

PRECISION DAIRY FARMING



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see blue.
in the College of Ag





Technological Marvels

- Tremendous technological progress in dairy farming (i.e. genetics, nutrition, reproduction, disease control, cow comfort)
- Modern dairy farms have been described as “technological marvels” (Philpot, 2003)
- The next “technological marvel” in the dairy industry may be in Precision Dairy Farming

1. Changing Dairy Landscape

- Fewer, larger dairy operations
- Narrow profit margins
- Increased feed and labor costs
- Cows are managed by fewer skilled workers



2. Consumer Focus

- Continuous quality assurance
- “Natural” or “organic” foods
- Greenhouse gas reductions
- Zoonotic disease transmission
- Reducing the use of medical treatments
- Increased emphasis on animal well-being





3. Information Era



- Unlimited on-farm data storage
- Faster computers allow for more sophisticated on-farm data mining
- Technologies adopted in larger industries have applications in smaller industries

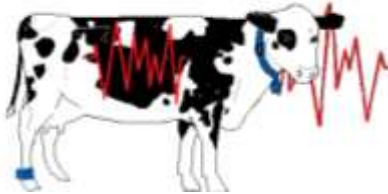


4. Cow Challenges

1. Finding cows in heat
2. Finding and treating lame cows
3. Finding and treating cows with mastitis
4. Catching sick cows in early lactation
5. Understanding nutritional status of cows
 - a. Feed intake
 - b. Body condition (fat or thin)
 - c. Rumen health (pH/rumination time)



Precision Dairy Management



The use of automated, mechanized technologies toward refinement of dairy management processes, procedures, or information collection



Automated Milking Systems



Automated Calf Feeding



Precision Feeding



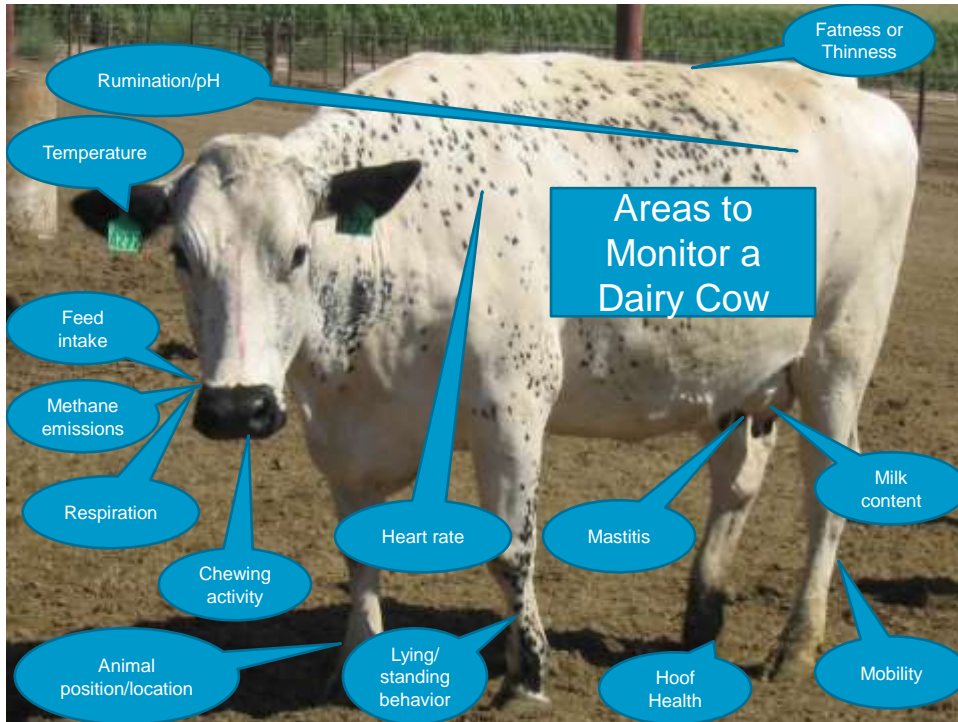
Data Management Solutions



Precision Dairy Monitoring

- Using technologies to measure physiological, behavioral, and production indicators
- Focus on preventive health and performance at the cow level
- Make more timely and informed decisions

