Knowledge grows

Globally Transforming the Future of Agriculture

Yara-IBM partnership

FOTC – November 2019

Agenda

- Yara's Mission and Vision – the base for development
- Why Digital Farming in Yara? Some concrete examples
- The Yara-IBM partnership


800 million people go hungry each day


2 billion ha of agricultural land degraded


25% of global emissions billion
come from FOLU


1/3 of our food is wasted
by inefficient systems

Mission

Responsibly feed the world and protect the planet

Vision

A collaborative society; a world without hunger; a planet respected.

The journey towards The Crop Nutrition Company for the Future

Producer Company
Commodity Margin

Crop Nutrition Company
Knowledge Margin

Market depth

Asset

Product

Crop

Solutions

Sell what we produce

- Place new capacity
- Manage seasonality

Build product reputation

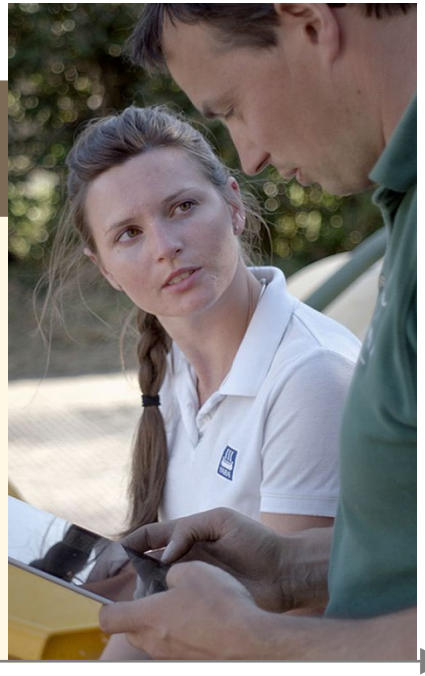
- High quality products
- Brand premium

Crop focused approach & offerings

- Crop knowledge
- Product portfolio
- Application competence

Scalable solutions

- Holistic solutions based on farmer needs
- Digital farming capability optimizes farmer practice and drives engagement with the farmer and distribution at scale
- Partnering with the food chain to continuously drive food quality, traceability and sustainability



