Can Data-Driven Agriculture Help Feed a Hungry World?

https://www.geospatialworld.net/wp-content/uploads/2017/06/iot-farming.jpg

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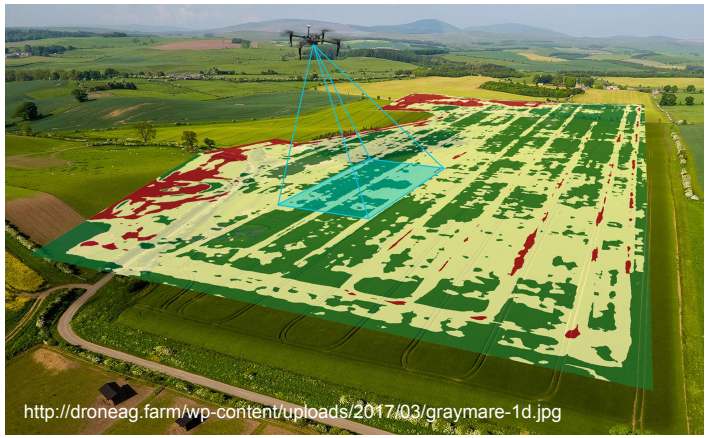
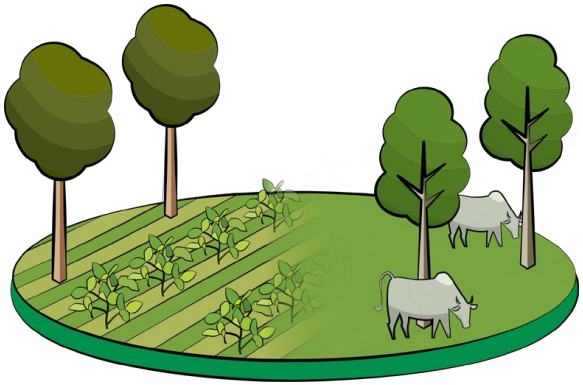
For W201 RDADA Spring 2018

January 22nd 2018

John Roach, 03/03/16 for YaleEnvironment360

- Big Data: tune agriculture to maximize yield
- Avoid deforestation pushed by demand
- Private vs. Open Source platforms

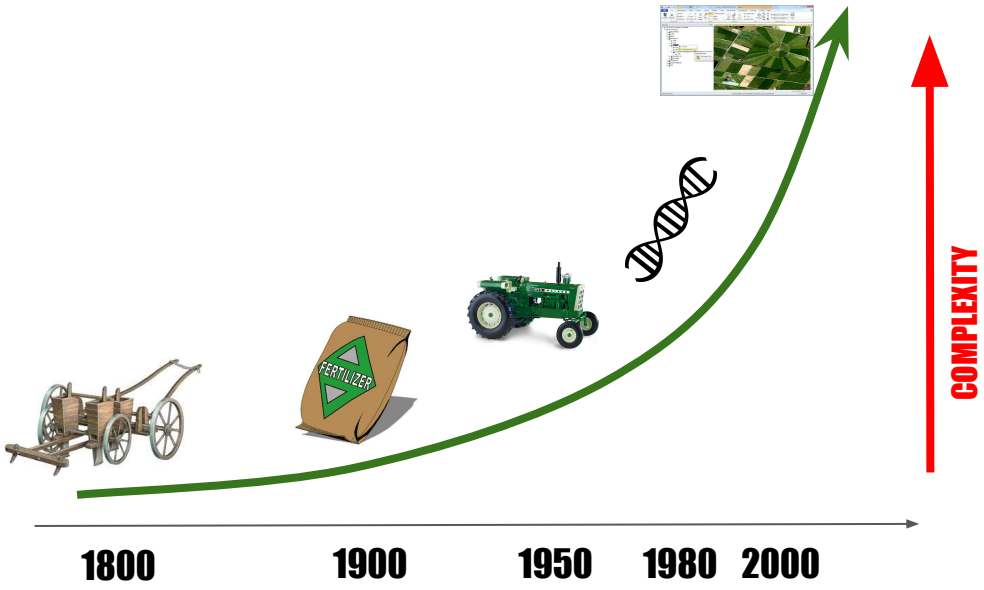




http://revistagloborural.globo.com/Integracao/noticia/2016/09/ilpf-variacoes-possiveis-e-rentaveis.html

