Data-driven agriculture in the digital economy

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GODAN

Vietnam November 2018

Why GODAN?

- **Demographics**:

  Tripling of the world population

- **Climate change:**

  Warmest years so far, natural catastrophes, agricultural zones changing

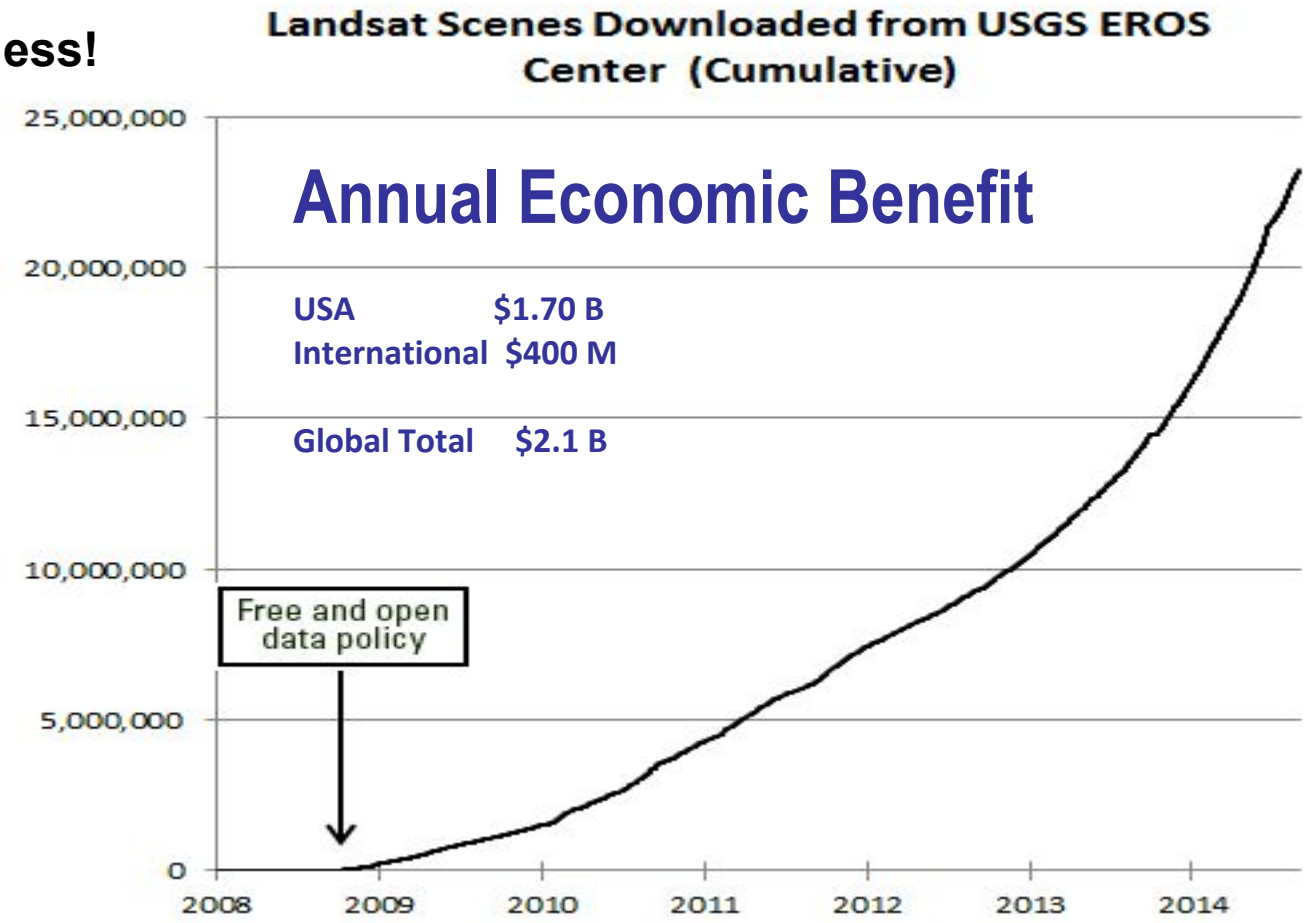
➢ **Technology costs** down, data availability unprecedented

