Automating the dairy farmer? Understanding the barriers to uptake and use of precision technology in dairy systems

D. McConnell

Speaker: Debbie McConnell
Automating the dairy farmer: understanding the barriers to uptake and use of precision technology in dairy systems

Dr Debbie McConnell
Precision technology – a changing world

- Emergence of a data-sharing world
- Agriculture provides a perfect host for precision technologies
- Ability to drive sustainability in dairy production systems:
  - Feeding
  - Nutrients
  - Labour
- Technology adoption rates remain relatively low in dairy systems

![Number of connected devices worldwide from 2012 to 2020 (in billions)](source: CISCO, 2016)
Study aim

How can we make the most out of precision technology in the dairy sector?

• Factors limiting uptake of precision technology?

• Why people were investing?

• How were they ensuring they were getting the most out of the technology?

• >70 interviews with:
  – Industry
  – Technology manufacturers
  – Farmers
  – Researchers
Factors limiting adoption?

• Limited evidence base on cost-benefit of technology

• Lack of resource
  – Financial
  – Time

(DEFRA, 2012)

(Bewley, 2014)
Factors limiting adoption?

- Limited evidence base on cost-benefit of technology
- Lack of resource
  - Financial
  - Time
- Easy of use
  - Skills base on farm
  - Off-farm support network

45% of UK dairy farmers felt that having better ICT skills was required to embrace use of technology (DEFRA, 2012)

(Bewley, 2014)
Why were people investing?

- Curious
- Wanted to be ahead of the game/new challenge
- Labour saving/Quality of life
- Better management of business

What did they look like?

- Younger (with older generation providing strategic/financial support)
- Achieved higher level education
- Multiple business enterprises – spread financial risk
How was technology performing on farm?

I’m not sure, I think it’s a better system, it’s got much more data and it cost a lot of money!

My herd fertility is good now but I’m not sure what it was like before

I am not sure what the best metrics are to measure against, I look at what the sales person told me

Long-term, yes we’d consider more robots but we want to get this working correctly first

Measure to Manage?

Investing in technology brings greater measurement, not necessarily better management
## Phases of the learning trajectory of new precision dairy farmers (adapted from Eastwood et al. 2012)

<table>
<thead>
<tr>
<th>3 - 6 months</th>
<th>6 – 12 months</th>
<th>12 months +</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Early learning</strong></td>
<td><strong>Consolidation phase</strong></td>
<td><strong>Advanced learning</strong></td>
</tr>
<tr>
<td>Basic data entry, creating simple groups, descriptive and responsive activity</td>
<td>Task repetition leading to knowledge consolidation, building data interpretation skills</td>
<td>Combining different data to give more effective decision support processes, tailored to specific needs, additive benefit to farm</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Opportunity for true cost-benefit assessment</strong></td>
</tr>
</tbody>
</table>
### Phases of the learning trajectory of new precision dairy farmers (adapted from Eastwood et al. 2012)

<table>
<thead>
<tr>
<th>3 - 6 months</th>
<th>6 – 12 months</th>
<th>Lack of:</th>
<th>12 months +</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Early learning</strong></td>
<td><strong>Consolidation phase</strong></td>
<td><strong>Data skills</strong></td>
<td><strong>Advanced learning</strong></td>
</tr>
<tr>
<td>Basic data entry, creating simple groups, descriptive and responsive activity</td>
<td>Task repetition leading to knowledge consolidation, building data interpretation skills</td>
<td>Strategic Guidance</td>
<td>Combining different data to give more effective decision support processes, tailored to specific needs, additive benefit to farm</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Opportunity for true cost-benefit assessment</strong></td>
<td></td>
</tr>
</tbody>
</table>
Building the skills base

• Recognising the skill set required on farm is changing – data management and interpretation a key requirement (££)

• Making precision agriculture more accessible at an earlier age
Providing strategic guidance

- Nick and Rebecca Dornauf, Gala Dairies, Tasmania
- Voluntary access, 4-way grazing system
- Started in 2010
- 600 cows (400 spring, 200 autumn)
- 8000kg milk/cow/year
Providing strategic guidance

“We felt quite alone, we didn’t know if what we were doing was right or how we compared to other robot farms”

- Need for clear KPIs when implementing precision technology
- Greater sharing of data across technology
Using technology to drive grassland production and utilisation

- Grassland agriculture will be pivotal to ensuring sustainable N.I. dairy, beef and sheep industries
  - Significant volatility in price and availability of imported feedstuffs
  - Environmental and social concerns

Significant financial benefit to improving grass growth and utilisation

+£441/ha

+£204/ha

(Mayne and Bailey, 2016)
Changing our understanding of the grazing environment: AFBI Precision Grassland Platform

- High-tech research platform which enables the collection of detailed information on soil, plant and animals

- **Soil** - Improving nutrient use efficiency of grassland pastures
- **Plant** - Improving pasture productivity and quality
- **Animal** - Increasing pasture utilisation and milk from forage
Changing our understanding of the grazing environment: AFBI Precision Grassland Platform

- Supported by network of farmer co-researchers providing on-farm test bed for new technologies but also key group for sharing experiences and developing KPIs
Summary

• Need to move from **technology centric view** to **user centric view** of precision agriculture

• Technology allows us to measure but not necessarily manage. Need to address skills gap on farm and offer appropriate industry support.

• Further integration required between research and technology developers to build appropriate KPI’s for technology

• Significant scope to drive grassland production and utilisation with precision technology but farmer engagement key