

Application and Viability of RFID Battery Free Sensing Technology for Digital Agriculture

Mos Sharifi
Research Engineer – AgResearch Ltd
BSc Electrical Eng – MSc Mechatronics Eng – PhD Robotics

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AgResearch

Driving Prosperity by Transforming Agriculture

We support New Zealand's pastoral sector through innovation in the following streams:



Dairy On-Farm

Increasing farm profitability and ensuring an internationally competitive milk supply



Meat & Fibre On-Farm

Improving productivity and profitability of sheep and beef farms



Dairy Off-Farm

Transform the contribution from dairy products and food solutions to the NZ economy



Meat & Fibre Off-Farm

Improve profitability and sustainability of the red meat sector and transform the wool industry for increased returns



Maori Agribusiness

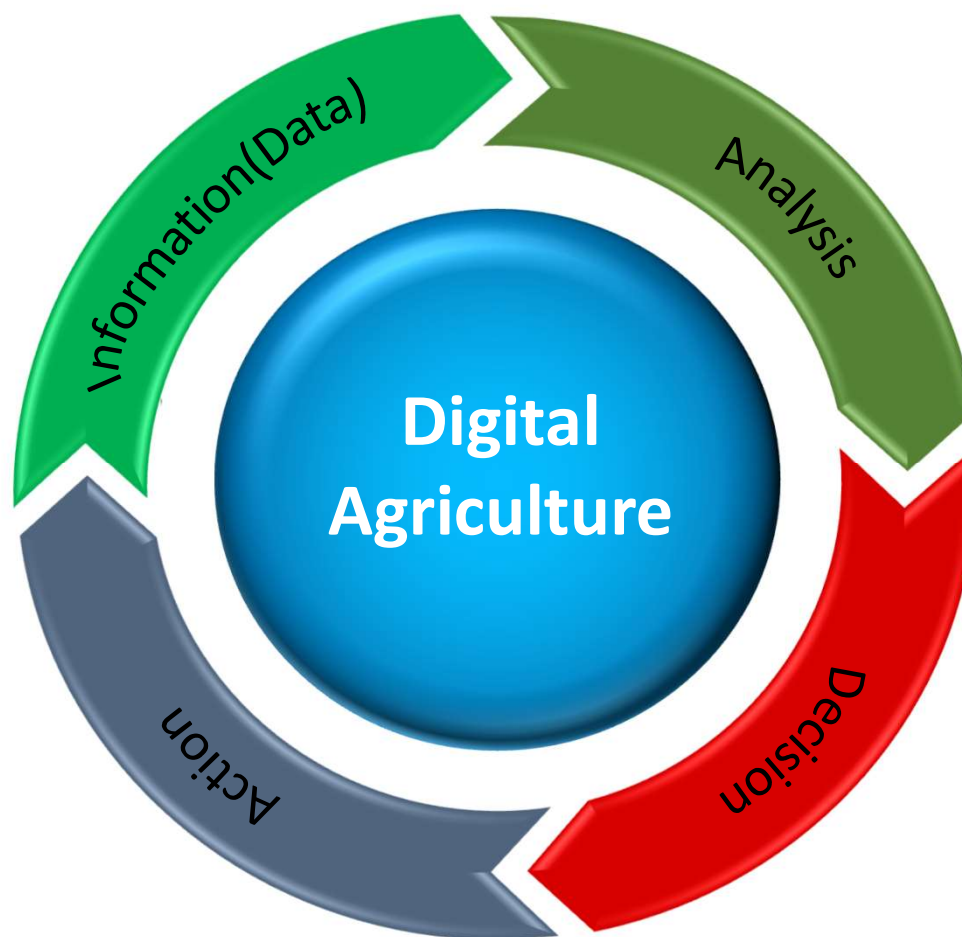
Growing potential for Maori Agribusiness in the pastoral sector

