



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

D. McConnell

Speaker: Debbie McConnell



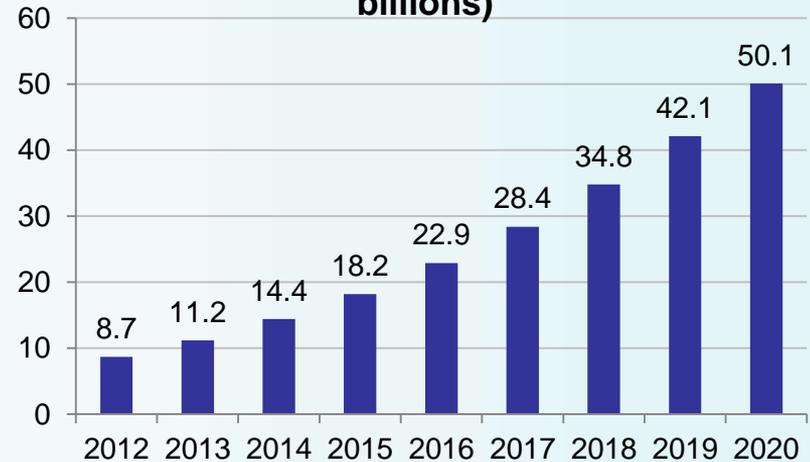
Automating the dairy farmer: understanding the barriers to uptake and use of precision technology in dairy systems

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?

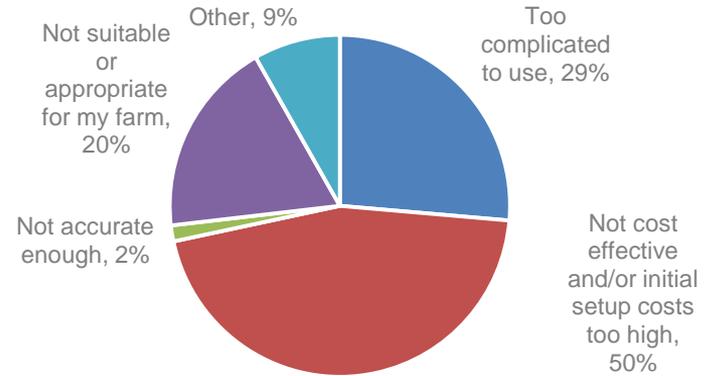
- Factors limiting uptake of precision technology?
- Why people were investing?
- How were they ensuring they were getting the most out of the technology?



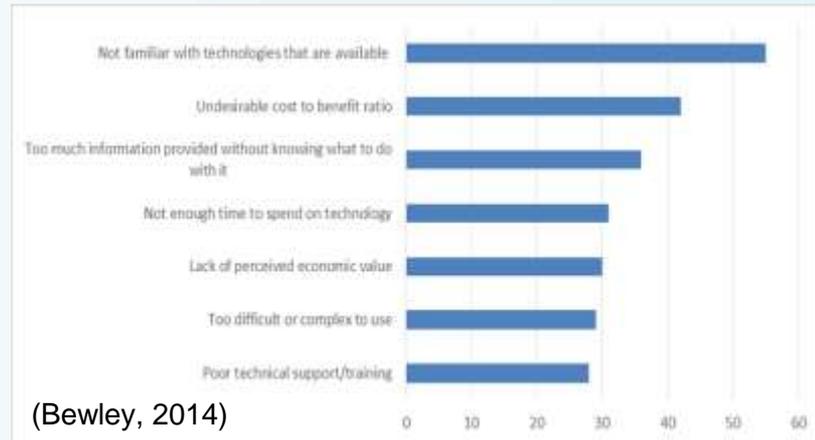
- >70 interviews with:
 - Industry
 - Technology manufacturers
 - Farmers
 - Researchers

Factors limiting adoption?

- Limited evidence base on cost-benefit of technology
- Lack of resource
 - Financial
 - Time



(DEFRA, 2012)

