Status of ICTs in sustainable food security

THE FUTURE

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Outline

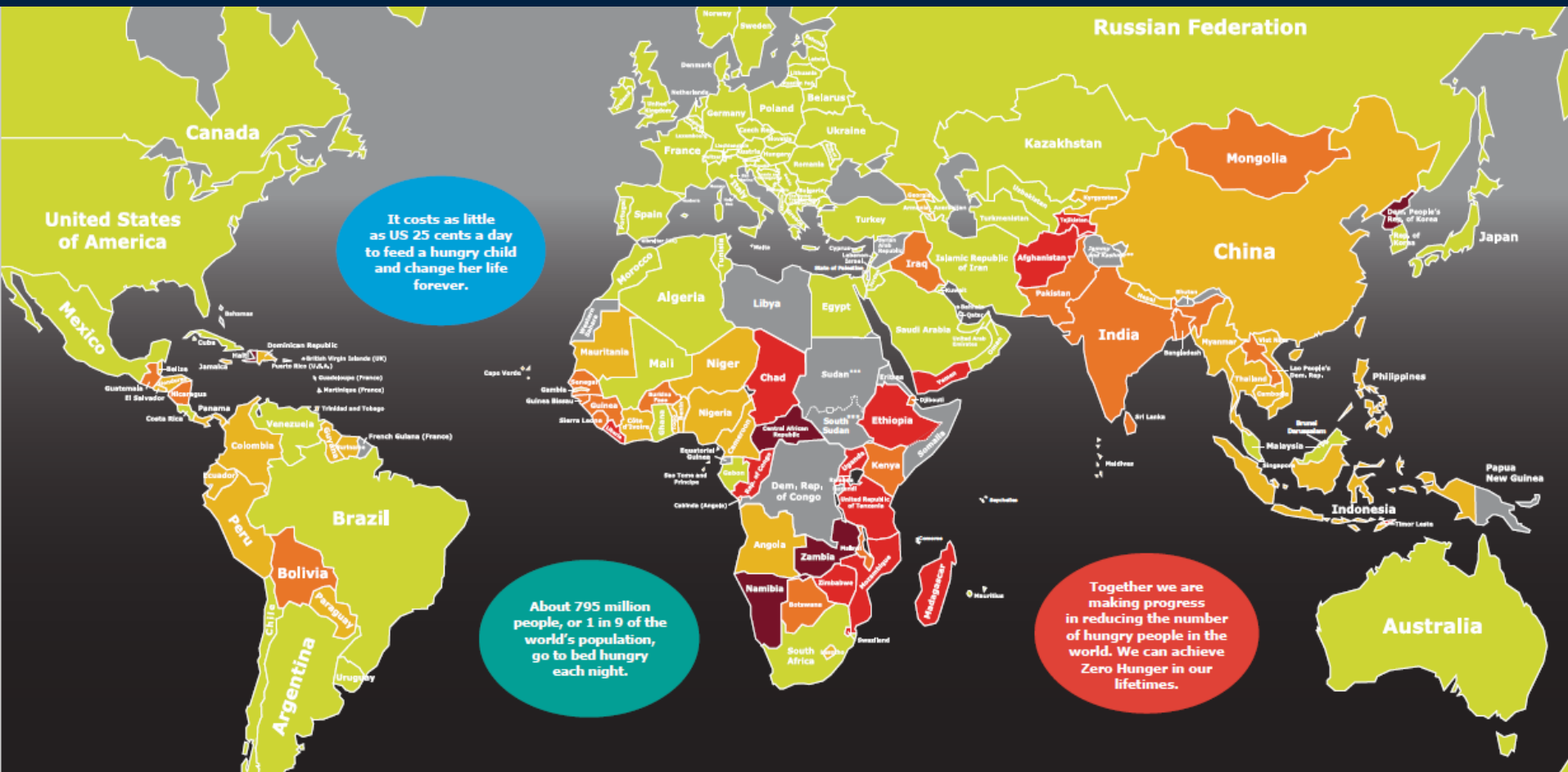Africa / SSA

Food & Agriculture

Internet

Agritech

Agriculture Apps

The African perspective

Sub-Sahara Africa

Africa – 2nd fastest growing region in the world between 2016 and 2020 (IMF)

SSA Countries	2015
Annual growth rate	3.5%
GDP growth per capita	4.2%
Investment in infrastructure (% of GDP)	3.5%
Agriculture (% of GDP)	32%
Population employed in agriculture sector	65%
Farms smaller than 1 ha	60%

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Sub-Sahara Africa

- **Population Growth Rate**
  - ➤ **Africa = exponential;**
  - ➤ **Europe = stable/declining**
- **By 2020 annual growth rate = 4.3%**
- **By 2030 food production will have to increase by 60%**
- **By 2034 Africa's working age population = 1.1 billion**

Can there be food security if population growth is out of control?

Are we addressing the symptom of the problem instead of the cause op the problem?

Remember, the land on which to grow food is limited … …

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Global food and agriculture sector

2015

Investors plowed $2.7 billion into agtech start-ups cultivating a new generation of robots, drones, soil and crop technology sensors, etc.

… … ripe for disruption

Investments Are at Record Levels and Increasing

Where Are Investors Placing Their Bets?

Agricultural Bioscience

Data-Enabled Agriculture

Automation and Robotics

Supply Chain and Logistics

Agricultural Processing

Alternative Business Models

FOURTH INDUSTRIAL REVOLUTION

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Sub-Sahara Africa

Africa – 2nd fastest growing region in the world between 2016 and 2020 (IMF)

SSA Countries	2015
Mobile technologies (% of GDP)	6.7%
Smartphone penetration	23%
Mobile phone penetration	75%
Internet penetration	24%

- **High cost of mobile ownership**
- **Limited connectivity**
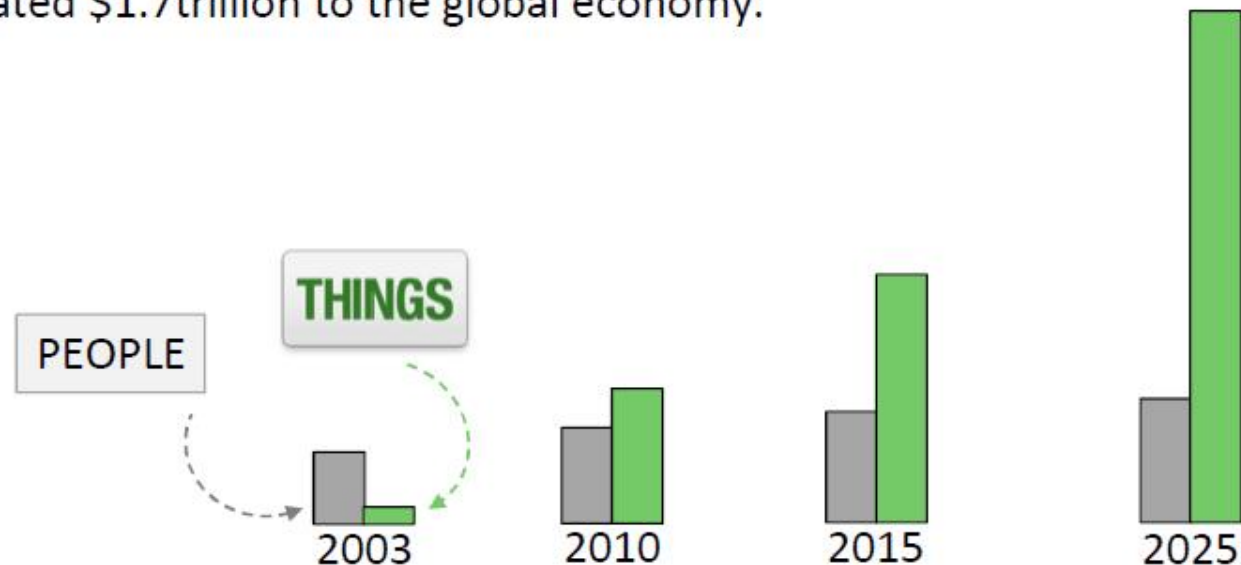- **High technical illiteracy rates**