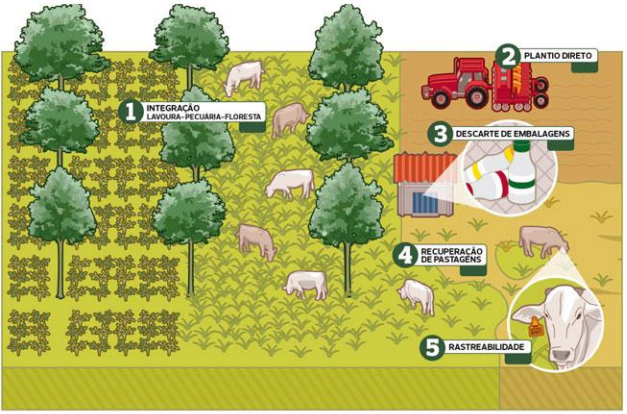
- Industrial-scale operations vs. Multi-use integrated systems
- We can't rely on a new Green-Revolution-like quantum leap

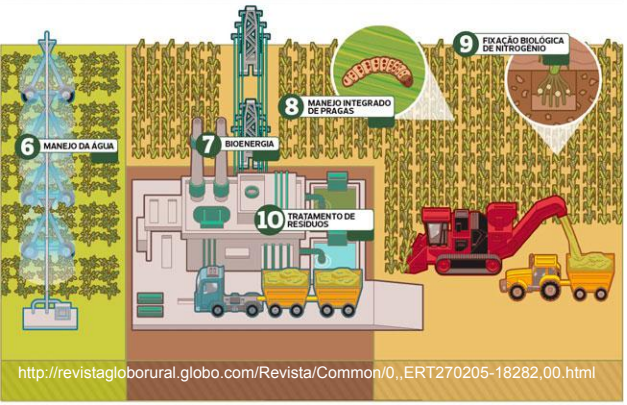
- Plow on 1800
- Fertilizers on 1900
- Green Revolution on 1950
- Genetics on 1980
- Data on 2000



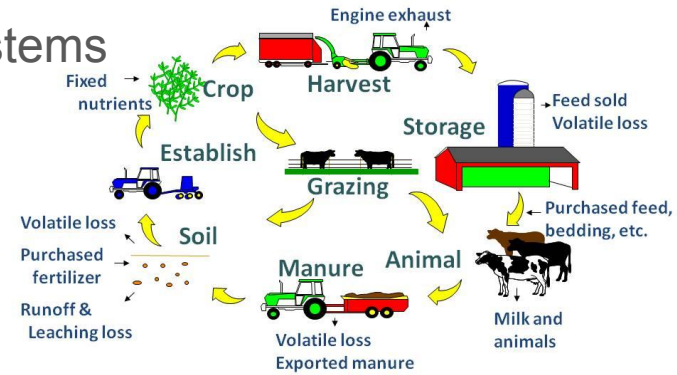
What is missing?

- Data concentrated in large scale farming operations - management



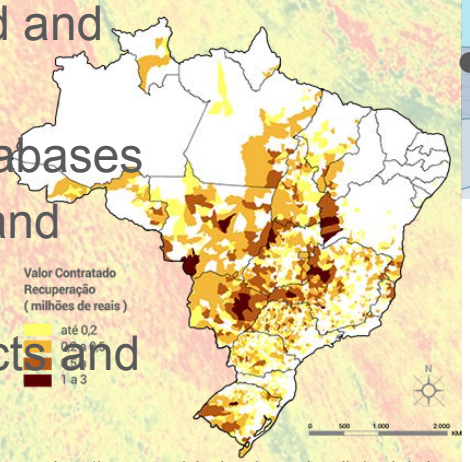


- Small farmers tend to drive diverse operations
- Enhanced understanding of natural systems and their interactions
- 70% of world food production
- Benefits to the ecosystems



What we're gonna do?