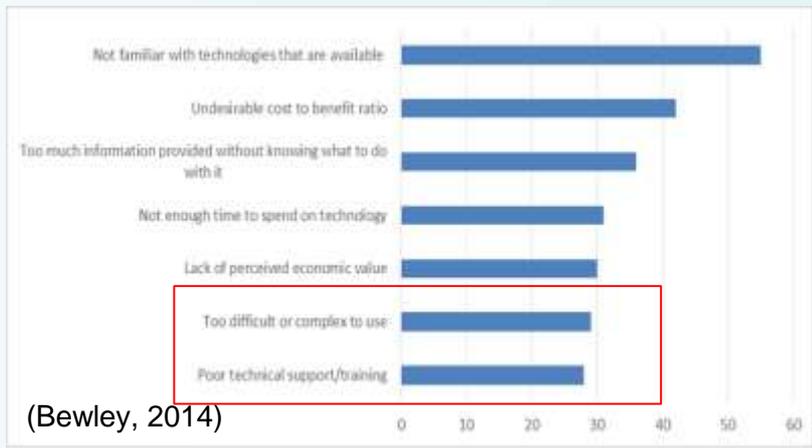
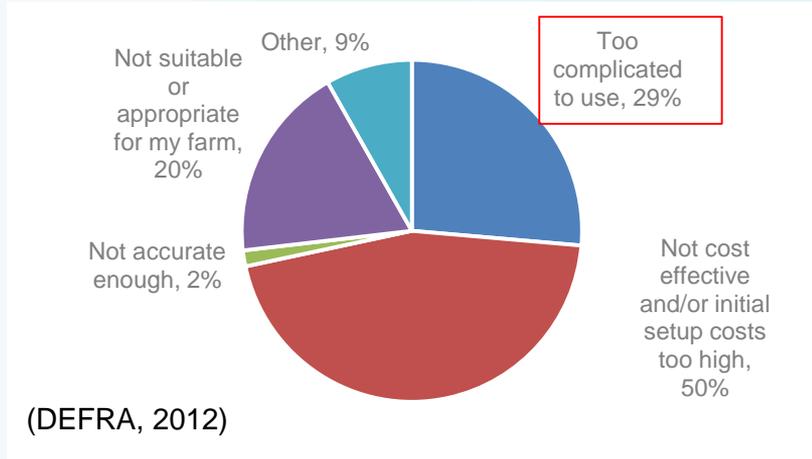


(Bewley, 2014)

Factors limiting adoption?

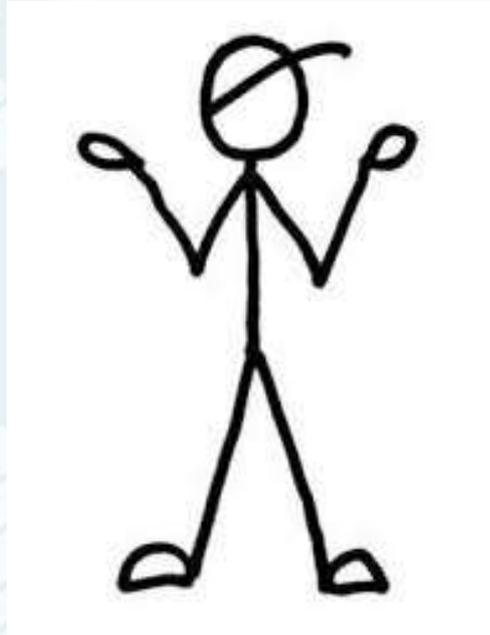
- Limited evidence base on cost-benefit of technology
- Lack of resource
 - Financial
 - Time
- Easy of use
 - Skills base on farm
 - Off-farm support network

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



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

Adaption process

Phases of the learning trajectory of new precision dairy farmers (adapted from Eastwood et al.2012)

3 - 6 months

Early learning

Basic data entry, creating simple groups, descriptive and responsive activity

6 – 12 months

Consolidation phase

Task repetition leading to knowledge consolidation, building data interpretation skills

12 months +

Advanced learning

Combining different data to give more effective decision support processes, tailored to specific needs, additive benefit to farm

Opportunity for true cost-benefit assessment

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Consolidation phase

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Lack of:

Data skills

Strategic Guidance

12 months +

Advanced learning

Combining different data to give more effective decision support processes, tailored to specific needs, additive benefit to farm

Opportunity for true cost-benefit assessment

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

NSW Department of Primary Industries

THE UNIVERSITY OF SYDNEY

Australian AMS KPI Project

Monitoring 9 commercial farms

Lyoris, Nicolas (NSW Dept of Primary Industries)
Kerisk, Kendra (FutureDairy, University of Sydney)

www.dpi.nsw.gov.au

NSW Department of Primary Industries

International AMS KPI Project - Average farm information

July 2018

The First International Automatic Milking System (AMS) KPI Project provides the International Dairy Industry community with key information of what is achievable under commercial conditions. Information about milk production, AMS utilisation and farm demographics will help understand how these farms 'behave' over a 12 month period.

A total of 10 farms are being monitored: 12 from Australia, 2 from New Zealand, 4 from Ireland and 1 from Chile.

Table 1: herd information

	ALL AMS Farms			Australian AMS Farms	New Zealand AMS Farms	Irish AMS Farms	Chilean AMS Farm
	Minimum	Average	Maximum				
Cows in herd (k)	42	142	280	160	77	90	220
Cows (k)	2%	28%	62%	22%	28%	28%	38%
Animals that calve (k)	0	9	43	10	3	1	43
Peak stocking rate (cows/ha)	0.4	2.3	4.8	2.3	0.7	3.0	2.3
Peak stocking rate (cows/ha) (winter)	18	48	73	47	31	81	99
(k/ha)	80	176	280	181	148	172	198

