corn
- 2nd Cereals
- 3rd Vegetables

## EUROPE

PERCENTAGE OF USERS

16%

REGIONS OF INTEREST



TOP COMMODITIES OF INTEREST

- 1st Corn
- 2nd Wheat
- 3rd Coffee

## ASIA

PERCENTAGE OF USERS

5%

REGIONS OF INTEREST



TOP COMMODITIES OF INTEREST

- 1st Corn, Rice, Vegetables
- 2nd Sugar, Wheat, Oil Crops
- 3rd Fruits, Beans

## OCEANIA

PERCENTAGE OF USERS

2%

REGIONS OF INTEREST



TOP COMMODITIES OF INTEREST

- 1st Cereals
- 2nd Livestock
- 3rd Cotton, Dairy, Chickpeas

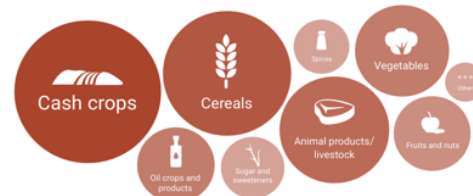
## OVERALL TOP 4 COUNTRIES OF INTEREST



If you could have a 'dream data dashboard', what would it monitor?

Poultry Rice Rainfall Water Food Security Harvest  
Trends Corn Yield Supply and Demand African  
Commodity Cost Production Dashboard Credit Risk  
Prices Land Weather East Africa Crop Vegetables  
Fundamental Agricultural Growth Industry Basis

What commodity groups are you interested in?



\*Confidential

What are you expecting to get out of Clews?



Sources: Gro Intelligence Sample Survey Oct. 12, 2016



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# Credit/Insurance

Lowering the cost of capital and expanding access to credit is critical

Better credit models can be developed by incorporating “market risk” data into the models.

- Variables well beyond existing credit history of borrower are data series that are available in Gro
  - Growing Cycles
  - Climate and growing conditions
  - Perils (fire, flood, infestations, predation)
  - Price of crop
  - Price of other commodities
  - National and regional programs and restrictions
  - Trade policies



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