Big Data Driven Crop Production

BORG EXELMANS

VERSAILLES 22-11-2017

Creation

2.5 Exabytes per day

530B songs

150M Iphones

5M laptops

90 years of HD video

Curation

Data without insights is useless

Computing

New infrastructure needed to cope with instant analysis

Consolidation

New means of data output delivery needed

Big Data Impact and Evolution

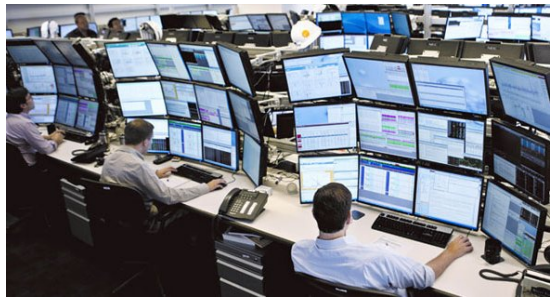
- Predictive Analytics (Asset maintenance)
- Ecosystems (Seeds, Weather, Workforce, Finances, Machinery, Soil,...)
- Data monetization (Infonomics)

- Data Management (Manage each element in the ecosystem)
- Digital Ethics

Big Data Impacts Day to Day Life

LinkedIn

monster.com



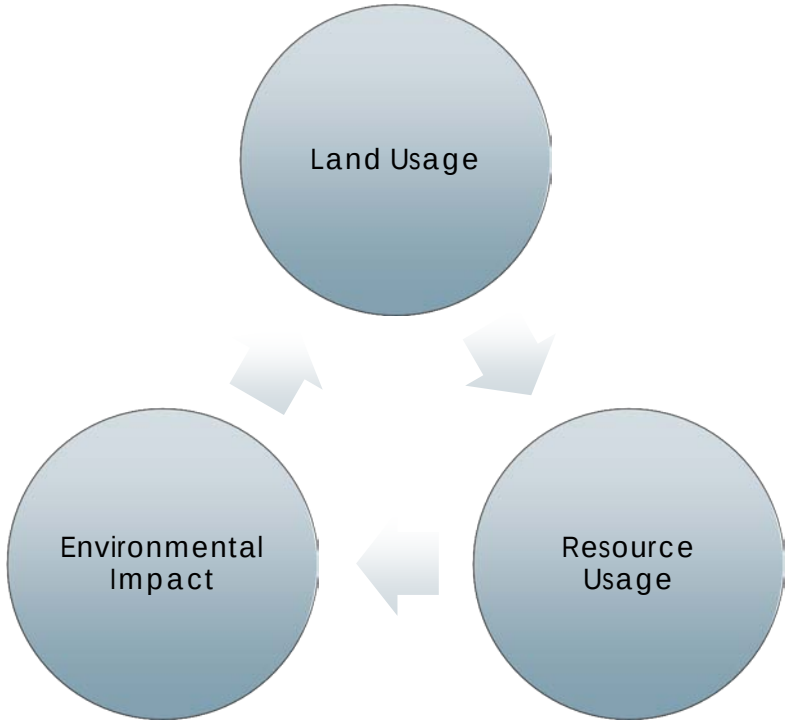
eHarmony

match.com

The Changing Scale of Agriculture

Demographics

Consumer Trends

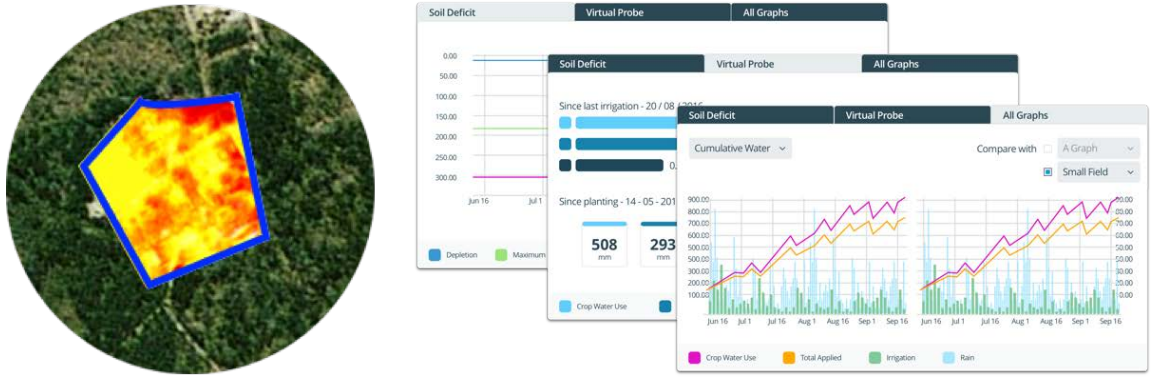


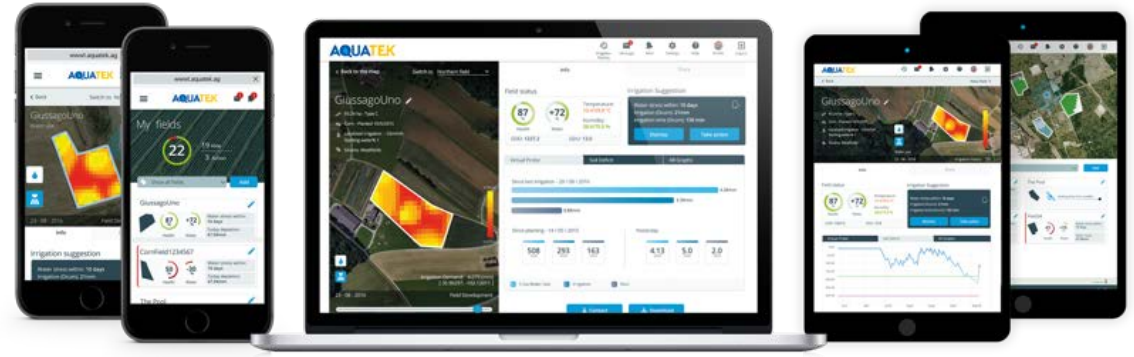
Legislations

External Factors

AquaTek

- Combined data sources
  - Simulating equivalent of 275 soil moisture probes per ha
  - Assessing daily crop water use
  - Estimates future requirements
  - Early warning system for crop stress





Betting the Farm on Information

Opportunity

Improved farming productivity, growth and margins

Data and Analytics

Soil tested with electrical charges and mapped for precise fertilizer dosages applied automatically

Drones equipped with infrared cameras survey for flood, irrigation and crop stress

Combines take continuous readings, analyzing data in real time data on moisture, yields, etc. via iPads

Results

Ability to farm 20,000 acres, up from 700 acres in the 1970s, with only 25 employees