Market Longevity

Context: Digitalization, big data, and sustainability are disrupting agriculture

Real-time precision sensors and insights

Data science, modelling, machine learning

Automation of application and farm operations

Convenient digital communication and sharing

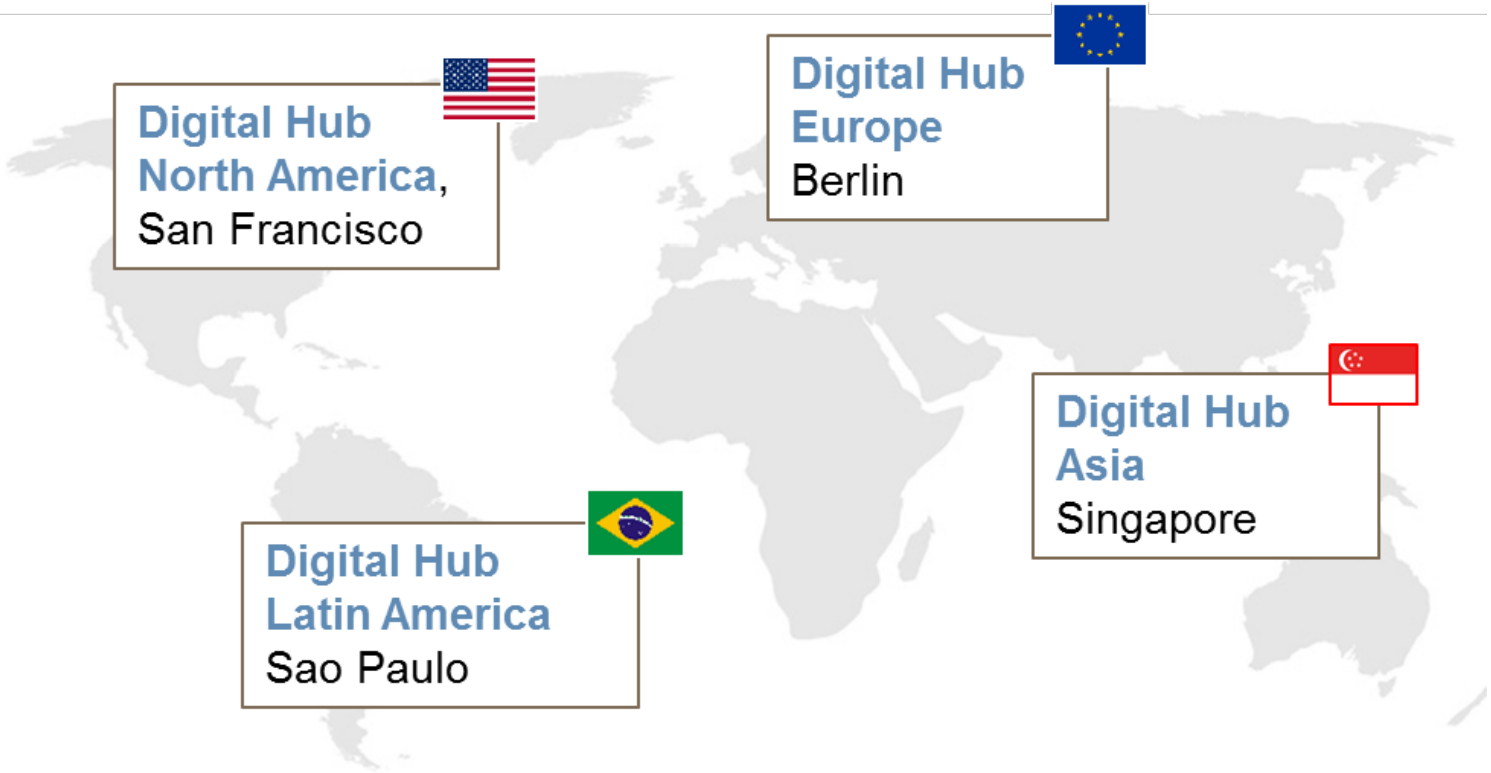
Need to step up sustainability of farming (yield, quality, waste, emissions)

Why Digital Farming in Yara?

Digital Farming is one core strategic element towards reaching our mission and vision, and a strategic growth pillar in Yara

- Key enabler to drive more food, quality, sustainability in farming
- Strategic growth and value driver, both to expand “crop nutrition for the future” and beyond
- Key differentiator and competitive advantage
- Multiplier of our knowledge into new areas

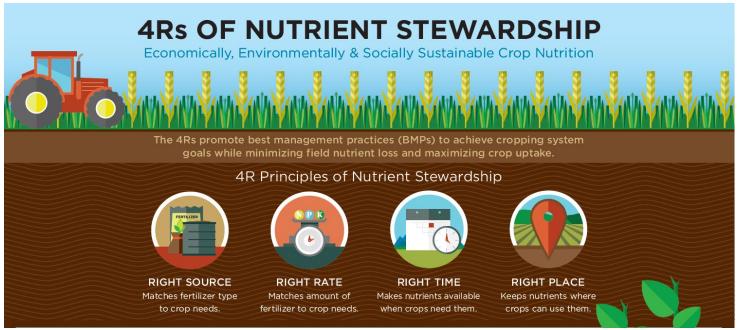
Technology hubs



Two business lines to fit different realities

Professional Markets - strategy based on 4R

- 4R driven approach
- Adapted to our business model in each region
- Evolution towards a platform with ample collaboration



Smallholder – strategy based on access and scale

- Scalability is critical
- Value in agronomy, but also market access, traceability, finance, others
- New business models to be developed

Source: United Nations. *Measured in USD/day

Digital Farming as a key enabler – Smallholder line

N-TESTER CLIP INNOVATOR PROGRAM

- N- Tester Clip turns a smartphone in a pocket nitrogen reader device
- N Tester Clip uses camera and flash of a smartphone as light source to determinate N rate
- N-Tester Clip is based on same calibration (crops) of N tester
- It´s still a prototype version working with some models of smarphone