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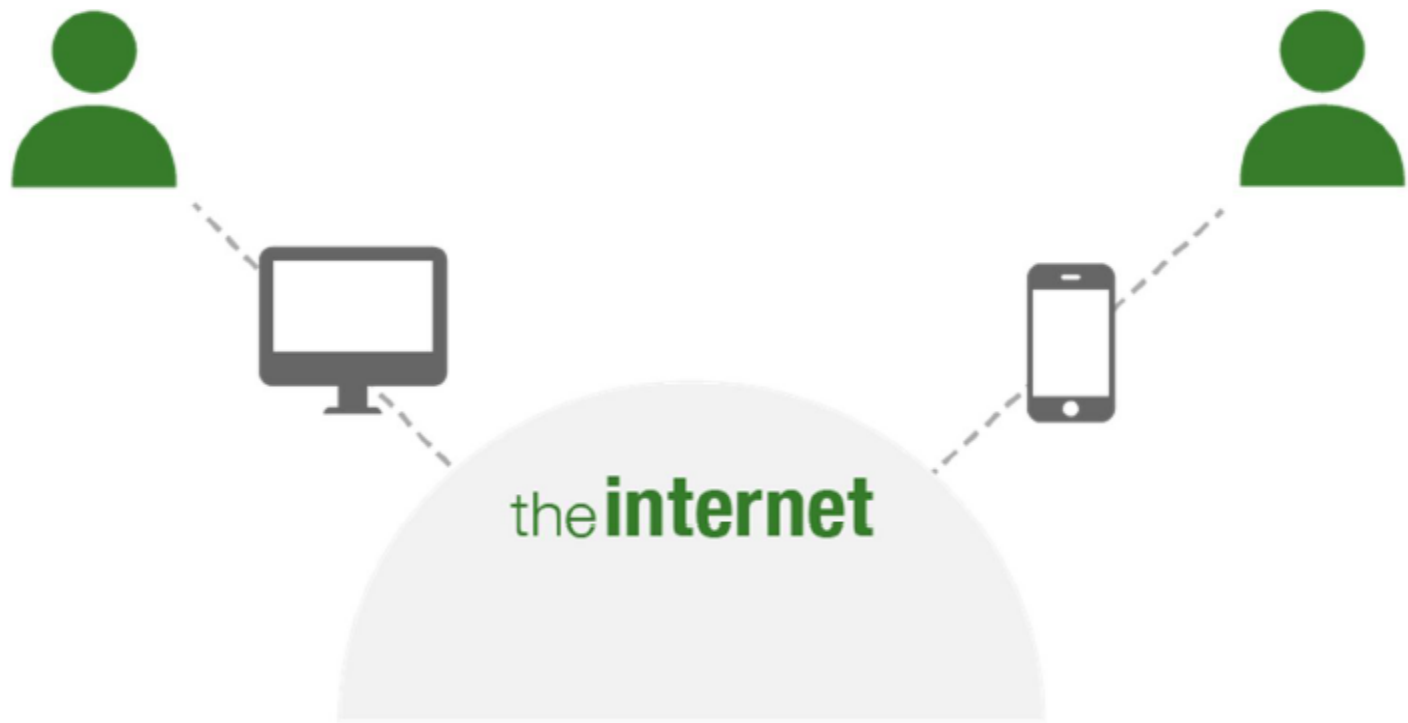
Internet of Things

Things

More Connected Things than People

In 2008, the number of **THINGS** connected to the internet exceeded the number of people on earth. In 2025 there will be well over 50 billion **THINGS** adding an estimated $1.7trillion to the global economy.
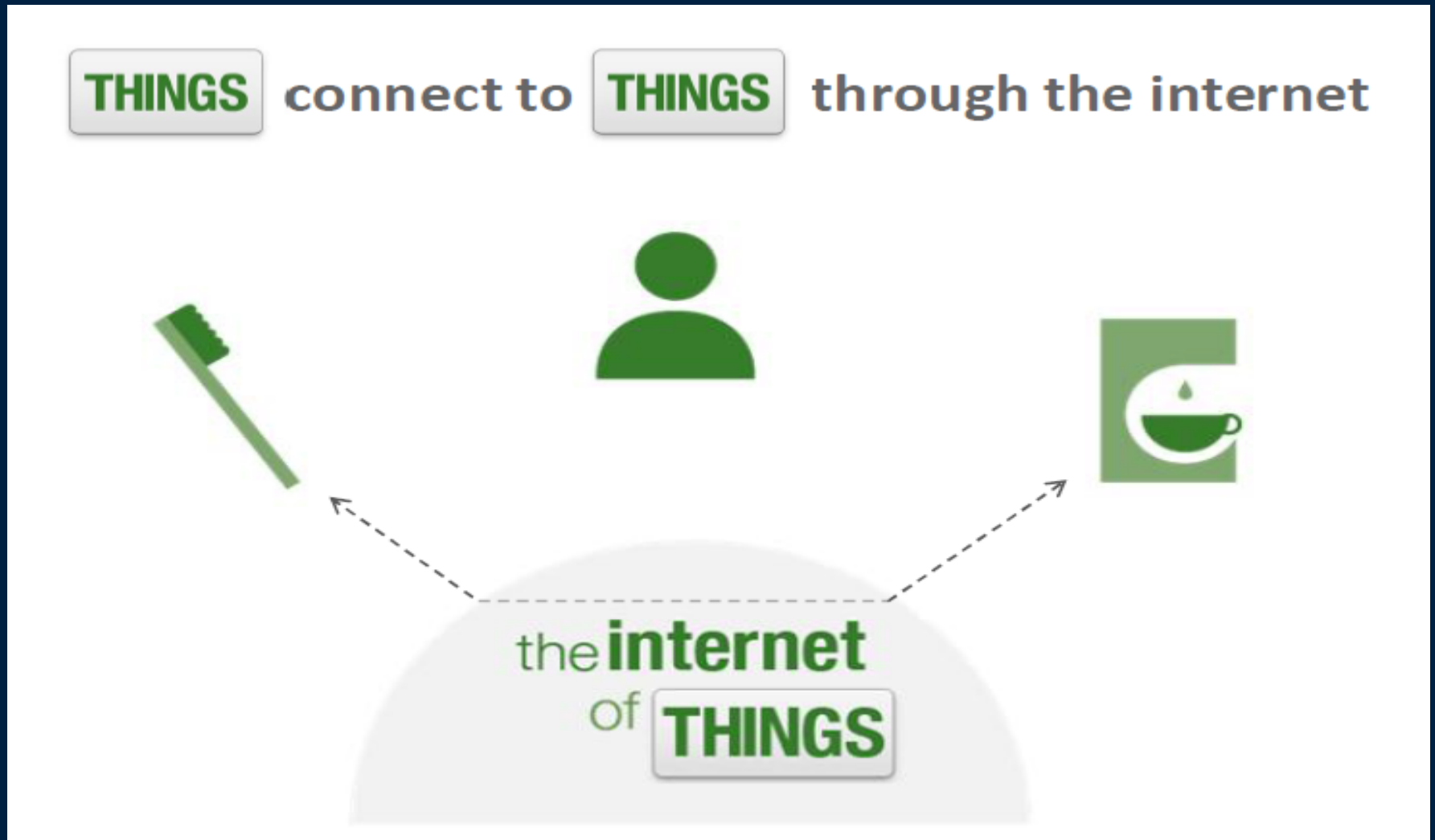

PEOPLE **THINGS**

2003 2010 2015 2025

Internet and People

People Connect to the Internet

the **internet**

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Internet and Things

THINGS connect to THINGS through the internet

the **internet** of **THINGS**

Why is that meaningful?