GODAN
Global Open Data
for Agriculture & Nutrition

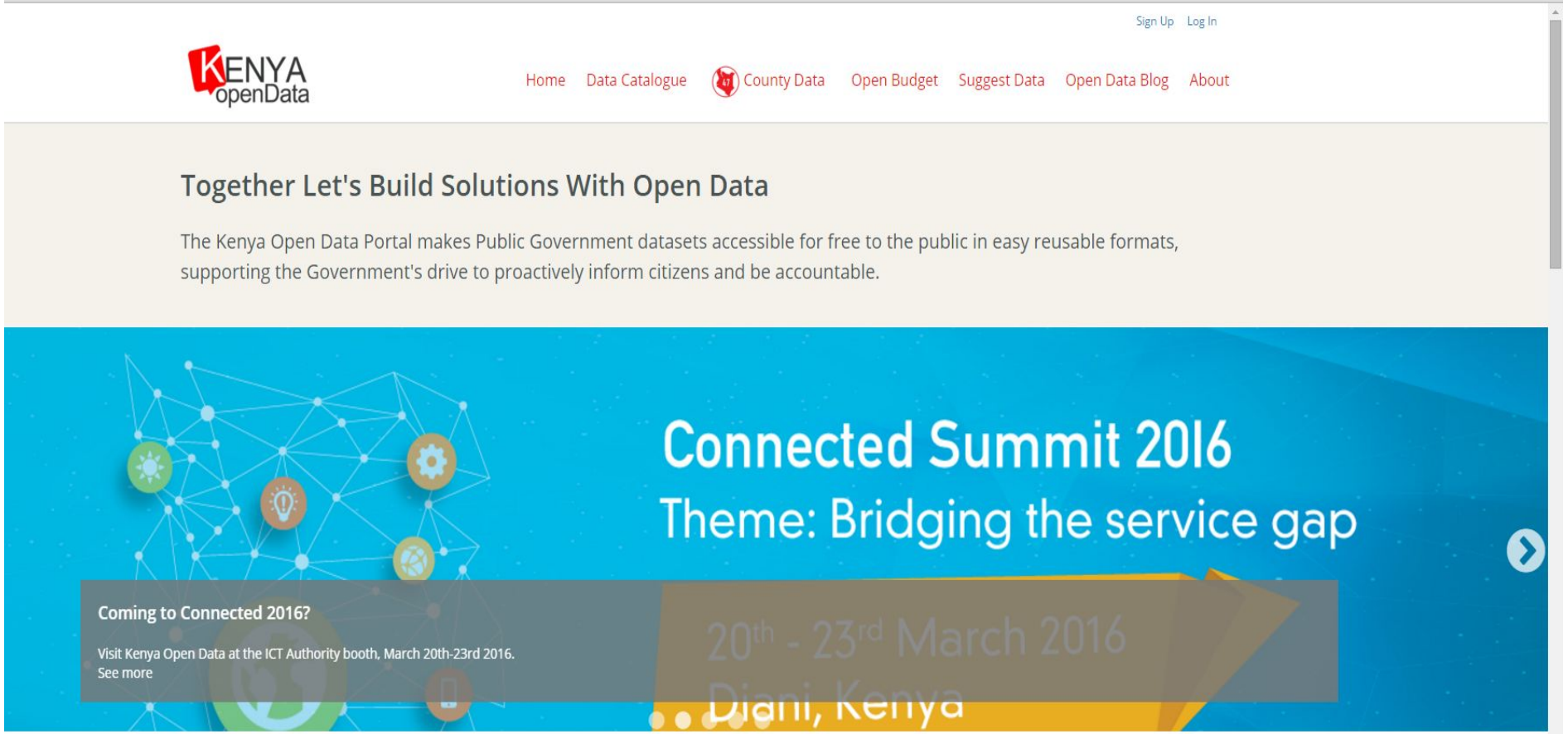
Building a global momentum (Dec 2014)

GODAN: 800+ partners
(September 2018)

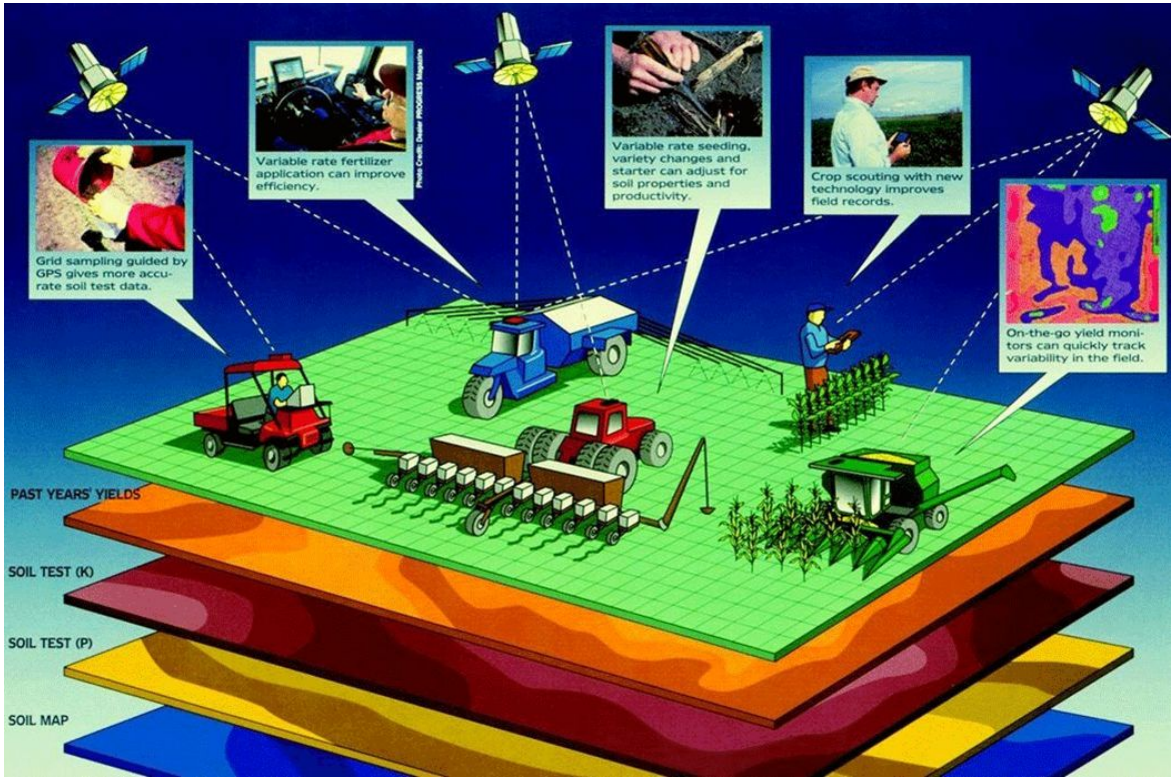
Why:
Data means business!



Open data for everyone: Open portals



Opportunities: New sensors, data integration



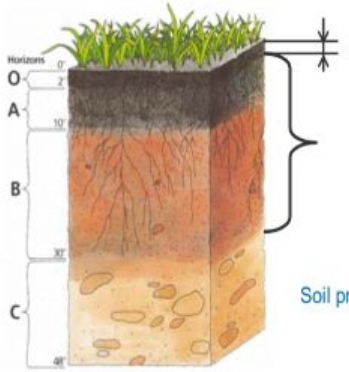
Soil mapping and modelling

Features:

- Field problem areas and yield heterogeneities analysis
- Soil quality indices development (max margin productivity)
- Air and soil temperature forecast
- Frosts forecasting
- Nitrogen and pH level determination
- Water erosion modelling

Data types

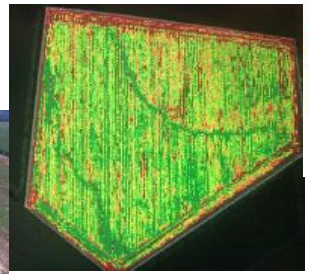
- Sentinel 1 & 2 (10 m resolution)