- UAV multispectral images
- Satellite data
- Weather data
- GPS, fertilizing, seeding and harvesting integrated and automated
- Regional private databases
- Mobile dashboards and management tools
- Environmental impacts and emissions models

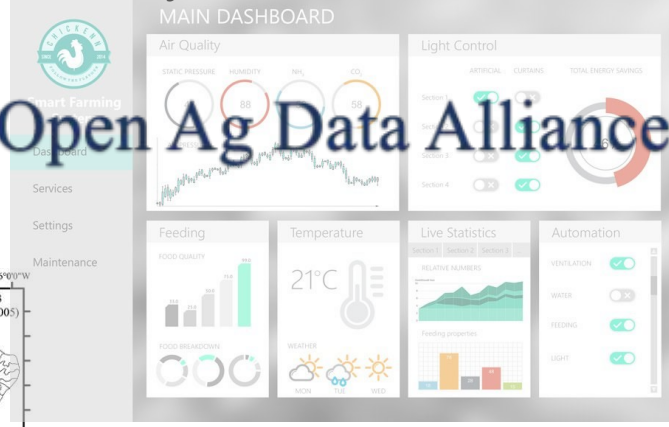


http://www.precisionhawk.com/media/topic/ndv

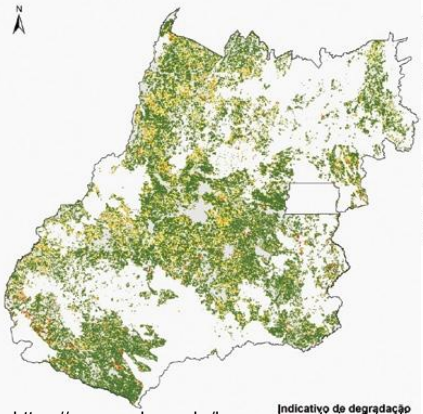
https://www.popsci.com/how-it-works-project-loon-global-internet

http://burthomesteadfarm.com/weather_station.htm

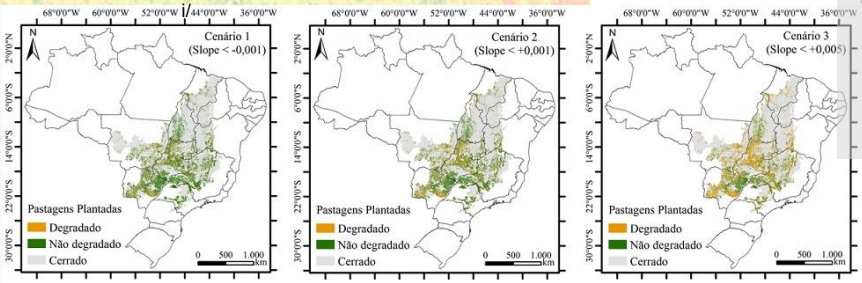
- Broader network access
- Increasing sensor numbers and mobile tools for data harvesting
- Boost data usage and access through open source databases and user friendly interfaces



Open Ag Data Alliance



https://www.embrapa.br/busca-de-noticias/-/noticia/2361250/embrapa-mapeia-degradacao-das-pastagens-do-cerrado



UF	Pastagem degradada	
	Milhões de hectares	Porcentagem (%)
BA	0,55	25
DF	0,03	26
GO	3,46	27
MA	0,36	21
MG	2,05	18
MS	2,86	25
MT	2,04	32
PI	0,18	38
PR	0,02	19
SP	0,40	16
TO	0,53	13
Total	12,49	21

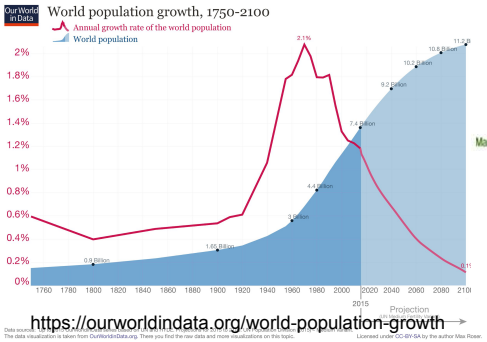
UF	Pastagem degradada	
	Milhões de hectares	Porcentagem (%)
BA	0,85	39
DF	0,04	37
GO	5,25	42
MA	0,66	37
MG	3,05	26
MS	3,98	35
MT	2,77	44
PI	0,24	48
PR	0,03	28
SP	0,58	23
TO	0,94	22
Total	19,39	30