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Linking all around you
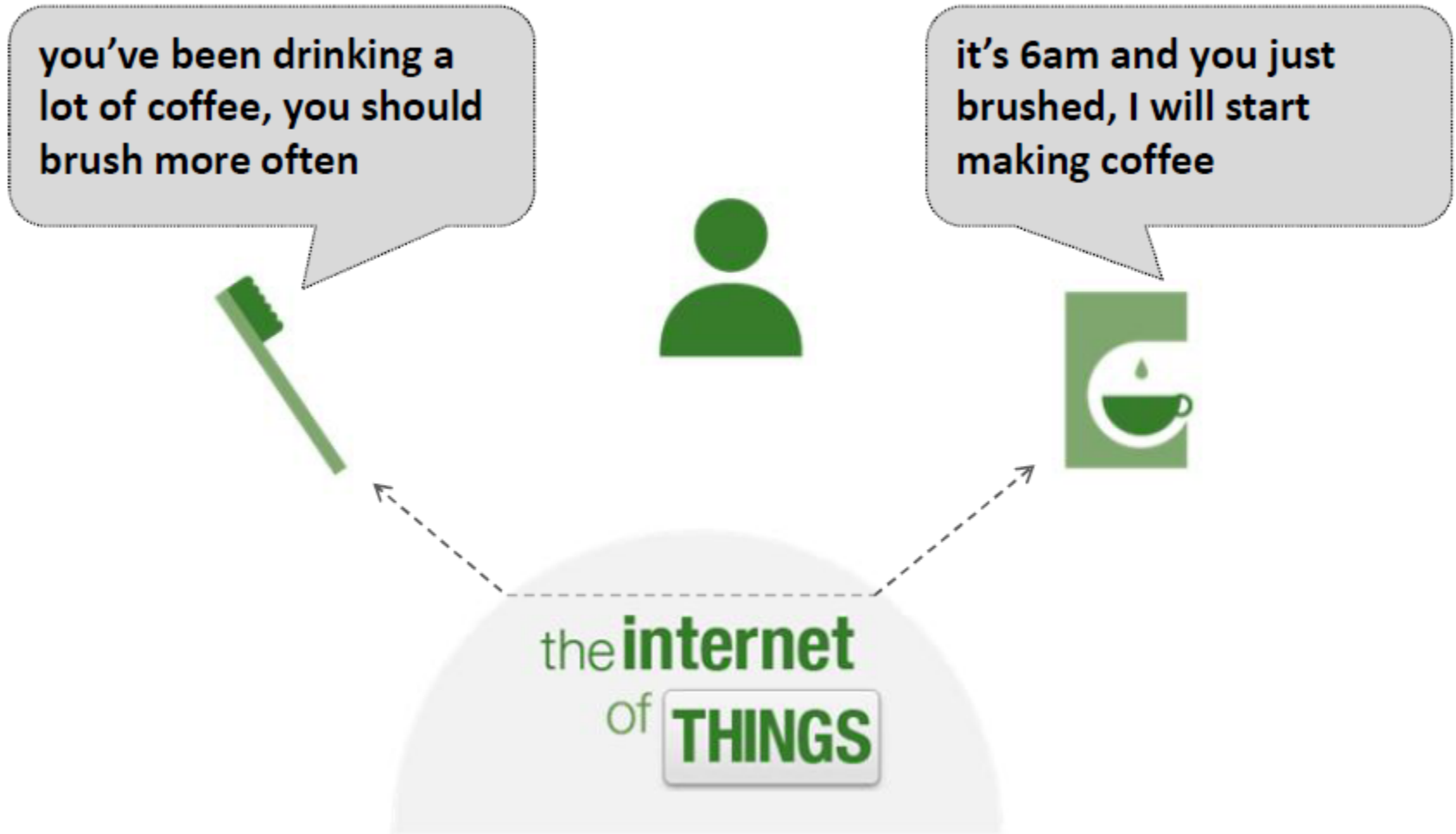
Linking you to agriculture

Linking you to agritech

- **Big Data & analytics - Monsanto's data-driven business compelled Bayer's acquisition offer**

- **Biological inputs - replace unpopular and environmentally damaging chemical pesticides and fertilizers**

- **Food security**

- **Traceability technologies**

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Linking you to the things in farming

