TSSG

Sensor-based integrated farm management: challenges and benefits
GROWTH

- 50% increase in milk production
- Growth in Exports
- Growth in Employment
- Sustainable returns
- Reduced GHG emissions per litre of milk produced

The adoption of new technologies at primary producer level;
Developing new working relationships within the food production chain;
Piloting new product streams;
Targeting resources at new markets;
Enhancing levels of productivity and competitiveness; and,
Developing production and management skills across the sector.

The value of primary output by €1.5 billion;
Value-added outputs by €3 billion; and
Exports to €12 billion, representing growth of 42% over the period 2007-09.

Sustainable Food Production
TSSG Innovation Model

What we offer

- Basic Research
- Science
- Applied Research
- Engineering
- Entrepreneurship
- Commercialisation
The Internet of Things

From any time, any place connectivity for anyone, we will now have connectivity for anything!

Figure 1 – A new dimension

Any TIME connection
- On the move
  - Outdoors and indoors
    - Night
    - Daytime
- At the PC

Any PLACE connection
- On the move
  - Outdoors
  - Indoors (away from the PC)
- At the PC

Any THING connection
- Between PCs
- Human to Human (H2H), not using a PC
- Human to Thing (H2T), using generic equipment
- Thing to Thing (T2T)

Source: ITU adapted from Nomura Research Institute
The Potential for IOT to Add Value

• Leveraging IOT in traditional industries is an untapped source of value add

• IOT has the potential to propel early adapters towards acquiring global competitive advantages

• Vast range of innovations e.g.,:
  • sensors providing ever more accurate data
  • visualisation and prediction of conditions for farming
  • autonomous monitoring and interventions in farming and food production processes
  • highly integrated communication from sensors to tractors to processing and logistics infrastructures
  • monitoring and control systems informing and assuring consumers of food safety and sustainability
Food Security
Dairy-Farming Today

• Precision Farming:
  – Growing influence of the *Internet of Things*
  – *Fine-grained* monitoring and automation
  – *Volume, Velocity and Variability of Data*
  – *Lack* of intelligence/analytics currently

• The need for Analytics:
  – Event Detection (e.g. Estrus)
  – Decision Support (e.g. Grass-land Management)
  – Context awareness (e.g. Machinery Navigation)
  – Other
IoT in Precision Agriculture

Farmers take a byte out of...
‘BIG DATA’

4.5 Million Hectares in Agriculture
100 Sensors per hectare
450 Million Sensors
~ 2 PB of Data per Year.

1.6 Million Cattle
1.6 Million Sensors
~ 40 TB data per year
TSSG Precision Dairy

External Analytics Services

- Data Collection & Storage
- Data Analysis
- Data Enrichment

Dairy Farm Management System

On-the-Farm Analytics

- Optimization Engine

On-body animal mobility and activity monitoring:
- Sink Node
- Universal animal-monitoring Sensor
- Data exchange routes

Environmental monitoring & virtual fencing:
- Environmental sensors
- Milk monitoring sensors
- Local GateWay
- Virtual fence boarder
- Desired direction of cattle movement
- Data exchange routes
- Farm-based control of the fencing and monitoring

Partners

- Government Agency/Body
- Dairy Processor
- Equipment/supply Manufacturer
- Independent Farmers
Smart Farming: Opportunistic Analytics

Use Case

* Analytic Platform for Opportunistically Offload Agri Data and Computation

Animal

Motion and Location Tracking Grassland Monitoring

Multi Interface Sink Units

LP-WAN: LoRa, SigFox, LTE-M (Rate: x kbps, Range: 10+km, Battery: 10+ yrs)

ULP-PAN: Bluetooth Smart, WiFi Direct, LTE Direct

Cloudlet

OpenStack++

ISP or 3rd Party Edge

Other Farms

Community API

Precision Dairy Project Test Applications:

Animal Behavior Classification

Collaborative Grassland Mapping

Objective: Making analytic applications scalable and adaptive

Aqua Culture – Supply Chain Management

*Without* AQUASMART  
(BigData = Mess)

*With* AQUASMART  
(BigData = Makes Sense)
Thank you

Q&A