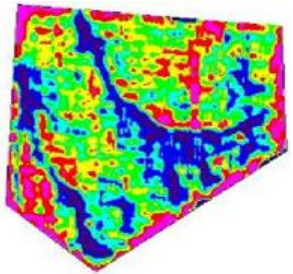


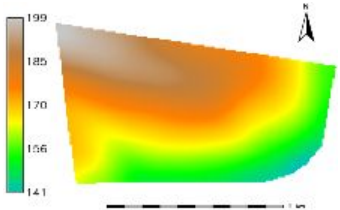
Thin, remotely sensed soil layer

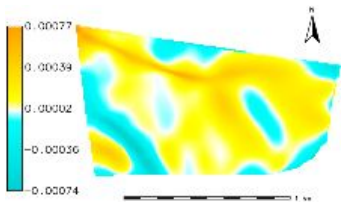
Root zone: layer of interest for most applications

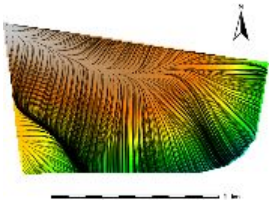
Soil profile







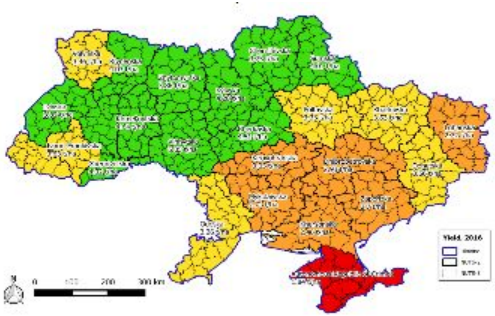


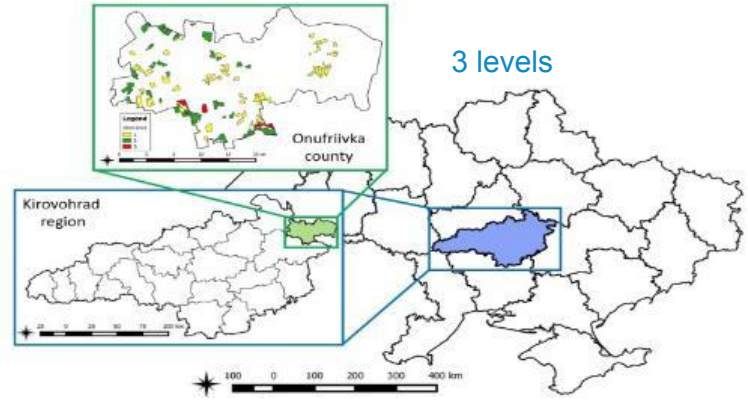


Crop Yield Forecasting

From 2011 with following data:
- MODIS MOD13Q1 NDVI;
- Yield statistics (Government Statistics Agency of Ukraine);
- 2 months in advance of harvest

3 levels
- Regions;
- Counties (Onufrivka county);
- Household (in Onufrivka county)