there are many **THINGS** in farming
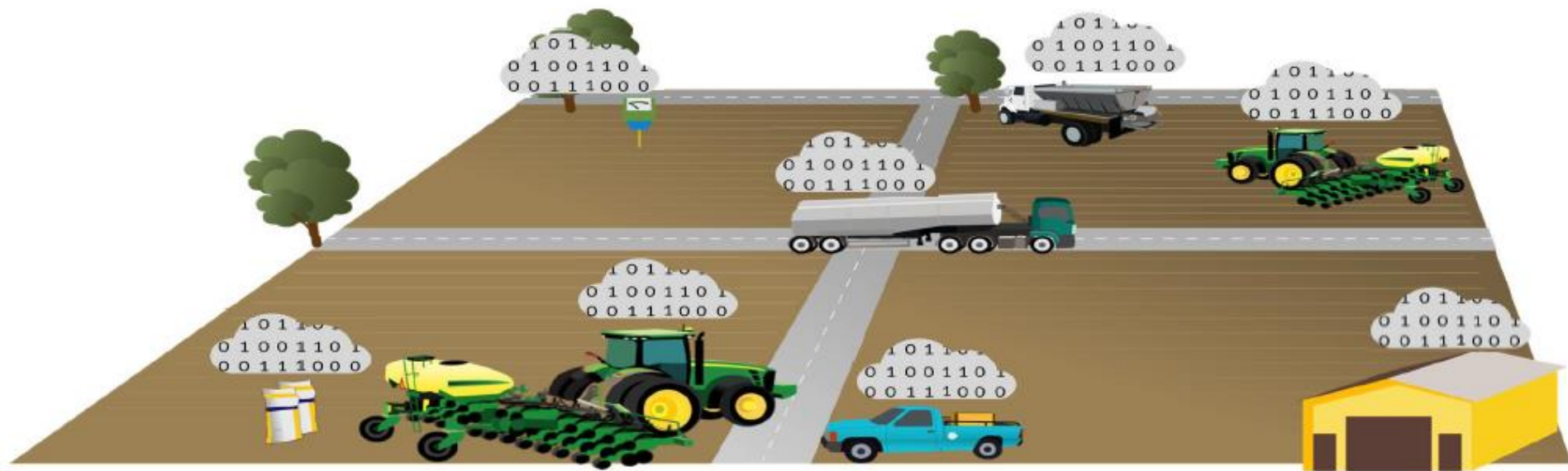
So many things in farming
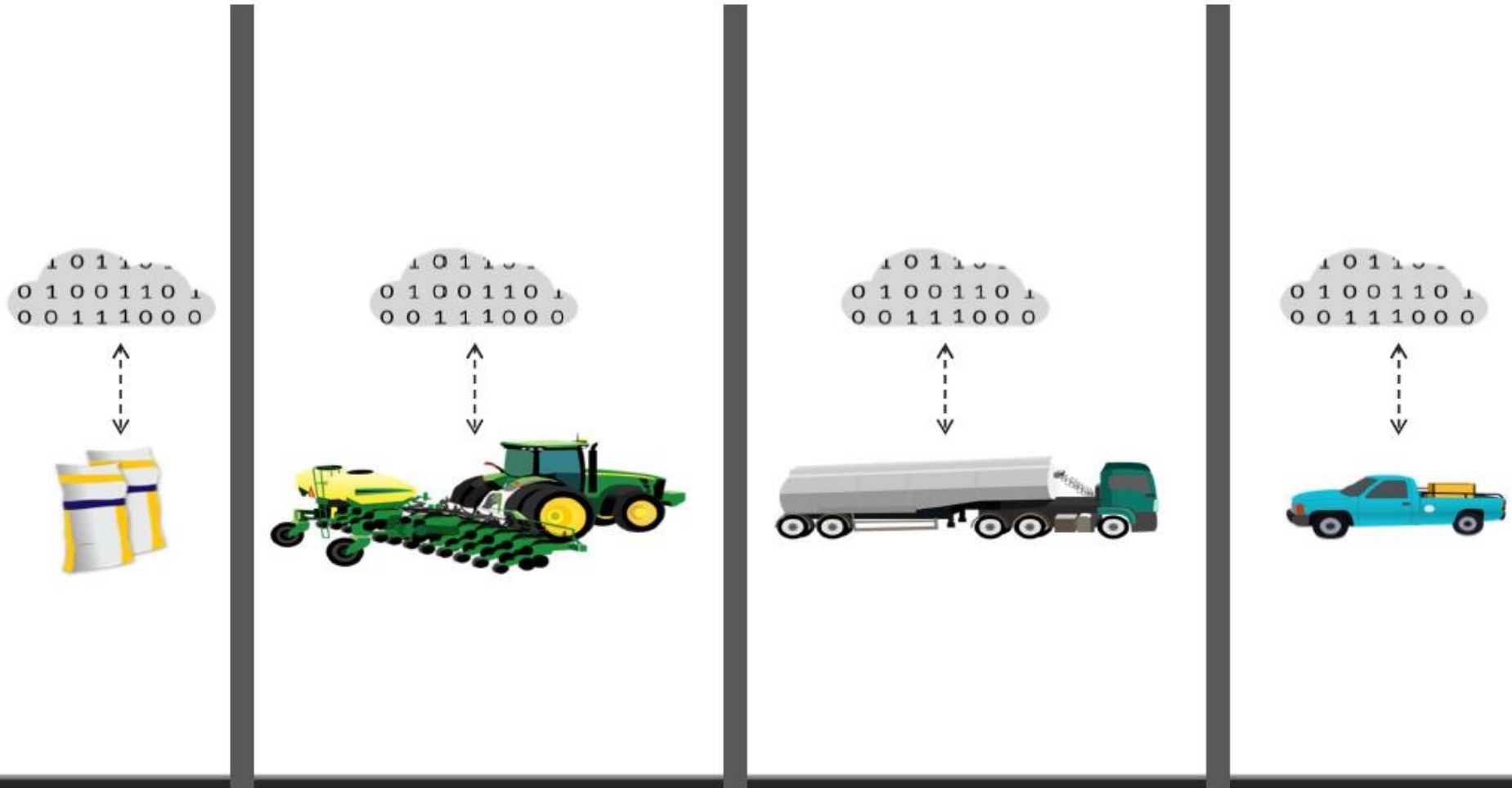
Linking the things in farming to other things in farming
