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-Saharan Africa

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

<table>
<thead>
<tr>
<th>SSA Countries</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual growth rate</td>
<td>3.5%</td>
</tr>
<tr>
<td>GDP growth per capita</td>
<td>4.2%</td>
</tr>
<tr>
<td>Investment in infrastructure (% of GDP)</td>
<td>3.5%</td>
</tr>
<tr>
<td>Agriculture (% of GDP)</td>
<td>32%</td>
</tr>
<tr>
<td>Population employed in agriculture sector</td>
<td>65%</td>
</tr>
<tr>
<td>Farms smaller than 1 ha</td>
<td>60%</td>
</tr>
</tbody>
</table>
Can there be food security if population growth is out of control?

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

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

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

... ripe for disruption
Sub-Saharan Africa

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

<table>
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<tr>
<th>SSA Countries</th>
<th>2015</th>
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</thead>
<tbody>
<tr>
<td>Mobile technologies (% of GDP)</td>
<td>6.7%</td>
</tr>
<tr>
<td>Smartphone penetration</td>
<td>23%</td>
</tr>
<tr>
<td>Mobile phone penetration</td>
<td>75%</td>
</tr>
<tr>
<td>Internet penetration</td>
<td>24%</td>
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</tbody>
</table>

- High cost of mobile ownership
- Limited connectivity
- High technical illiteracy rates
Internet of 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 $1.7 trillion to the global economy.
Internet and People

People Connect to the Internet
Internet and Things

THINGS connect to THINGS through the internet

Why is that meaningful?
Linking all around you

- you’ve been drinking a lot of coffee, you should brush more often
- it’s 6am and you just brushed, I will start making coffee
Linking you to agriculture

The Internet of 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
Linking you to the things in farming

there are many THINGS in farming
So many things in farming

Each operating on its own!
Linking the things in farming to other things in farming

Now is the time to link them!
Compatibility

THINGS have to talk the same language

- hello!
- holá!
- hallo!
The internet of farming things

Linking up is meaningful!

- **Quality**: Field moisture is X%, bring YZZ fertilizer
- **Locality**: I will be at the north edge of the field at 5:00pm
- **Time**: Ok, I will tell the planter my ETA is 5:00pm
The future?

**the implications for AGRICULTURE**

- Technology
- Business Models
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?
Technology for small

The newest technologies won’t just be for the largest and most expensive machines
Even the smallest details can be improved when things are connected

If you send truck in 10 minutes there will be no wait time when you arrive

Current wait time is 45 minutes

Working smart!
Systems improvement

The internet of agriculture will enable better system outcomes

Optimisation!
Agriculture Apps

2010 – 300,000 mobile apps  
2015 – 1,500,000 mobile 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
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
Agricultural transformation across value chain

**ICT impacts everything**

- **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 volatility**
- **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**

**Key benefits**:

1. Increased productivity
2. Improved incomes
3. Better produce quality
Limitations and constraints

- Digital illiteracy and limited technical sophistication
- Restrictive Government actions
- Cost inefficiencies
- Poor infrastructure and connectivity
- Limited inclusion
- Limited dependability
Access and use of financial & digital technology services

Digital technology - Relevance in Sub Saharan Africa

SSA lags behind other developing countries

Source: GSMA 2016 (The Mobile Economy Africa)
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
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
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
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.
AFRICA AGRICULTURE STATUS REPORT 2016
CABI
Progress towards Agricultural Transformation in Africa

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

Jason Brantley – Managing Director, John Deere Sub Saharan Africa

John Deere
Thank you

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