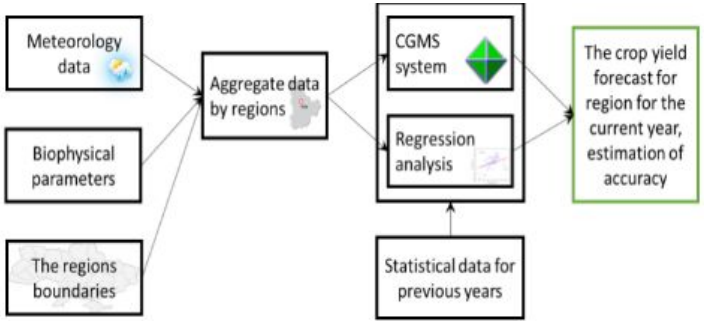


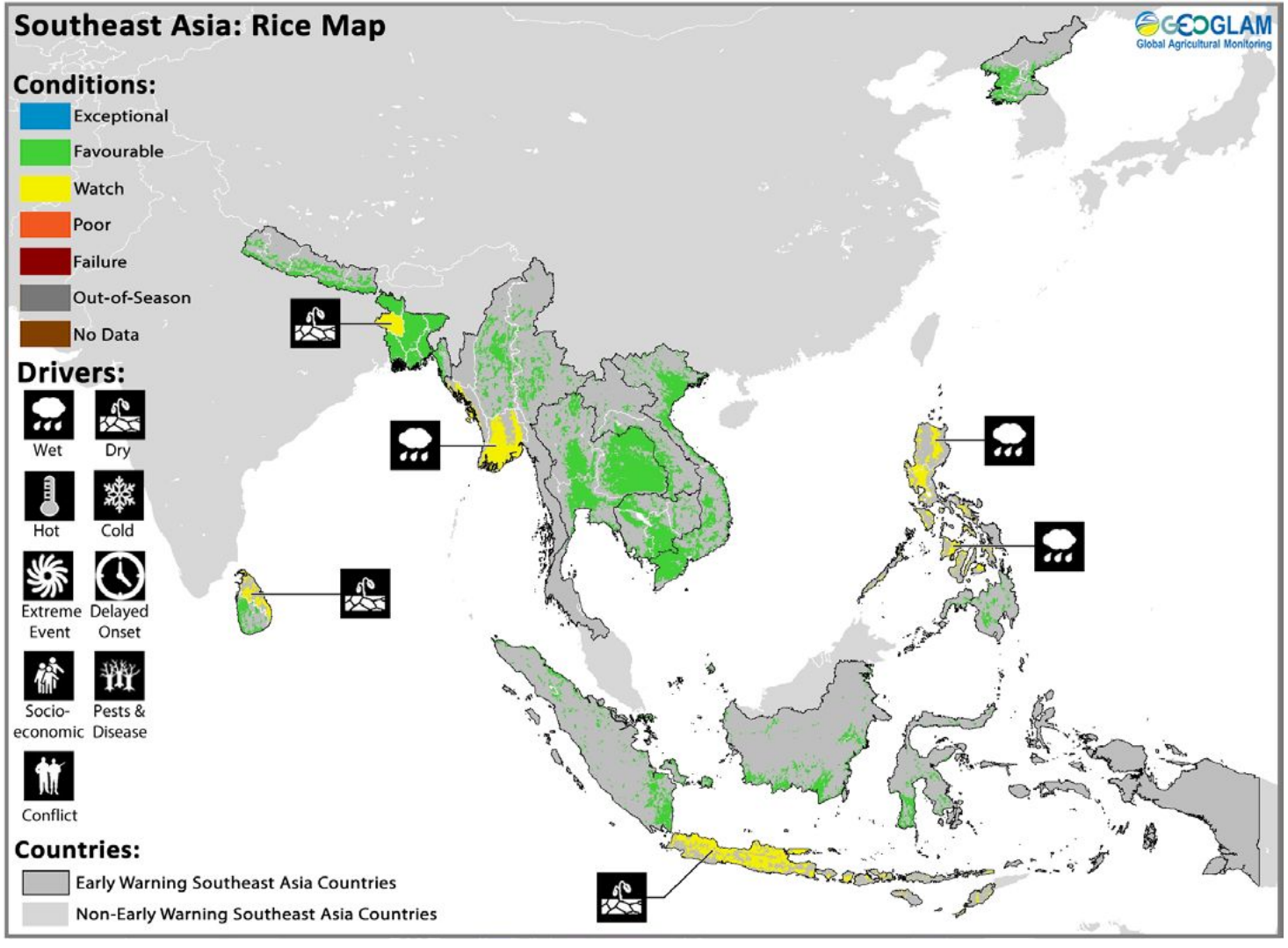


Algorithm is based on:
- Historical data
- Soil moisture
- Precipitation (GPM)
- Weather conditions
- Analysis of spectral indices (NDVI, ReCl, EVI)
- Biophysical parameters (LAI, FAPAR)
- Satellite imagery (Sentinel 2, Sentinel 1, Landsat 8, MODIS Mod13q1, commercial data e.g. RapidEye)

Crop yield forecasting accuracy estimation for previous seasons:

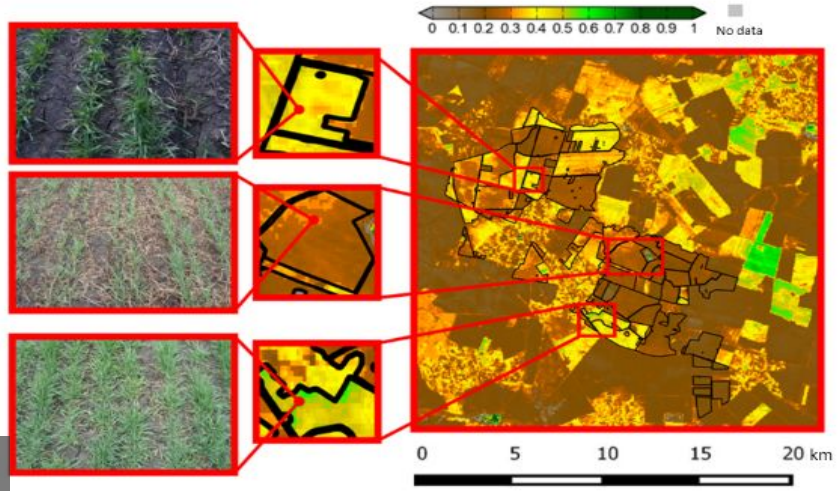
Crop yield forecast accuracy two months before harvest - 70 %
Crop yield forecast accuracy two weeks before harvest - 90 %

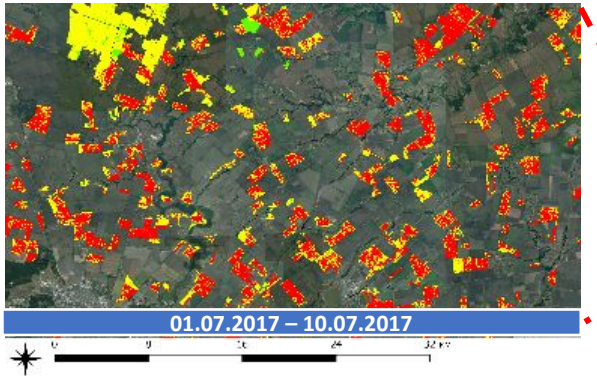


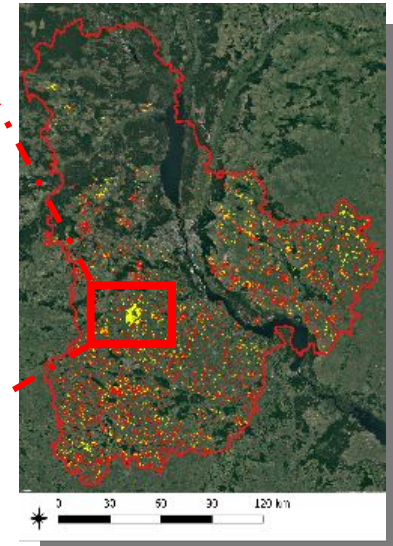

Southeast Asia: Rice Map
GEOGLAM
Global Agricultural Monitoring
Conditions:
Exceptional
Favourable
Watch
Poor
Failure
Out-of-Season
No Data
Drivers:
Wet
Dry
Hot
Cold
Extreme Event
Delayed Onset
Socio-economic
Pests & Disease
Conflict
Countries:
Early Warning Southeast Asia Countries
Non-Early Warning Southeast Asia Countries

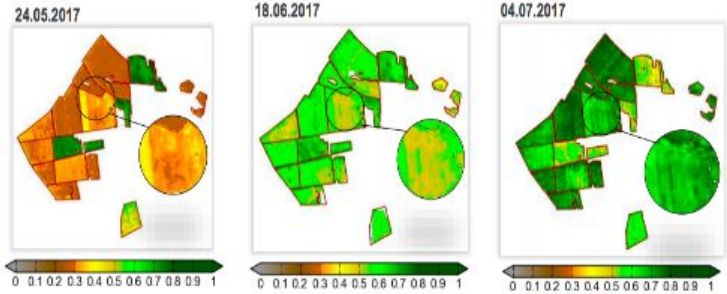
Crop Conditions/disaster management

- Crop conditions assessment
- Dynamic analysis of vegetation maps (e.g. NDVI and ReCl)
- Comparison of current and average historic vegetation index (crop production assessment)
- Favorable or non-favorable growing conditions
- Spectral indices accumulation (NDVI, ReCL, LAI, EVI etc.)