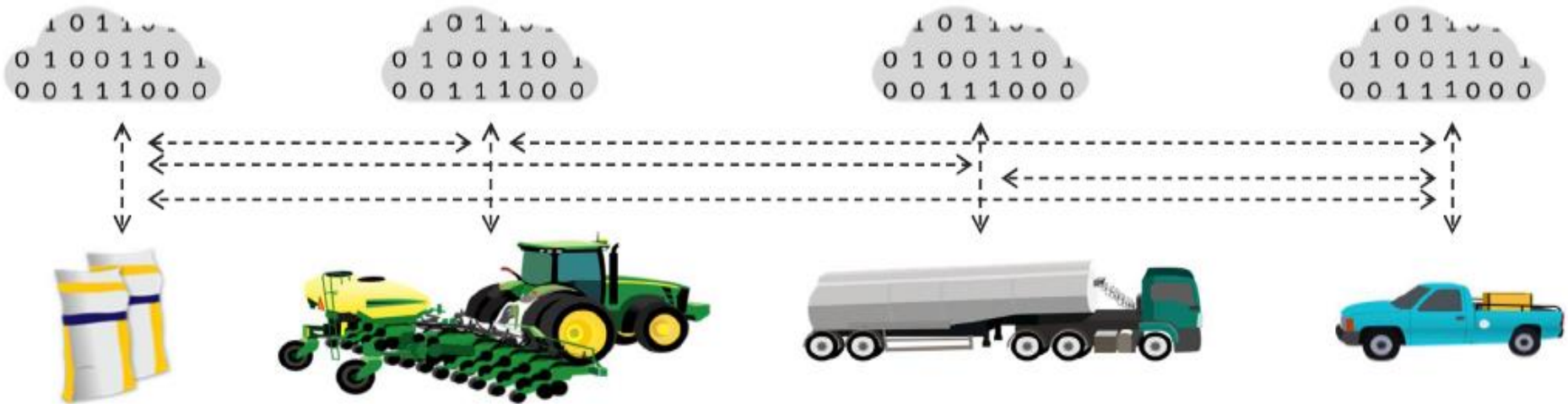
Now is the time to link them!
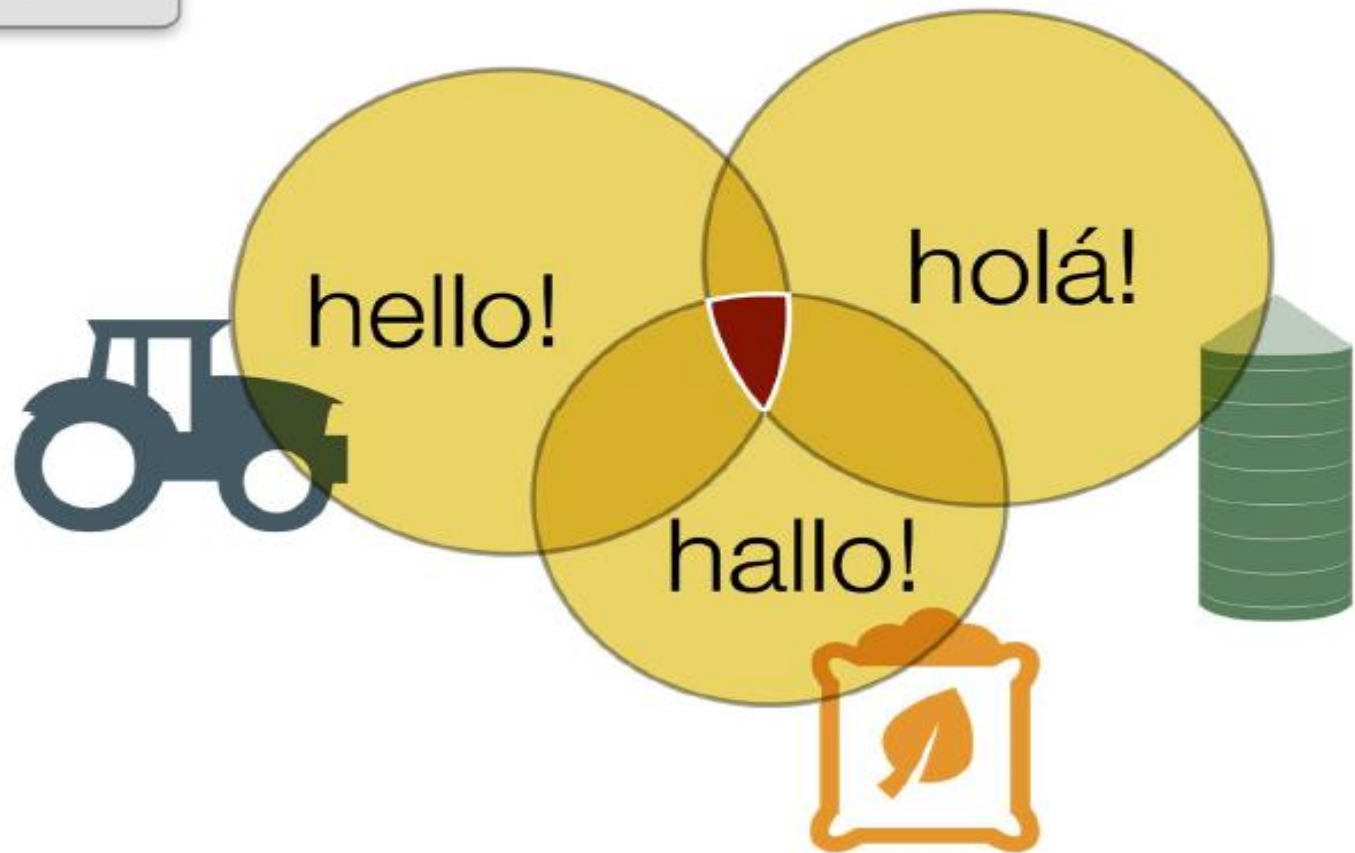
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Compatibility
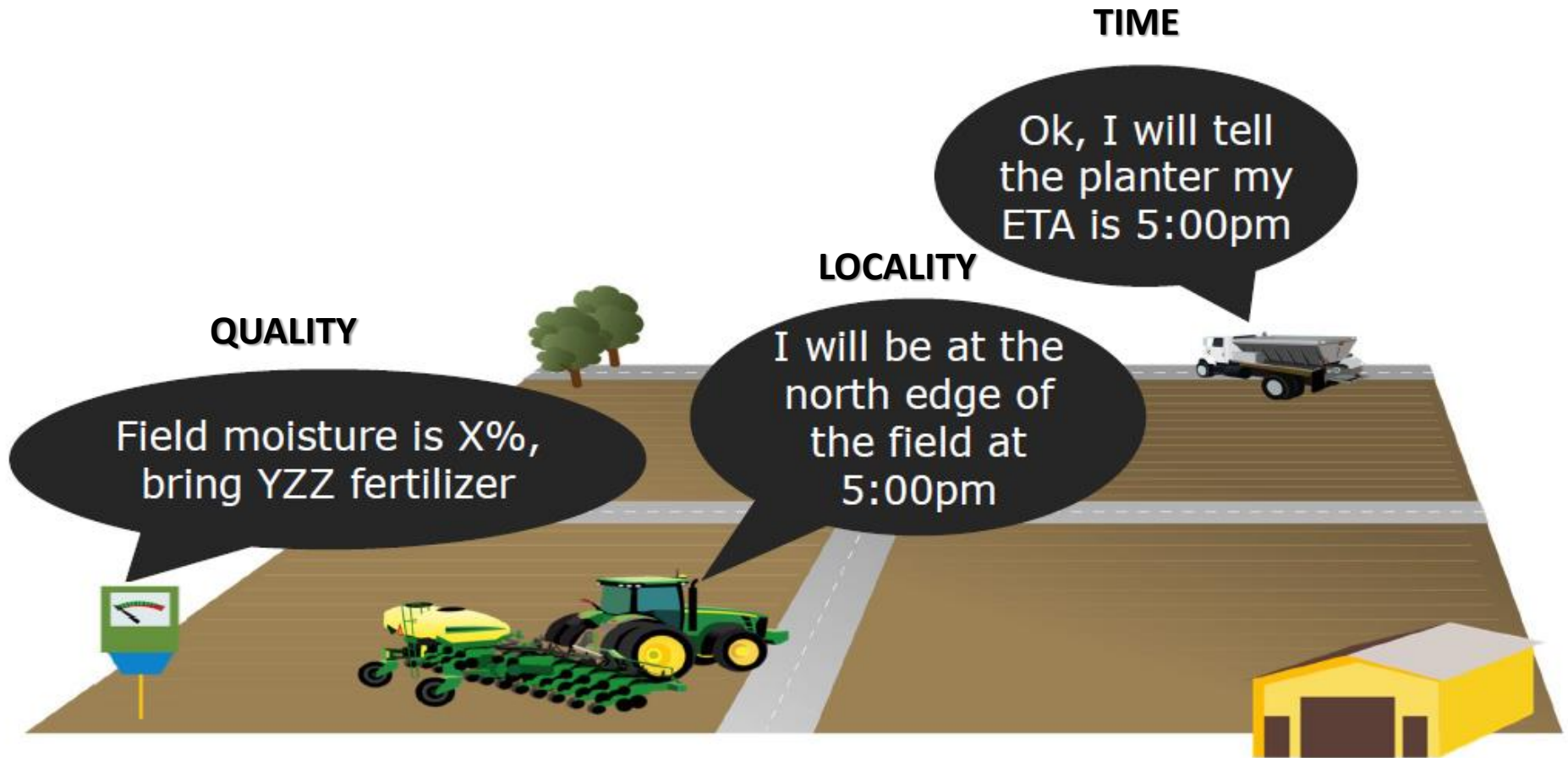
The future?