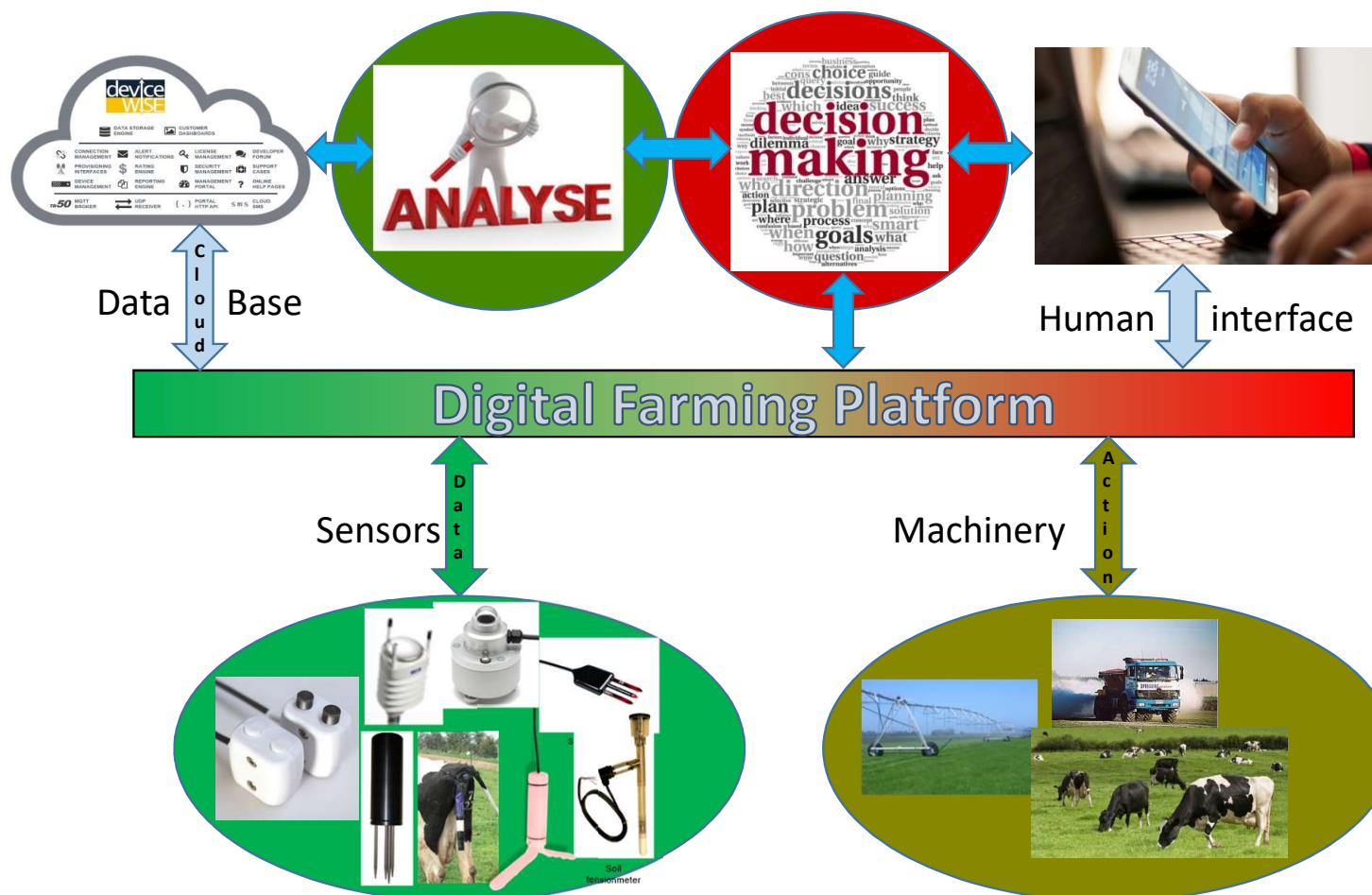
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- *Sensors in Agriculture*
- Battery Free Radio Frequency Identification (RFID) Sensing
- Use Case in Agriculture sector
- Case Study
- Summary