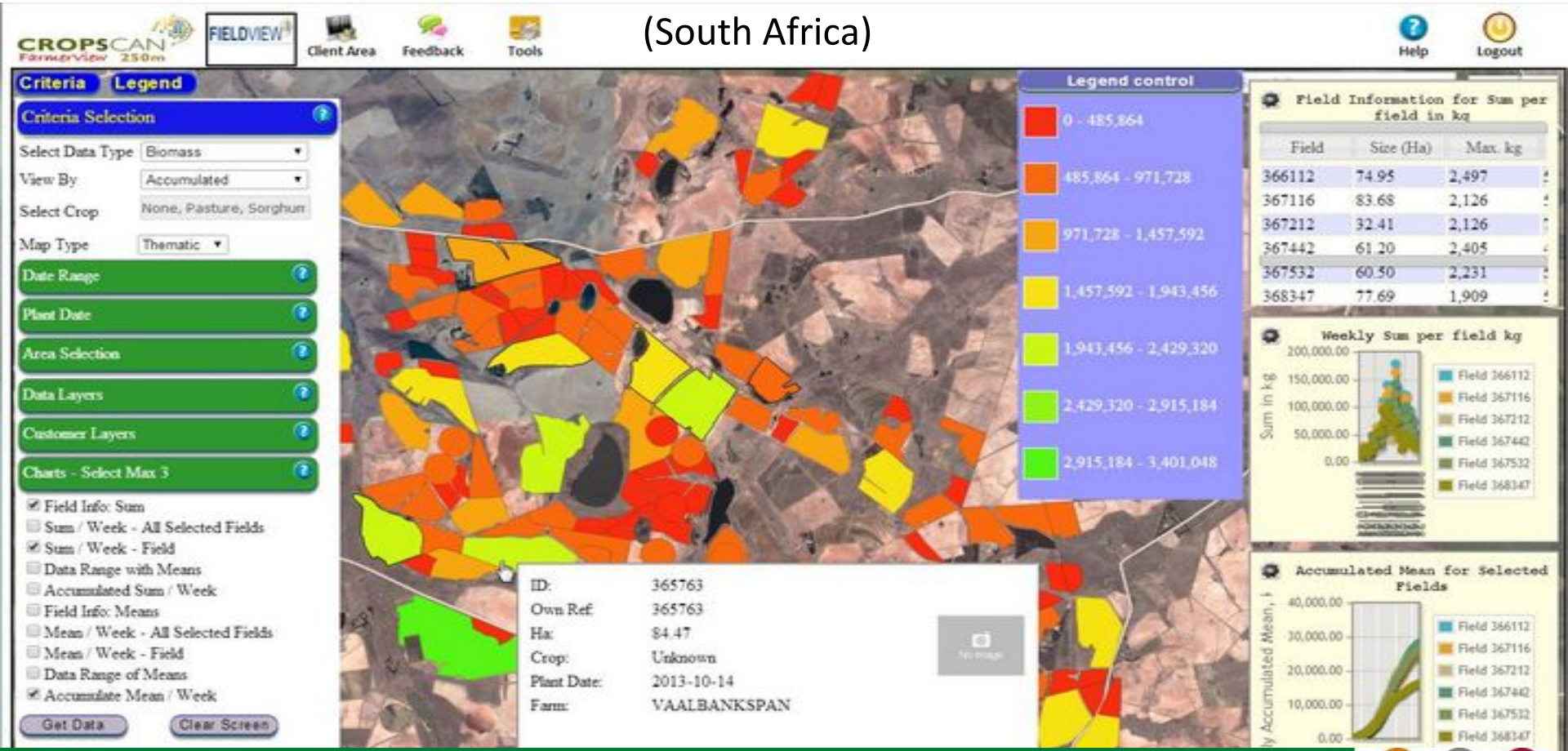




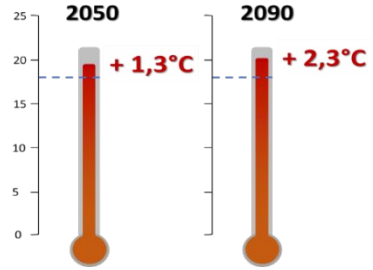


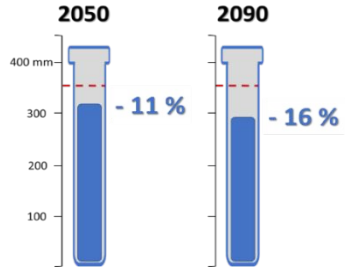
Data for precision irrigation/farming:

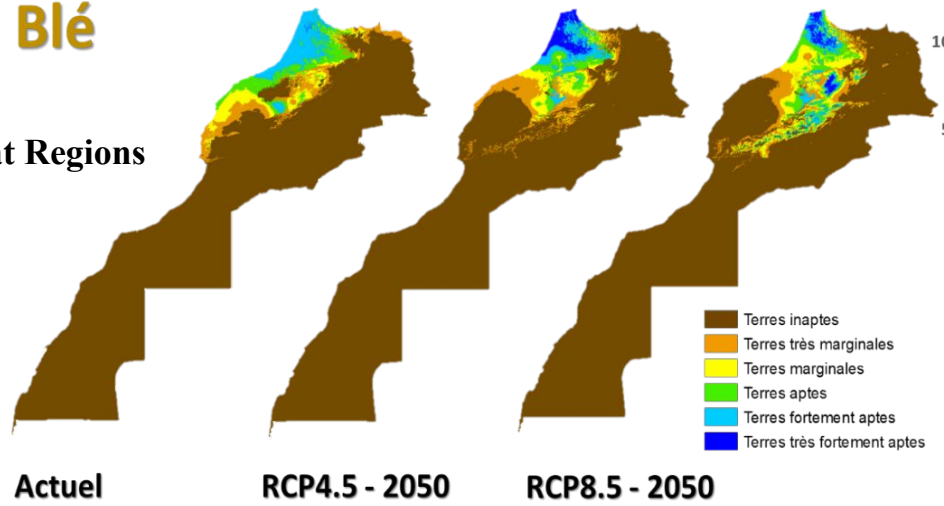
(South Africa)