GEOGLAM

(Group on Earth Observations-Global Agricultural Marketing)

Voluntary partnership: governments including 102 nations, European Commission, and 103 participating organisations. Envisions coordinated, comprehensive and sustained Earth observations and information.

Sensing

sensors are no longer JUST part of a 'thing'...
...they are the Digital Nervous System of the **internet** of **THINGS**
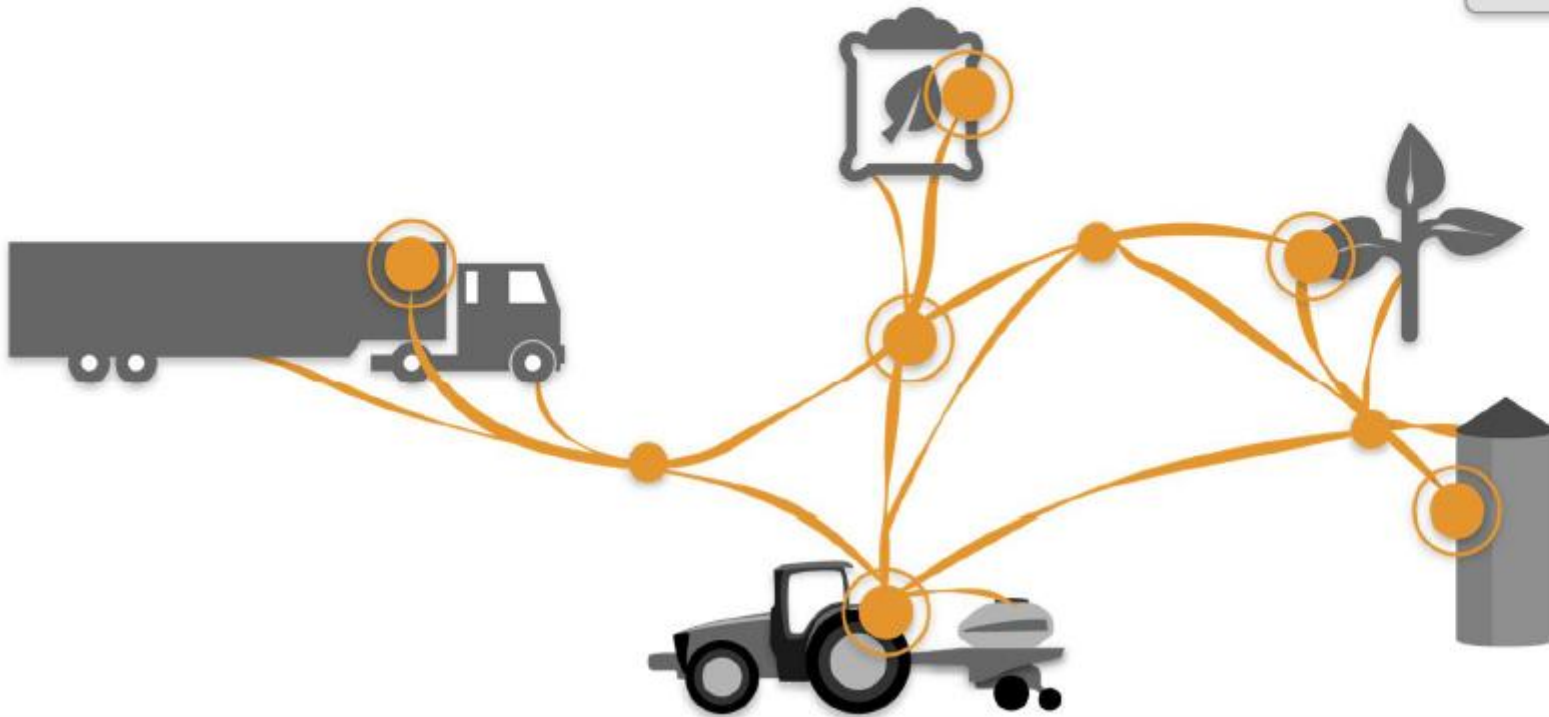
Things have to talk to each other

Things in sync

Every 'thing' can become an Internet THING

Unique business models

Subscription Economy - Connecting equipment not in use, with farms in need of machines

New business models will arise out of old things becoming an internet THING

Farm UBER - implements on call?

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Technology for small

The newest technologies won't just be for the largest and most expensive machines