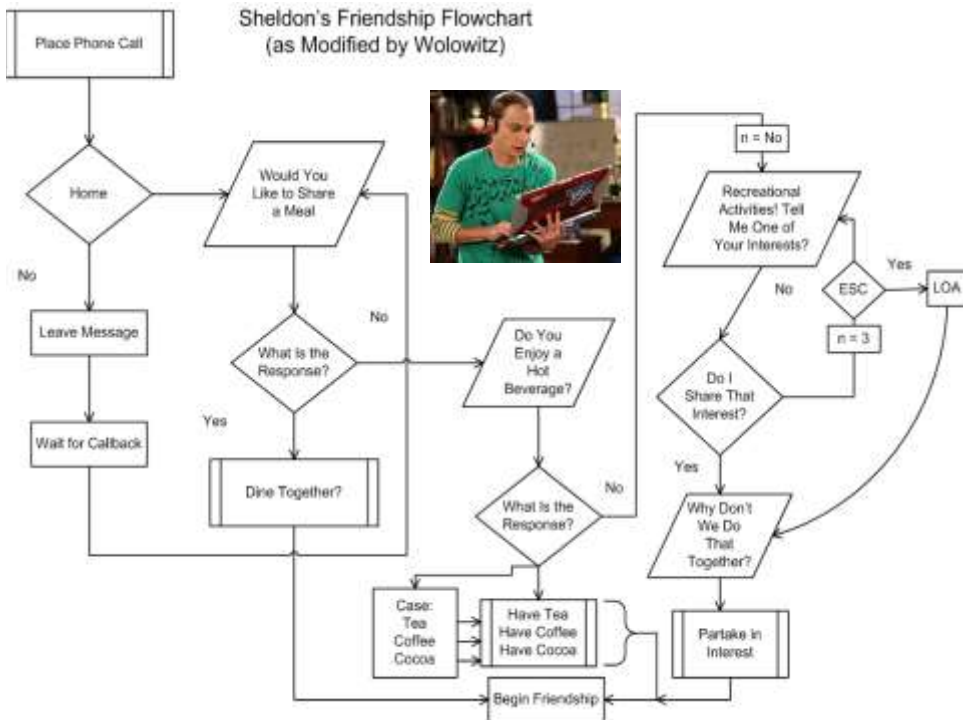
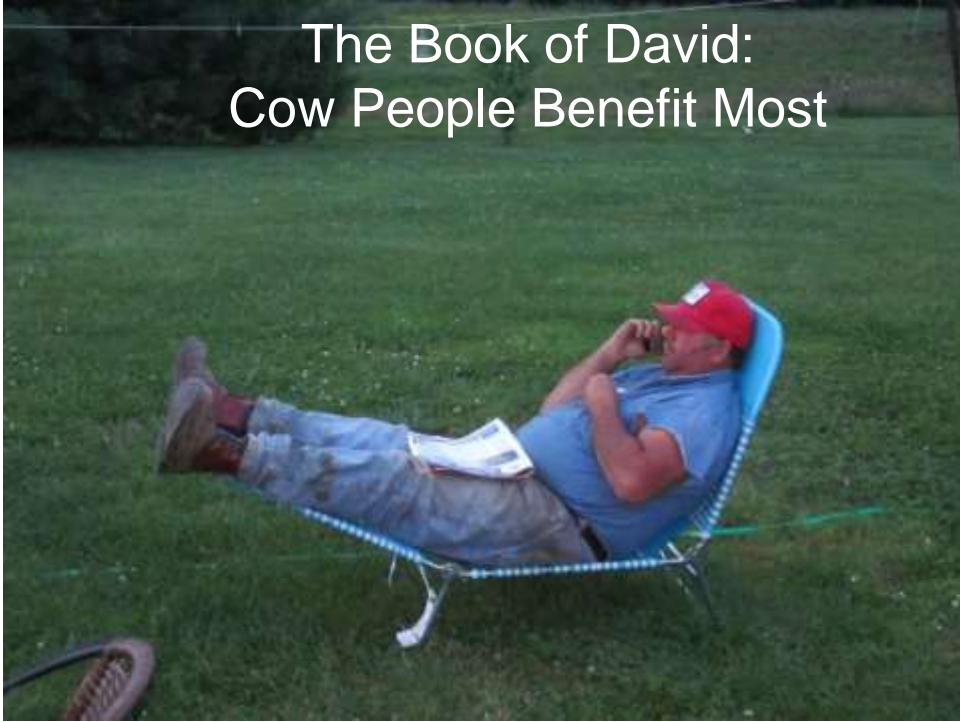