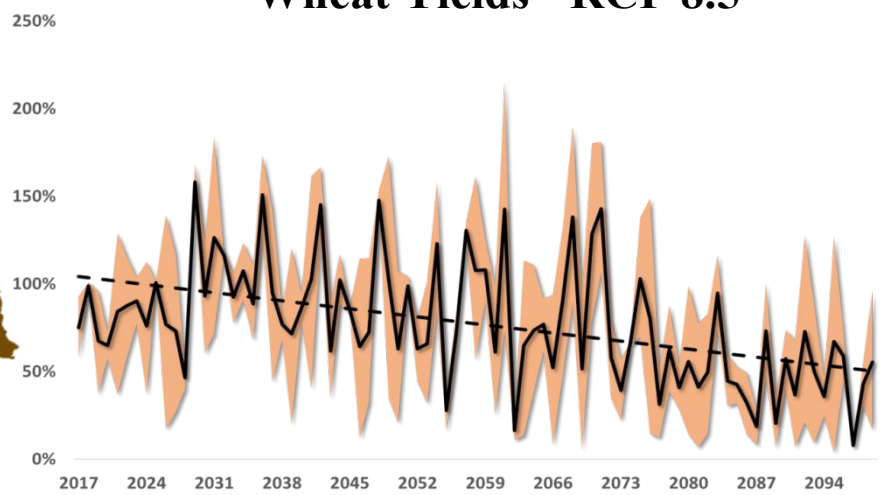


Data to mitigate climate change impact:
(Morocco)



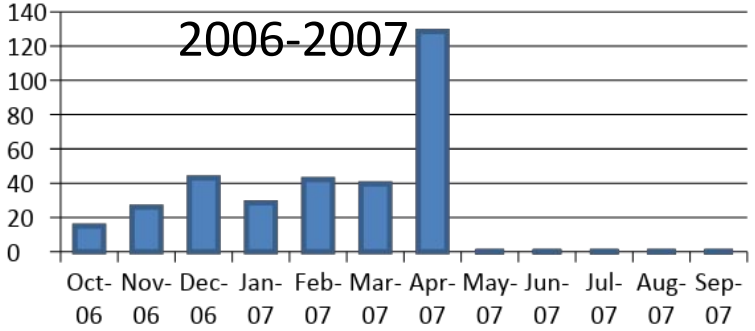


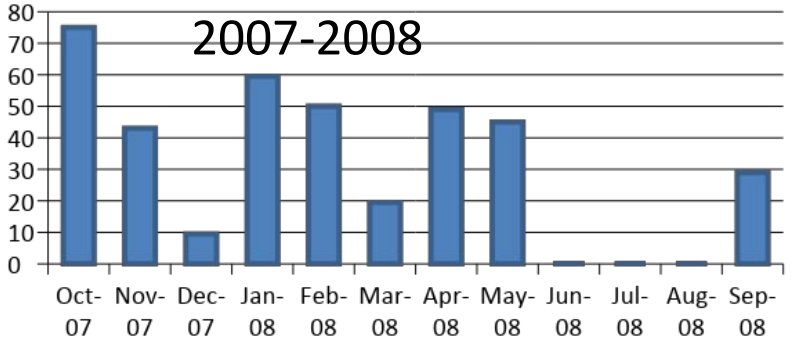


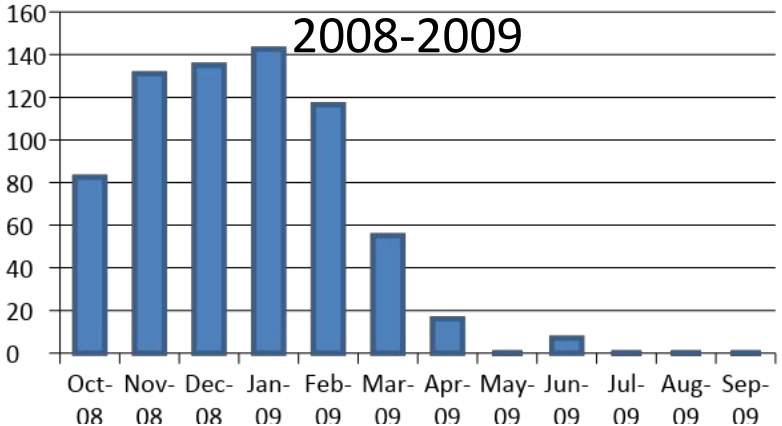


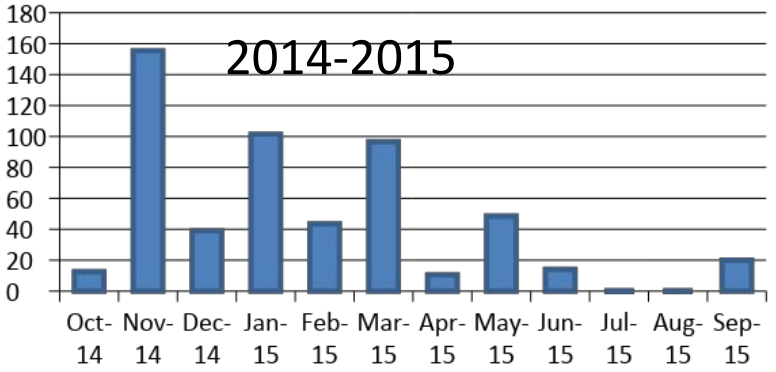
http://www.inra.ma/docs/accagrimag/assagric/Brochangclimregfesmek.pdf

ON-FARM RAINFALL : GREAT VARIABILTY BETWEEN YEARS AND BAD DISTRIBUTION WITHIN YEARS.