Technology for all
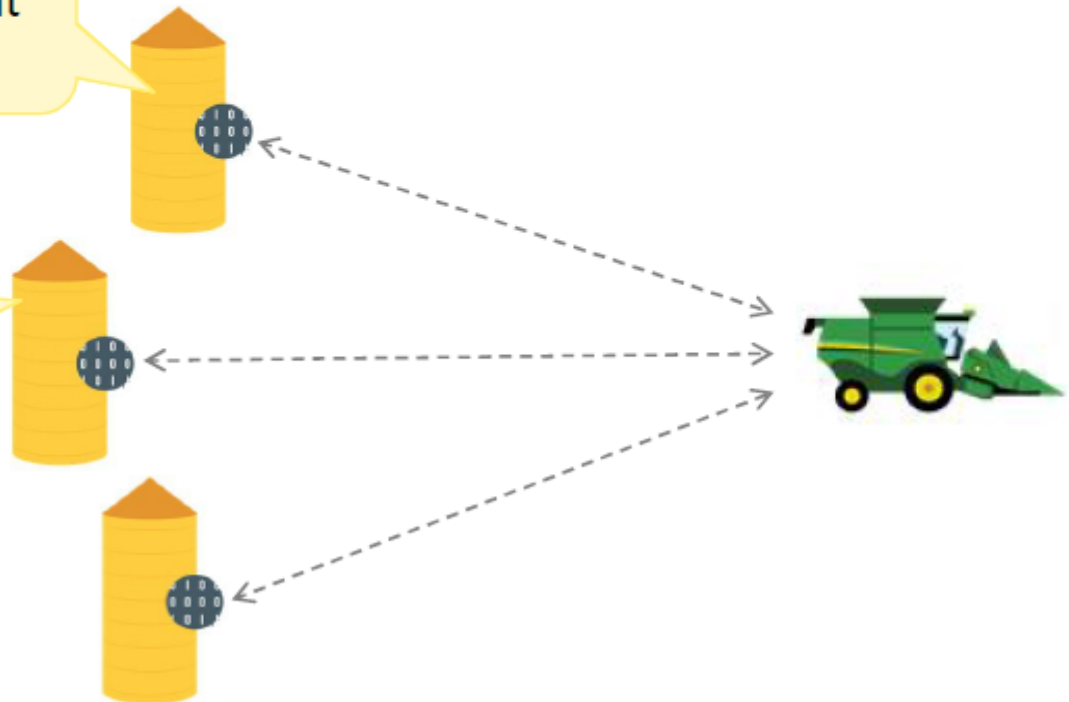
Systems improvement

the **internet** of **AGRICULTURE** will enable better system outcomes
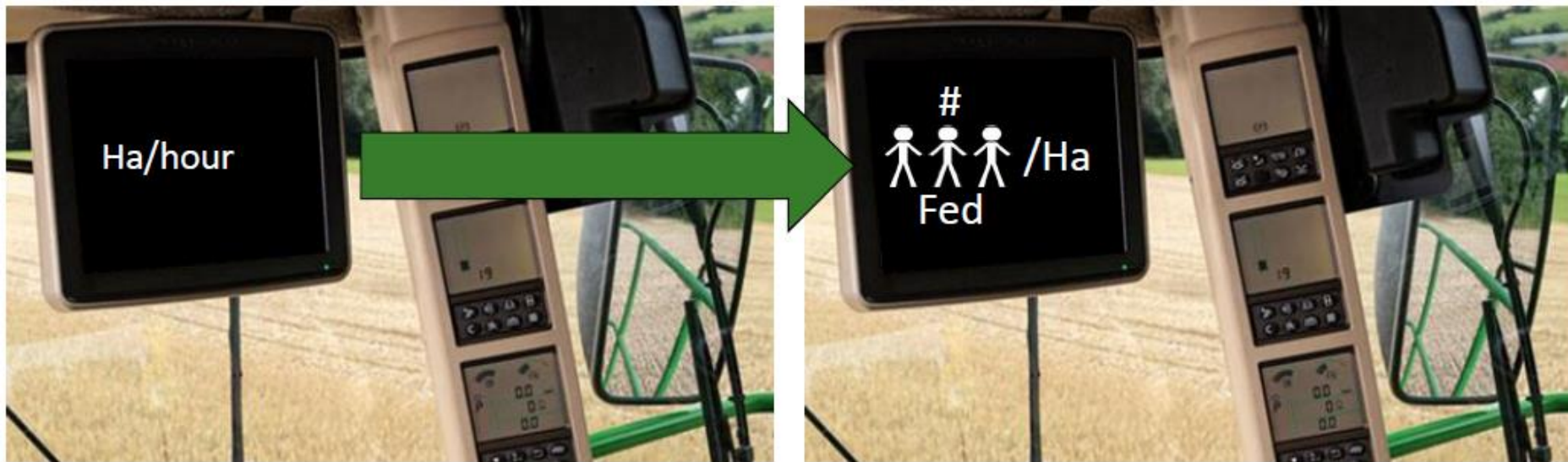
Optimisation!

Agriculture Apps

2010 – 300 000 mobile apps   **2015** – 1.5 million apps

= 400% Increase in just 5 years

Looking for more agriculture apps?

10 Must-Have Agriculture Apps to be More Efficient In 2016

15 Best New Agriculture Apps Worth Downloading In 2014

13 New Mobile Agriculture Apps For 2013

10 Best Mobile Agriculture Apps For 2012

20 Best Mobile Apps For Agriculture For 2011

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Agriculture Applications (APPS)

Connected Farm Field - field records and costs to determine profit/loss

Grain Tracker - field-to-office data transfer

My New Holland - instructional videos, operator manuals, operating & maintenance tips

Vrain - track expenses and increase profitability, also see the weather forecast

Nutrient Calculator - agronomic planning tool - fertilizer applications & soil nutrients

Agren Soil Calculator - manage soil health - plug in various crop rotations, tillage systems, conservation practices and view resulting erosion

Just In Time Plant Nutrient Calculator - correct application of Soludrip water-soluble fertilizers

AgDNA - mobile automated precision farming services — seeding records, fertility applications, weather patterns, soil quality, health yield — and real-time, geo-spatially accurate information about productivity of every field

Cropalyser - identify major pests, diseases, disorders in vegetable crops ; advises on control and prevention of pests and diseases

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The future?

Agricultural transformation across value chain

Information-based decision making aimed at sector growth and increased produce quality

Farmer training and market-related education

Government and private investment in infrastructure and IT to create transparent and efficient market access

The introduction of market structures to mitigate risks and provide safeguards against harvest losses and price votality

Adapted business models to increase the availability of quality inputs at a fair price

The introduction of farmer aggregation models to increase access to and use of technology

The introduction of innovative financing models to support investment into land improvements, productivity and quality.

Regulatory reforms and adapted banking models to increase farmer access to finance

Decision making — **Quality Inputs** — **Mecha-nization** — **Investment** — **Access to finance** — **insurance and risk mitigation** — **Market Access** — **Informa-tion and training**