Digital Farming as a key enabler – Professional Market line

Adapt-N

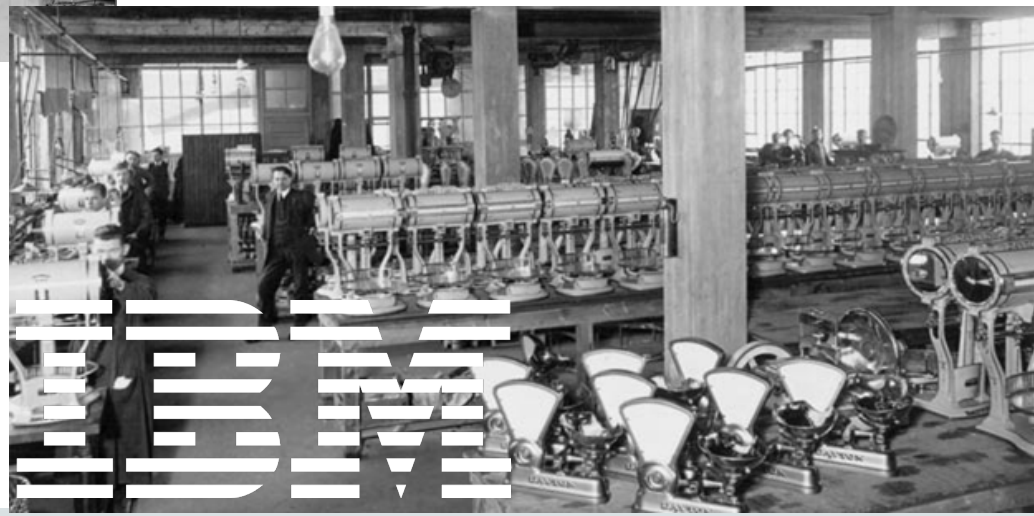
Adapt-N – a solid foundation to be expanded upon

The same N rate each year is sub-optimal
Most fields have spatial variability
Broad changes in N management can produce big results

- Engage growers in a real conversation about nitrogen using their farm, practices, and weather
- Comparing management scenarios to see how N performance might be improved
- Understanding how the weather impacts N loss
- Helping distributors get growers on board with the concept of more progressive nitrogen management

Why?

Over 225 years of collective innovation and leadership have come together to solve some of the world’s most pressing problems



Yara and IBM aim to build the world’s leading digital farming platform combining technology and agronomy to professional and smallholder farmers in order to globally transform the future of agriculture

Together, we will bring our individual expertise to contribute to answer global Food and Land Use Challenges by

- Enabling producers and consumers to make better, more informed choices
- Connecting the value chain rapidly and efficiently
- Scaling productive and regenerative agriculture
- Reducing food loss and waste
- Delivering stronger rural livelihoods

Yara and IBM will focus on all aspects of optimizing farming

Optimizing farming by combining consumer trends, crop insights, in-field data, digital agronomy knowledge, as well as cutting-edge technology such as advanced analytics, Cognitive including Artificial Intelligence

Our Pledge

- We will improve the adoption of information technology in farming by creating new and user-friendly digital experiences.
- We will innovate broader and faster by combining Yara's agronomic knowledge, digital agronomy-induced insights through Yara's Digital Farming unit, and technology-forward research in IBM, which is an unmatched opportunity to develop truly game-changing innovation that works and is easy to use.

What is the roadmap?