UF	Pastagem degradada	
	Milhões de hectares	Porcentagem (%)
BA	1,55	71
DF	0,07	60
GO	8,80	70
MA	1,30	74
MG	5,82	50
MS	6,52	58
MT	4,25	67
PI	0,34	68
PR	0,05	51
SP	1,09	42
TO	2,13	51
Total	31,93	60

http://mundogeo.com/blog/2013/06/05/monitoramento/

GODAN ACTION
Global Open Data for Agriculture & Nutrition

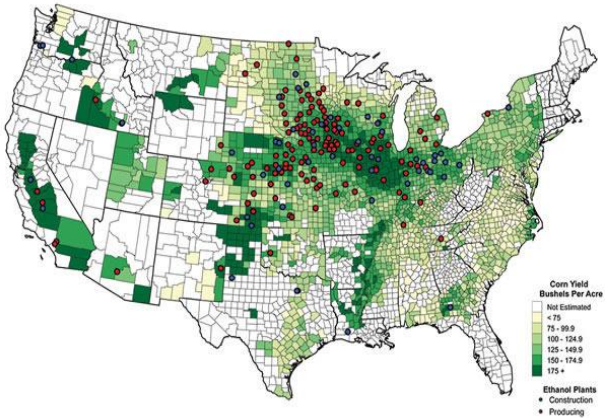
Stakeholders:



https://ourworldindata.org/world-population-growth

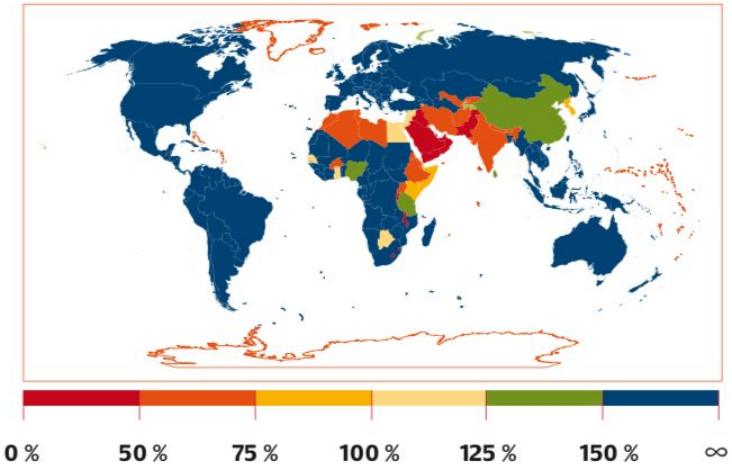
http://agr.georgia.gov/farm-safety-program.aspx

- Society
  - Natural food trend
  - Overall Environment improvement



http://alumn.us/map-of-us-agricultural-production.html#

- Farmers
  - Increase Yield
  - Regain market share
  - Doing the right thing
  - Triple bottom line



https://www.water-energy-food.org/uploads/media/understanding_the_nexus.pdf

- Governments
  - Food safety concerns - self-sufficiency
  - Trade

Roadblocks:

- Data collect:
  - Harsh environment - farms
  - Widespread incompatibility
  - Farmers collaboration

https://pixabay.com/en/farmer-pitchfork-man-toy-1497811/

- Modelling:
  - Natural models - unpredictability
  - Different data sources - integration
  - Data Privacy - who owns the data?
  - Unstructured data

https://www.flickr.com/photos/rosipaw/4643095630

Bibliography:

- Roach, John. Can data-Driven Agriculture Help Feed a Hungry World? Yale Environment 360. 03/03/16
- Credits on the images

THANKS FOR LISTENING!

https://www.geospatialworld.net/wp-content/uploads/2017/06/iot-farming.jpg