1. Increased productivity
2. Improved incomes
3. Better produce quality

Source: A.T Kearney, Africa's Agricultural Transformation Opportunity, 2016

ICT impacts everything

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Limitations and constraints

- **Digital illiteracy and limited technical sophistication**

- **Restrictive Government actions**

- **Cost inefficiencies**

- **Poor infrastructure and connectivity**

- **Limited inclusion**

- **Limited dependability**

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Access and use of financial & digital technology services
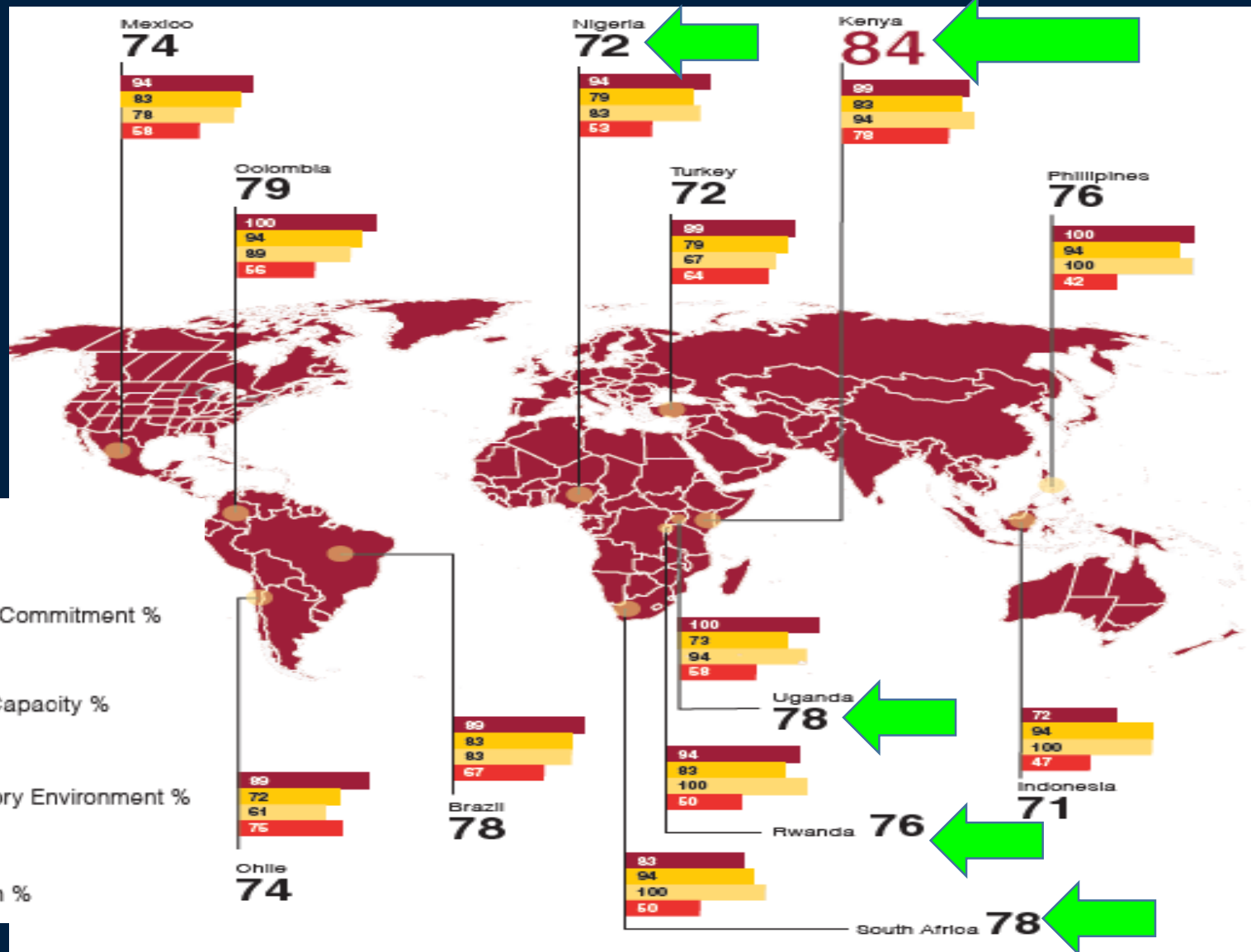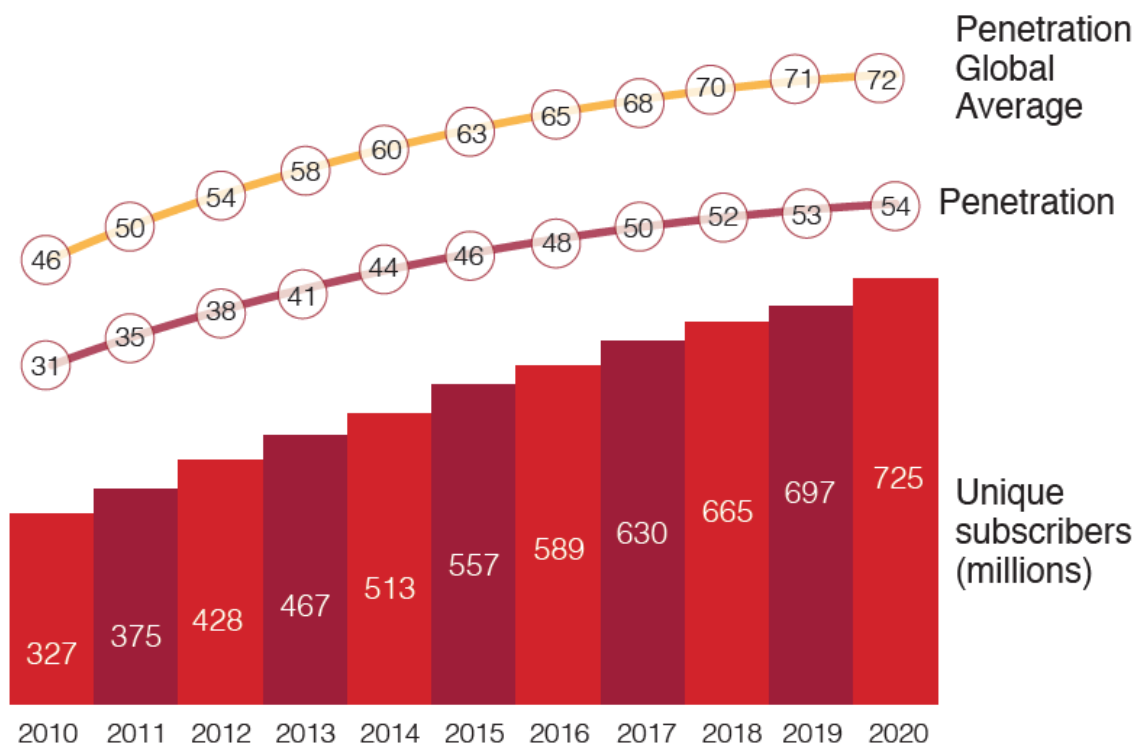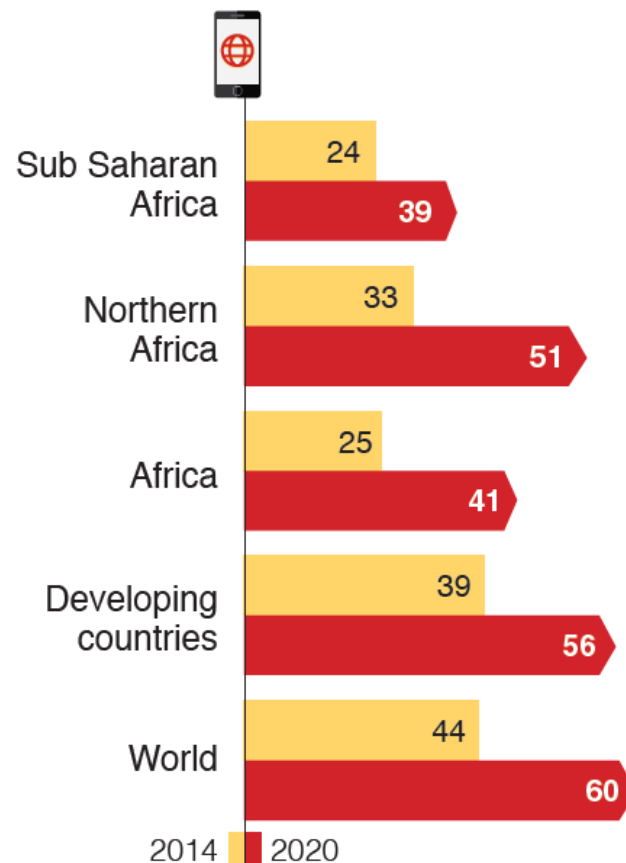

Source: The 2016 Brookings Financial and Digital Inclusion Project Report

Digital technology - Relevance in Sub Saharan Africa

Mobile phone based services penetration in Africa (%)

Penetration Global Average: 46, 50, 54, 58, 60, 63, 65, 68, 70, 71, 72

Penetration: 31, 35, 38, 41, 44, 46, 48, 50, 52, 53, 54

Unique subscribers (millions):

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
327	375	428	467	513	557	589	630	665	697	725

Mobile internet Subscriber penetration in Africa (%)

Region	2014	2020
Sub Saharan Africa	24	39
Northern Africa	33	51
Africa	25	41
Developing countries	39	56
World	44	60

Source: *GSMA 2016 (The Mobile Economy Africa)*

SSA lags behind other developing countries

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RATIONALE: Scale & sustainability

- **Simple designs tailored to the needs of smallholder farmers**

- **Rise of farmer organizations & aggregation platforms**

- **Multi-stakeholder partnerships**

- **Extensive field presence and trusted intermediaries**

- **Enabling regulatory environment**

- **Data and service interoperability**

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RATIONALE: Popularity & success of digital technology platforms

- **Inclusion of the Private sector**

- **Decreasing infrastructure costs and increasing connectivity**

- **Increasing access to finance**

- **Increasing regional influences in ICT use**

- **Increasing advocacy platforms**

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Promising policies & programs

- **Feed Africa and the Comprehensive African Agricultural Development Programs (CAADP)**

- **Tech-based sector regulatory incentives**

- **ICT for agriculture initiatives**

- **Integrated and collaborative R&D networks**

- **Public sector engagement in precision agriculture**

- **Public-private partnership extension programs**

- **Climate Smart agriculture policies**

- **Cluster-specific initiatives**

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Digital technology

Digital technology has the potential to **catalyse** all parts of the food system and is currently doing so in an **inclusive** and **sustainable** manner, targeting smallholders, women and youth.

The high level **political will** and **commitment** to increased growth in the agricultural sector, observed through the enactment of **regional policies** is helping accelerate climate smart agriculture and financial inclusion, that has resulted in **increased access** to inputs and markets by smallholders and positive regional externalities.

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References

AFRICA AGRICULTURE STATUS REPORT 2016
CABI

Progress towards Agricultural Transformation in Africa

Jason Brantley – Managing Director, John Deere Sub Saharan Africa

JOHN DEERE

Online Dedicated Grains program
USA

Clouds, big data, and smart assets
USA

AFRICAN FARMERS IN THE DIGITAL AGE

BILL & MELINDA GATES FOUNDATION

How Digital Solutions Can Enable Rural Development

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Thank you

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