Table 2: Daily milk production and quality

	ALL AMS Farms			Australian AMS Farms	New Zealand AMS Farms	Irish AMS Farms	Chilean AMS Farm
	Minimum	Average	Maximum				
Daily milk production (kg/day)	17	6,200	8,427	9,807	996	2,822	2,842
Fat (%)	3.6	4.1	5.2	4.0	4.7	4.0	5.08
Protein (%)	3.2	3.4	3.9	3.2	3.8	3.4	3.88
Standard error (L/100L)	48	98	152	171	122	113	79

www.dpi.nsw.gov.au

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



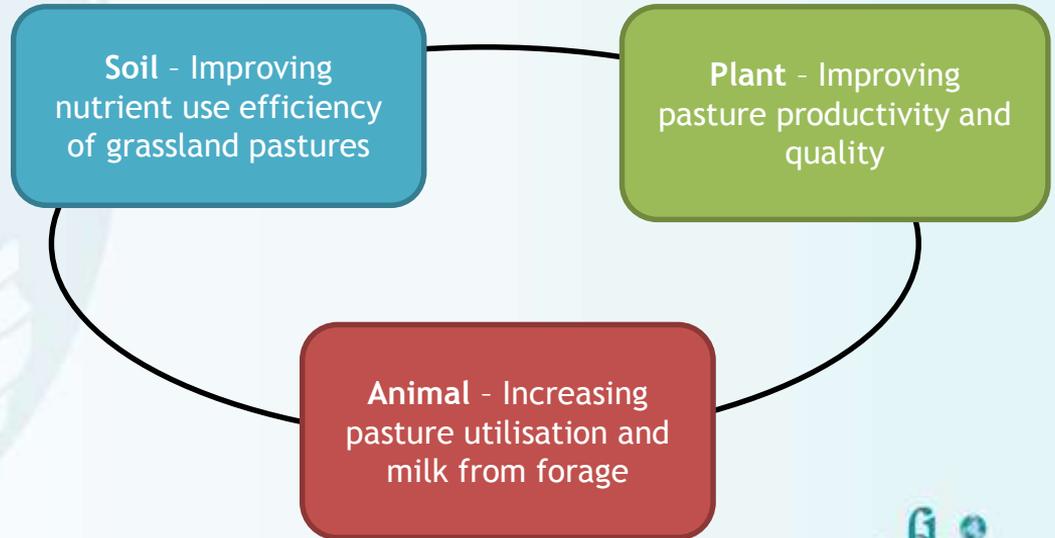
+£441/ha



+£204/ha

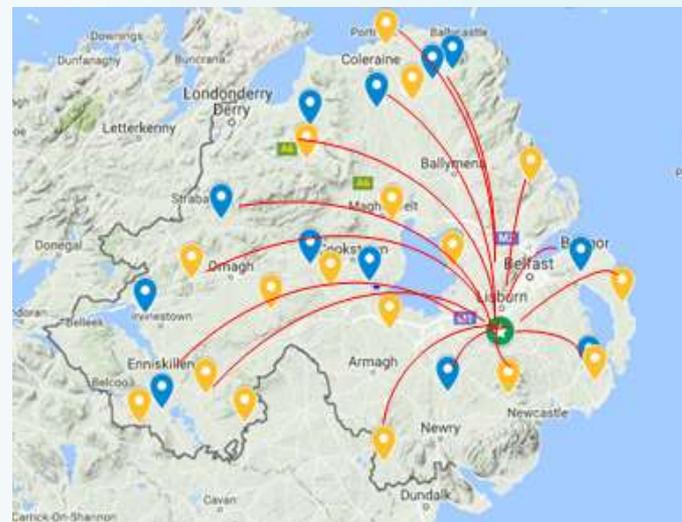
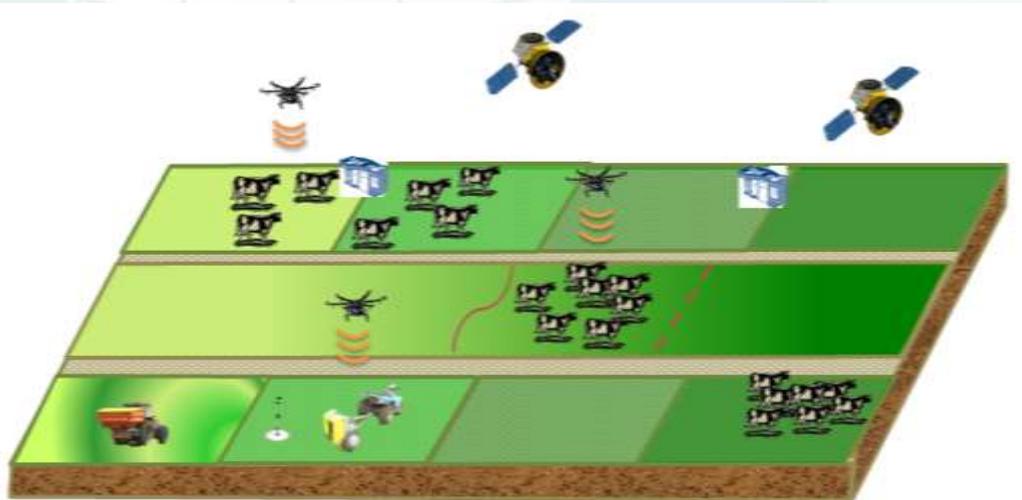
Changing our understanding of the grazing environment: AFBI Precision Grassland Platform

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



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