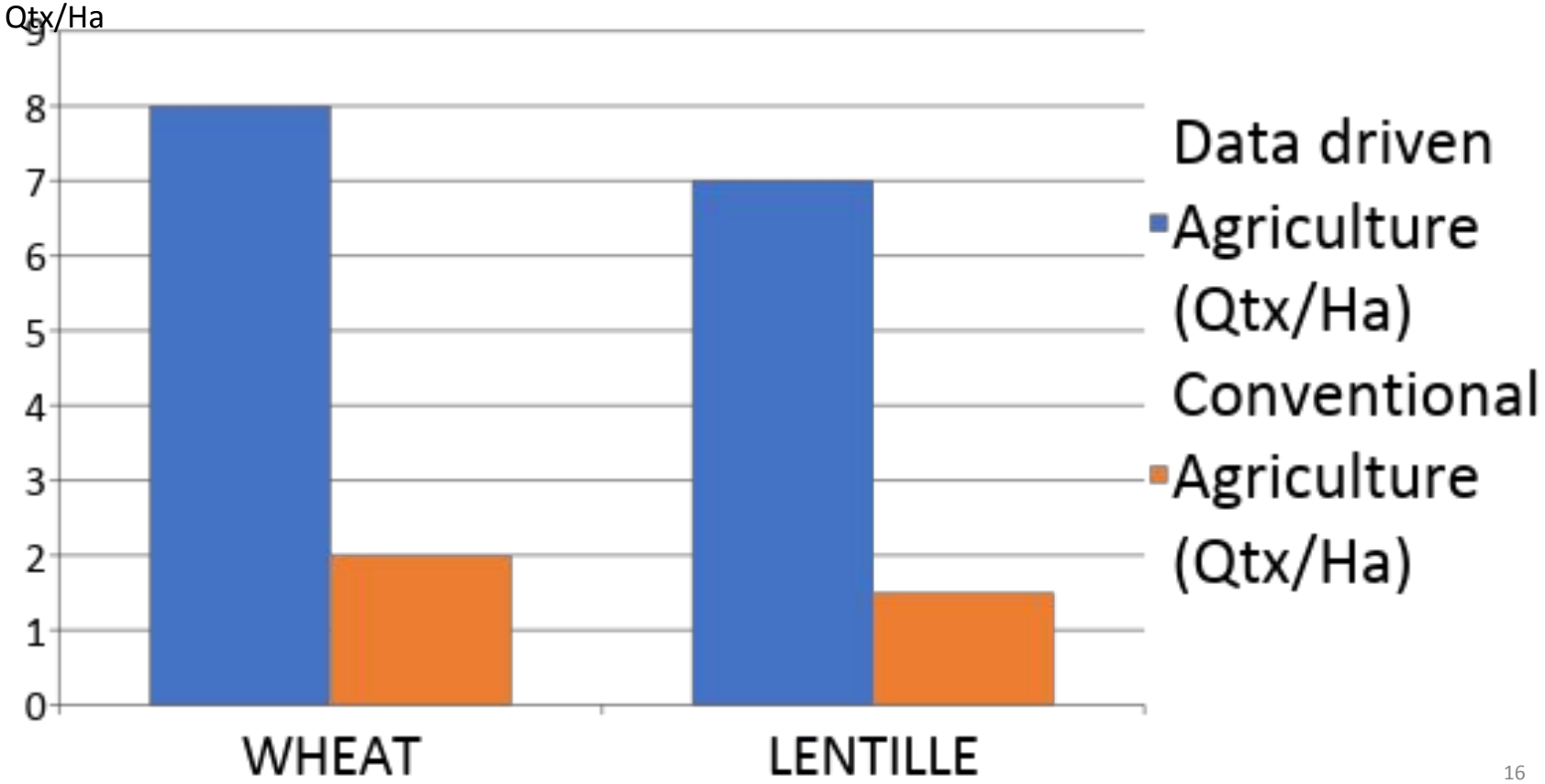




Data driven soil management:

Yield Comparaison – Harvest 2007

(220 mm Rainfall poorly distributed)



Data for large production (US//UK):

Climate FieldView Plus™ provides seamless data integration for a deeper understanding of your fields to help you make important operating decisions with confidence. Identify problems and take quick action to solve them with field data digitally displayed in real-time as you pass through the fields.

CLIMATE FIELDVIEW

Available in 2016

	prime	plus	pro
Field-Level Weather	●	●	●
Notifications	●	●	●
Scouting	●	●	●
Data Connectivity*		●	●

Data and adapted technology: (Australia - research)