ROI growth from 14% to 21%, despite 8x increase in cost of sensor-loaded combines

Eliminated need for crop diversification to hedge against weather, disease and market conditions

Tom Farms

Data Mining for Riskless Farming

THE CLIMATE CORPORATION

MONSANTO

Opportunity

Former Google employees offer crop insurance to underserved parts of the world

Data and Analytics

Continually gathering weather measurements from 500K locations; 30 trillion simulation data points, 50TB per day

Actuarial analytics to predict weather-related risks for specific crops in specific locations

Hadoop, Lisp, Clojure, Amazon Web Services; 1000s of concurrent instances of map-reduce

Results

Out-compete insurers that can't assess granular risk; automatic claim payments based on weather

Enable farmers in Asia and Africa to take on risk

Monsanto acquires company for $930M

NCCS solves climate mysteries with advance analytics

Opportunity

NCCS needed a supercomputing capability for creating and analyzing complex global climate models and managing more than 25 PB of climate science data.

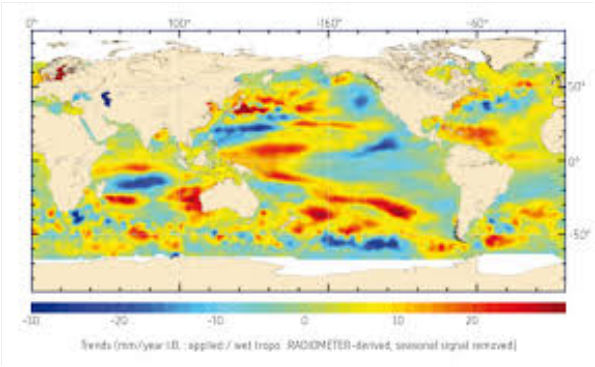
Needed a Visualization technology to help scientists see their research in incredible detail.

Data and analytics

NCCS opted to CSC to scale the processing cores to 35000 in the current discover system which is an assembly of multiple Linux servers.

Added the Visualization Wall, driven by16 Linux-based servers to develop and maintain visualization.

Results

Developed the highest-resolution atmospheric simulation , modeling 2 years of Earth's climate, computing performance increased to 130-folds.

Created the 17-by-6-foot Visualization Wall enabling them to visualize their climate research.