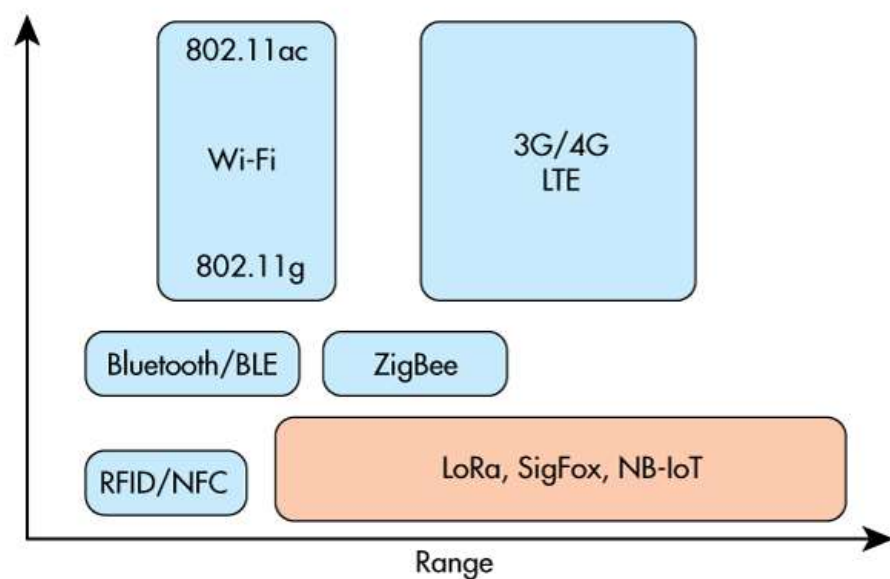
Agriculture must become **more efficient** and **sustainable** if it is to provide enough food for a growing world population.







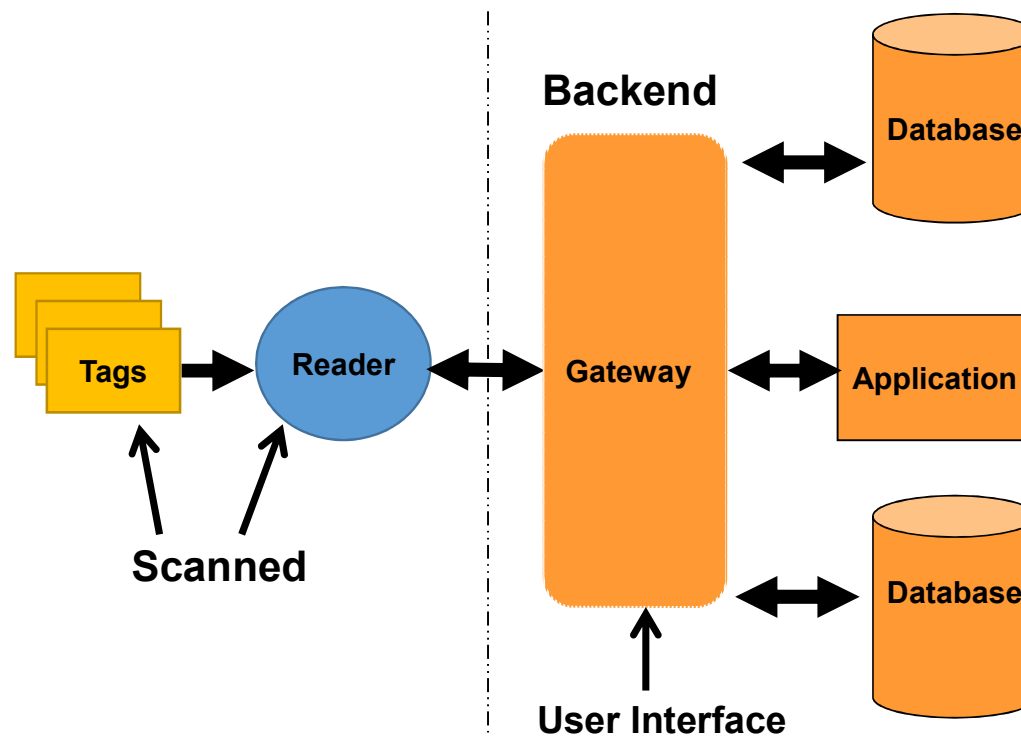
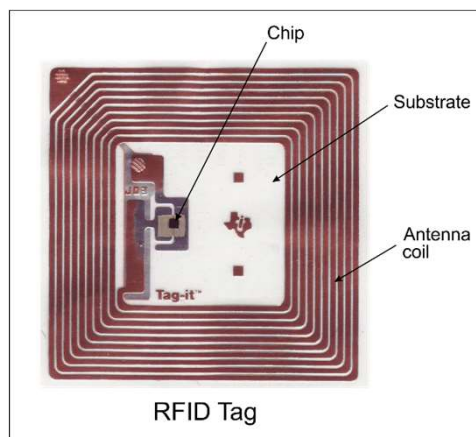
Wireless Communication