THE UNIVERSITY OF SYDNEY

Australian Centre for Field Robotics

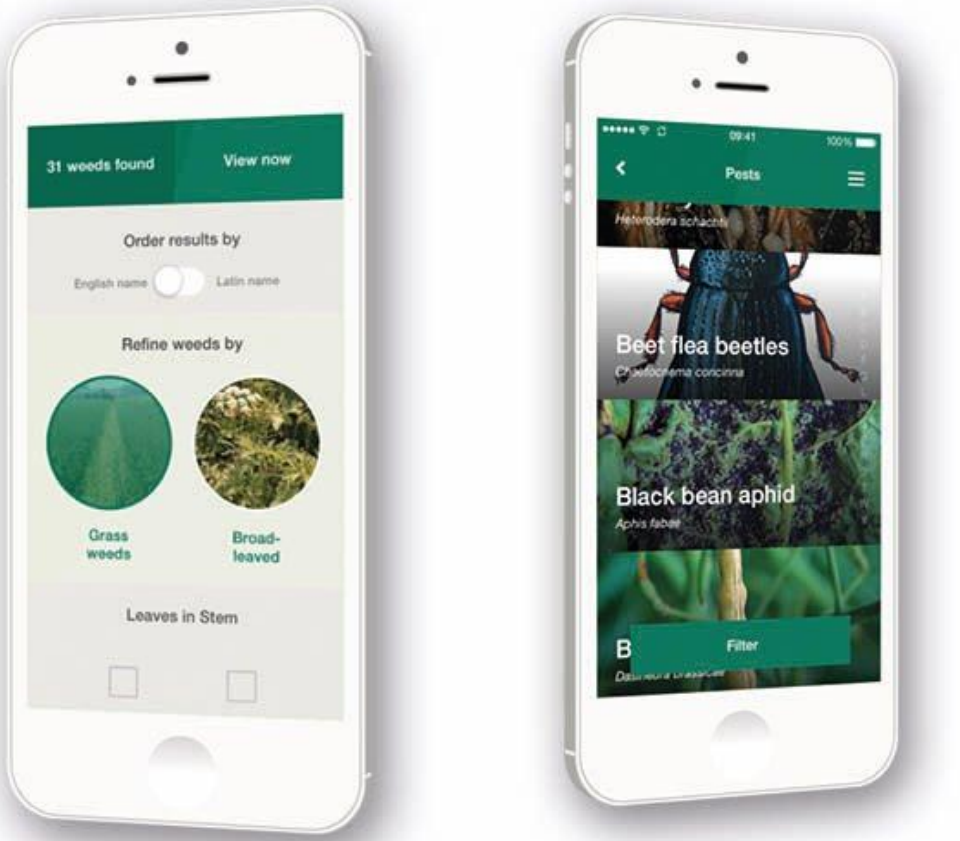
Digital Farmhand

Field demonstration - Richmond, July 2017

<u>Low tech</u> inputs & open data:

TerraSen Station BASIC

- Big Data at your fingertips:



No tech at all: ESOKO Model:

Big data that users can understand:
Ethiopia: Data – driven Agriculture

HOTLINE 8282

Ethiopian ATA
Agricultural Transformation Agency
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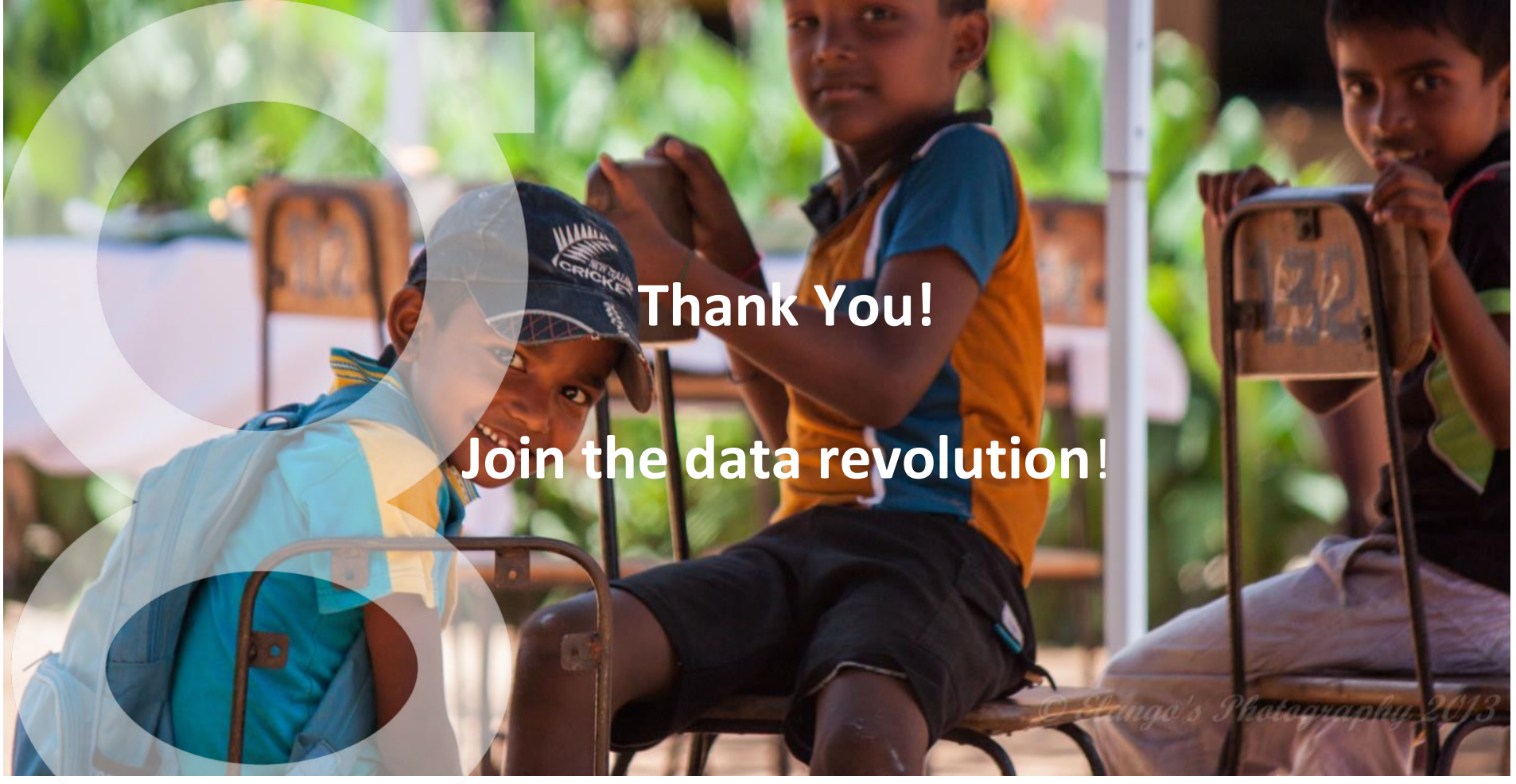
Open data for everyone: The F.A.I.R. principles:

- Data should be **Findable**
- Data should be **Accessible**
- Data should be **Interoperable**
- Data should be **Re-usable**.

***…and be in a format that makes sense to its target recipients**


Thank You!
Join the data revolution!