- **Jointly build the Data Platform; to be finalized Q4 2019**
- **IBM will, based on Yara agronomical requirements, deliver API's that enable individual in-field specific advice, notifications and recommendations globally; first step to be finalized on a step by step basis up to Q3 2020**

  Farm weather; historical, forecast, evaporation, solar radiation
  Biomass monitoring
  Automatic field boundary and crop identification
  Irrigation status
  Yield prediction at harvest for Corn

- **Yara to deliver blockchain enabled in-field data into the IBM Food Trust platform; first step finalized in 2020**

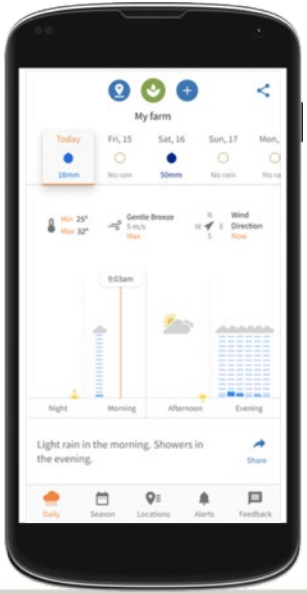
How are we doing it?

A concrete example already in place

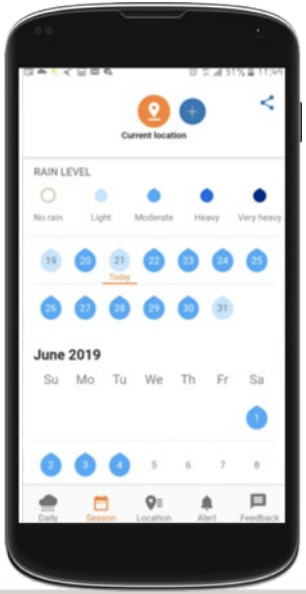
FarmWeather - *Your Farm, Your Weather*

Hyperlocal weather insights specifically for smallholder farmers.

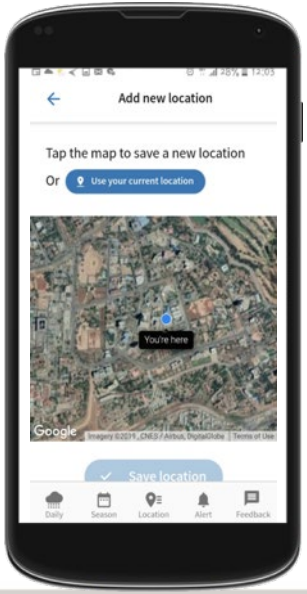
Hyperlocal* Rainfall focus, including historical



Future/Historical Calendar planning view

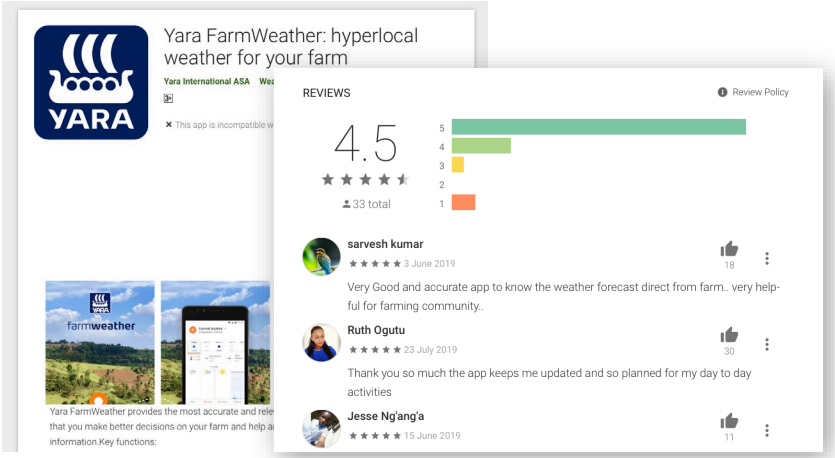


Multi-location tracking



- Pioneering technology for rural environments PWA catering for the rise of simple smart-phones
- Best in class IBM weather feeds enables the most accurate weather insights available to smallholder farmers.
- Version 2 will integrate crop and season dynamic to increase relevance even further.
- **Status: live in India and Kenya, ~156 000 users**
- Markets driving scale in 2019:
  India, Kenya, Thailand, Philippines, Indonesia

FarmWeather – 8 *Weeks after first full GTM in India and Kenya.*



156,110 Farmers

- Average 2000 new users per day
- Peak season September, October, November
- Launches planned for Thailand and Indonesia Q4


Thank you !
Passionately shaping the future of agriculture.
Yara Digital Farming