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General Overview of RFID Architecture

RFID battery free sensors



Temperature



Temperature & Humidity



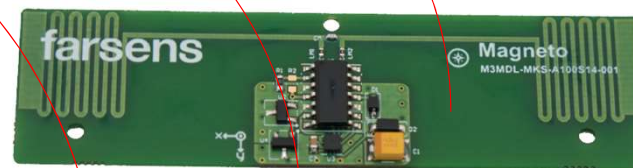
Load Cell



Pressure



Orientation



Magnetic Field



Relay output



- **What RFID is NOT**
 - **A natural power source – requires a Reader**
 - **A present power source – require a short range reader**

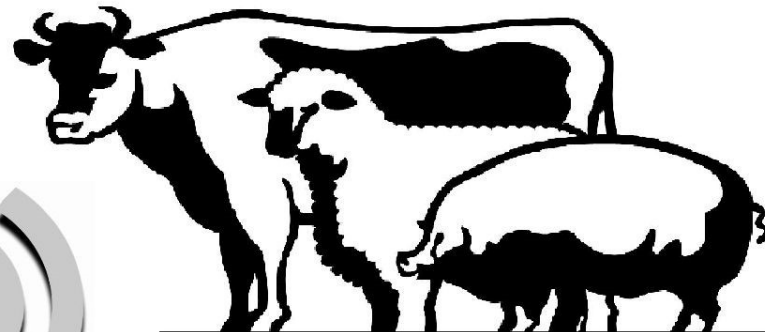
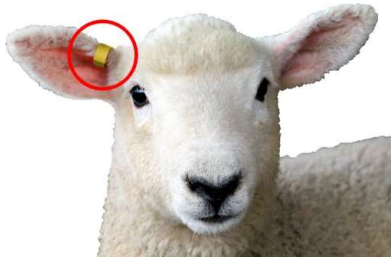
- **What RFID is**
 - **A reliable source – wireless communication independent of environmental condition**
 - **Maintenance free solution – require no battery**



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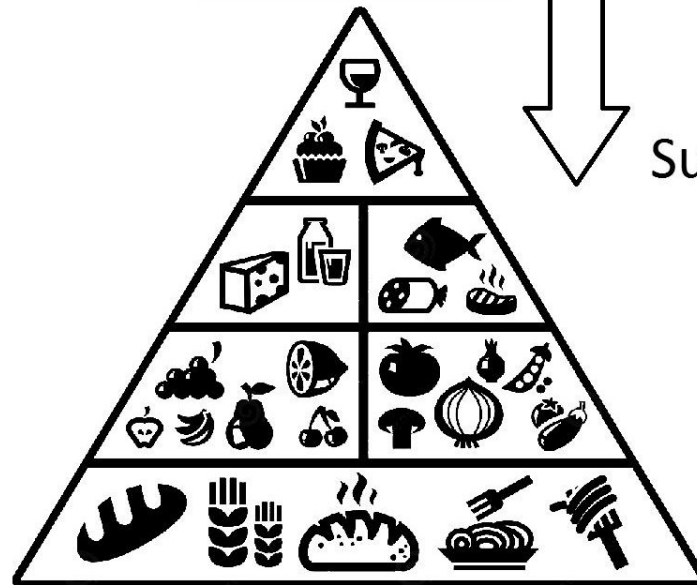




RFID

Traceability

Supply chain control



RFID battery free sensors



Temperature



Orientation



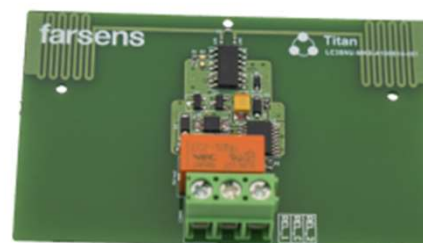
Temperature & Humidity



Load Cell



Magnetic Field



Relay output



Pressure

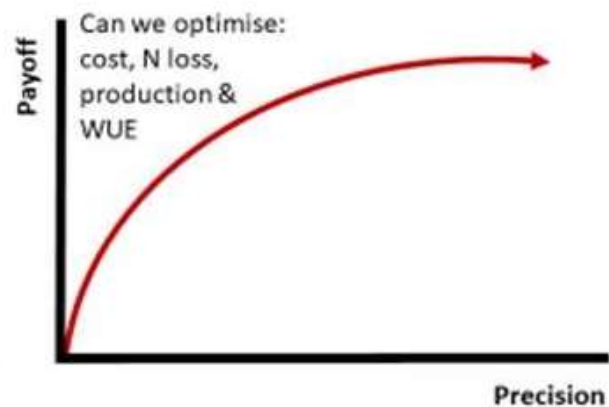
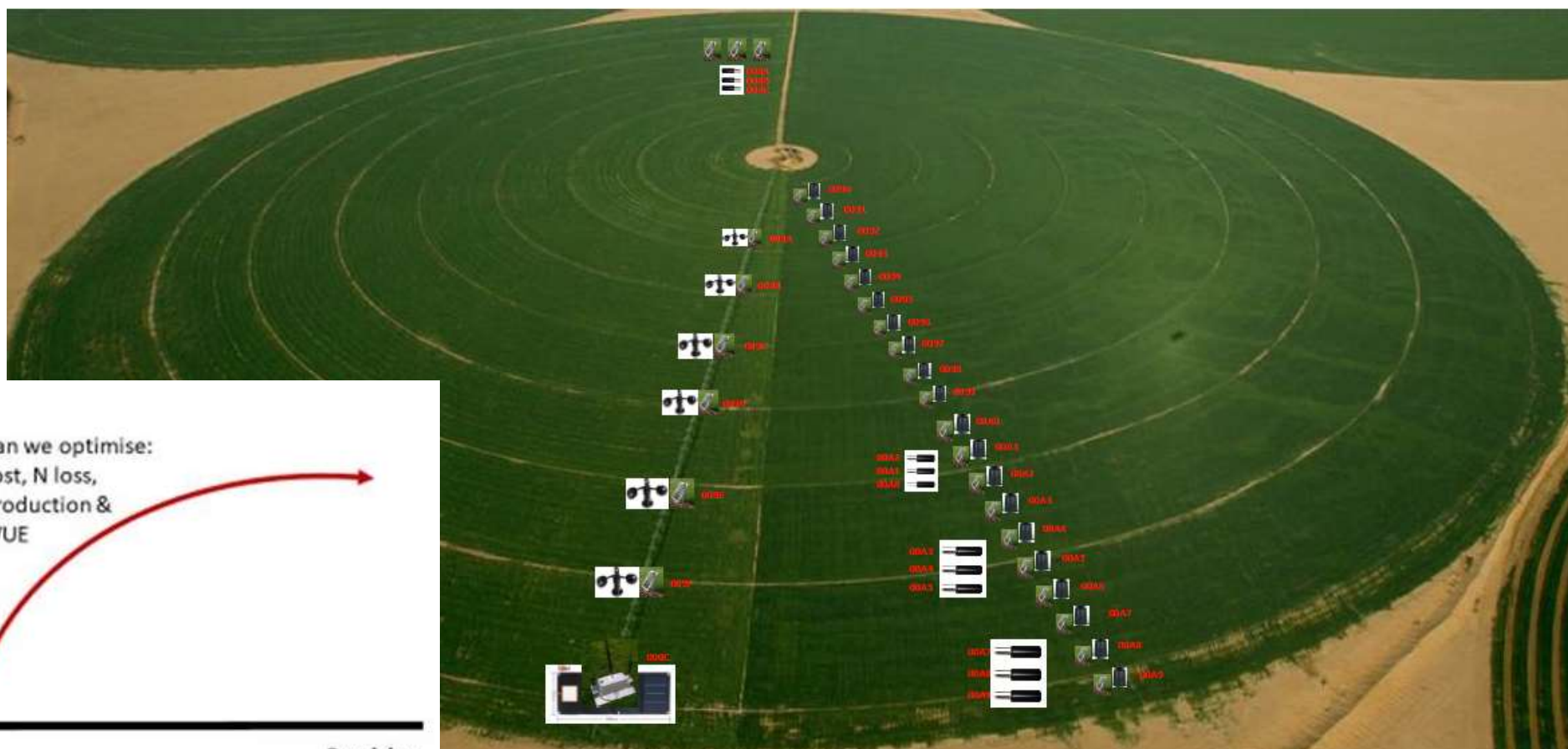


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Battery Free Soil Moisture Sensing for Efficient Pasture Irrigation







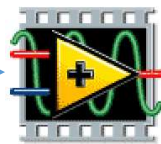
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Vs.



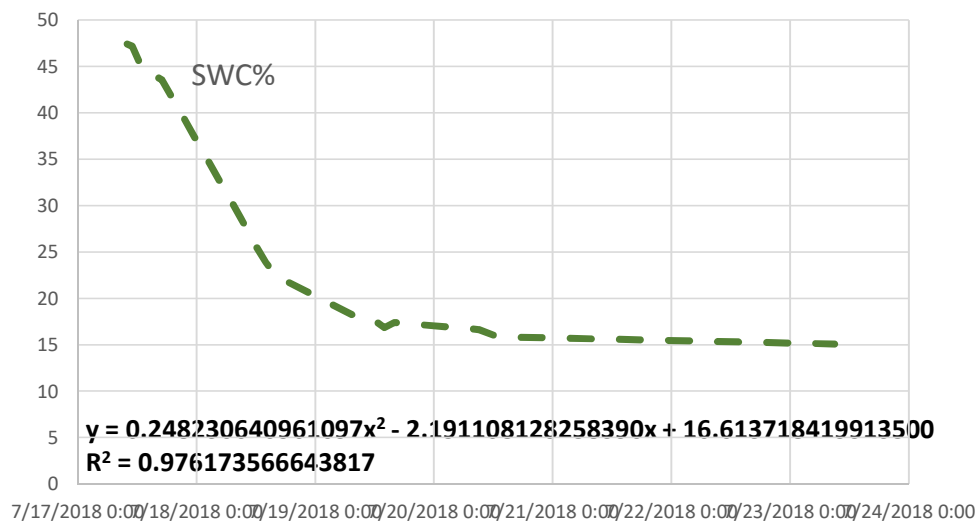
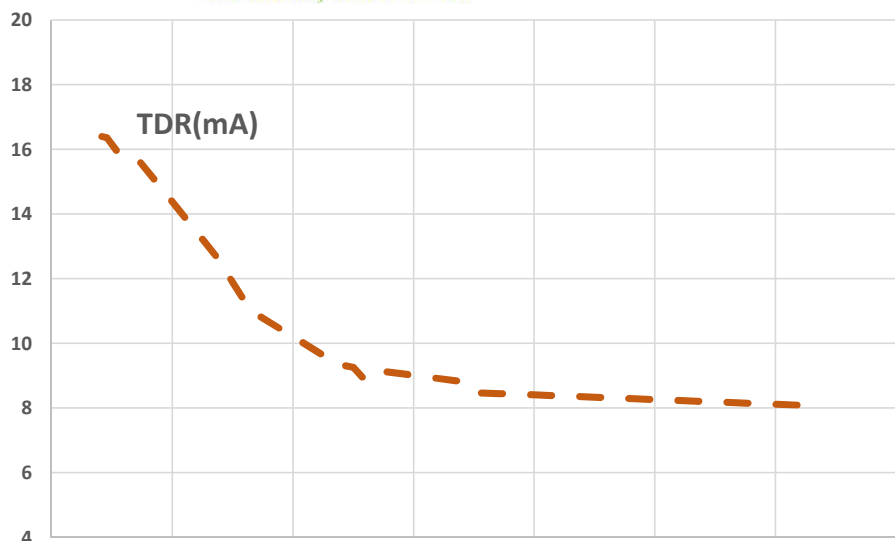
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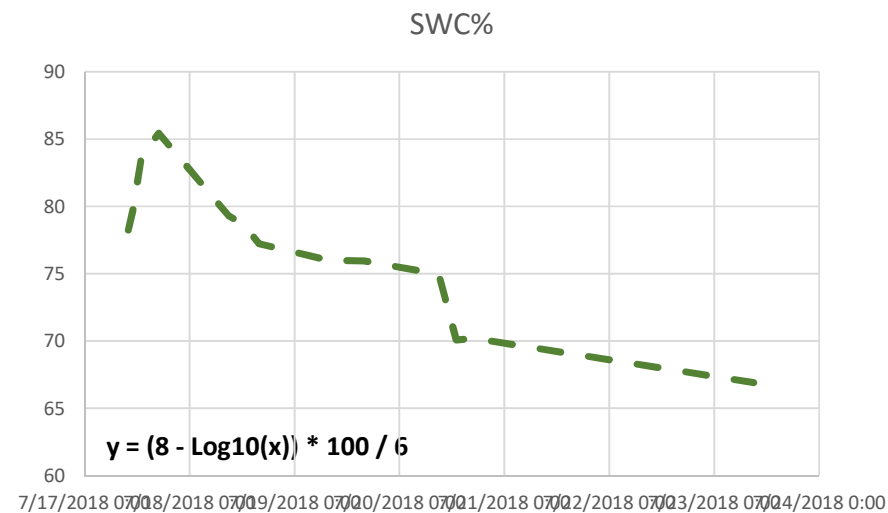
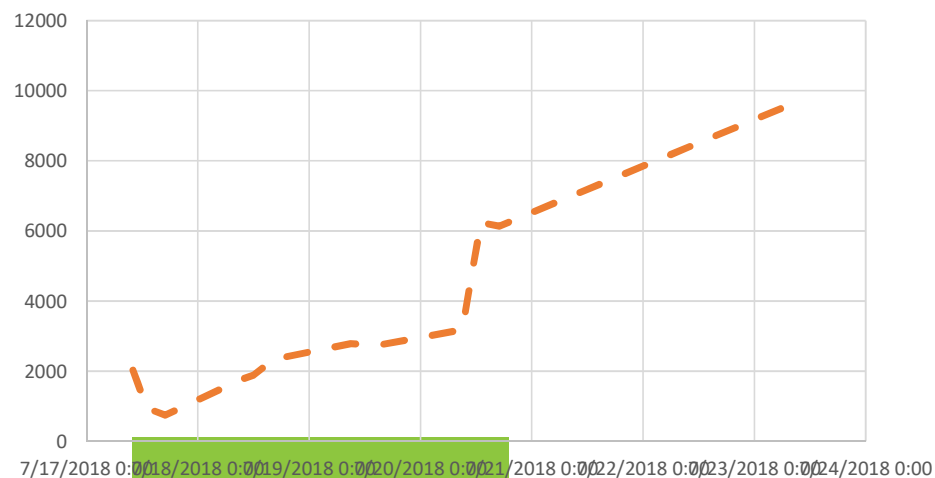
NATIONAL INSTRUMENTS

LabVIEW

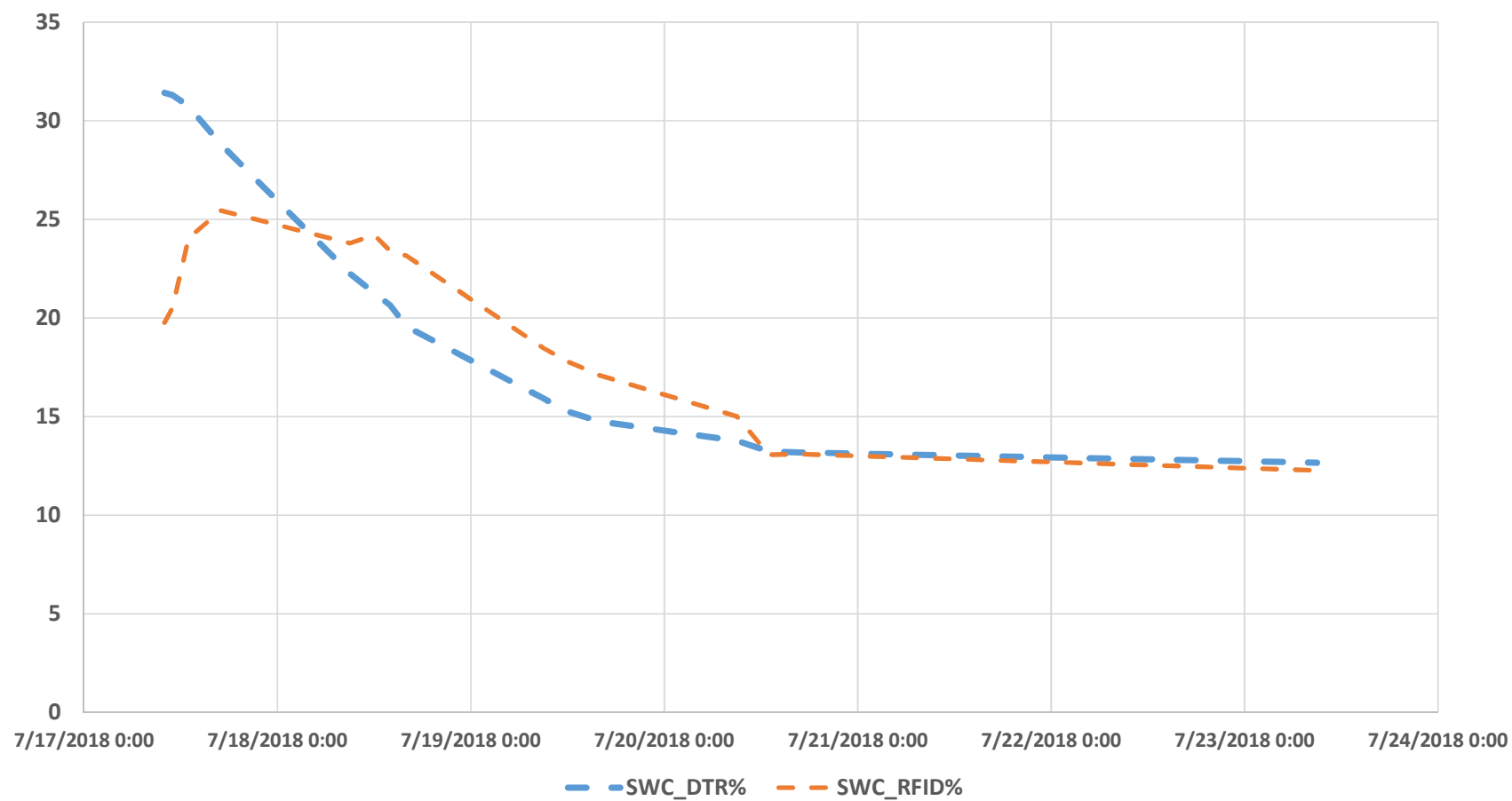




RFID_Rsense (Ω)



TDR vs. RFID



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Summary

Battery-Free Sensing Systems:

- No risk of growing toxic products due to damaged batteries
- Reduce maintenance cost – No battery change will EVER needed
- Lower cost than standard wireless sensors
- Commercially viable
- Other applications in agriculture