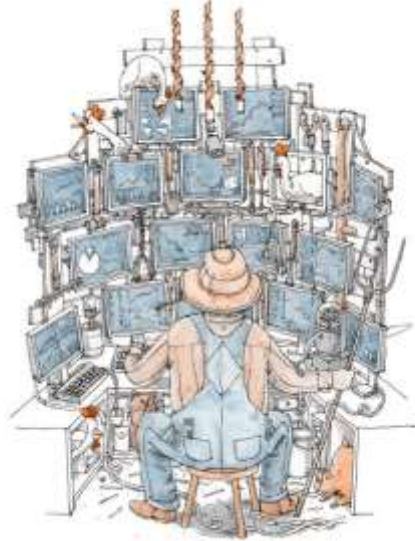


Precision Dairy Farming Benefits

- Improved animal health and well-being
- Increased efficiency
- Reduced costs
- Improved product quality
- Minimized adverse environmental impacts
- Risk analysis and risk management
- More objective (less observer bias and influence)

The Book of David: Cow People Benefit Most





Ideal Technology

- Explains an underlying biological process
- Can be translated to a meaningful action
- Cost-effective
- Flexible, robust, reliable
- Information readily available to farmer
- Commercial demonstrations
- Continuous improvement and feedback loops



Data Handling



- Industry needs to establish guidelines for farmers to follow
- What questions should they be asking?
- What to do with information provided?



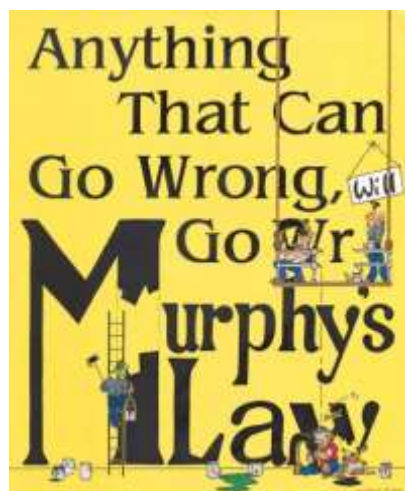
Precision Dairy Adoption Considerations

PDF Reality Check

- Maybe not be #1 priority for commercial dairy producers (yet)
- Many technologies are in infancy stage
- Not all technologies are good investments
- Economics must be examined
- People factors must be considered



Murphy's Law





Economic Considerations



- Need to do investment analysis
- Not one size fits all
- Economic benefits observed quickest for heat detection/reproduction
- If you don't do anything with the information, it was useless
- Systems that measure multiple parameters make most sense
- Systems with low fixed costs work best for small farms



Technology Pitfalls



- “Plug and play,” “Plug and pray,” or “Plug and pay”
- Technologies go to market too quickly
- Not fully-developed
- Software not user-friendly
- Developed independently without consideration of integration with other technologies and farmer work patterns






Technology Pitfalls

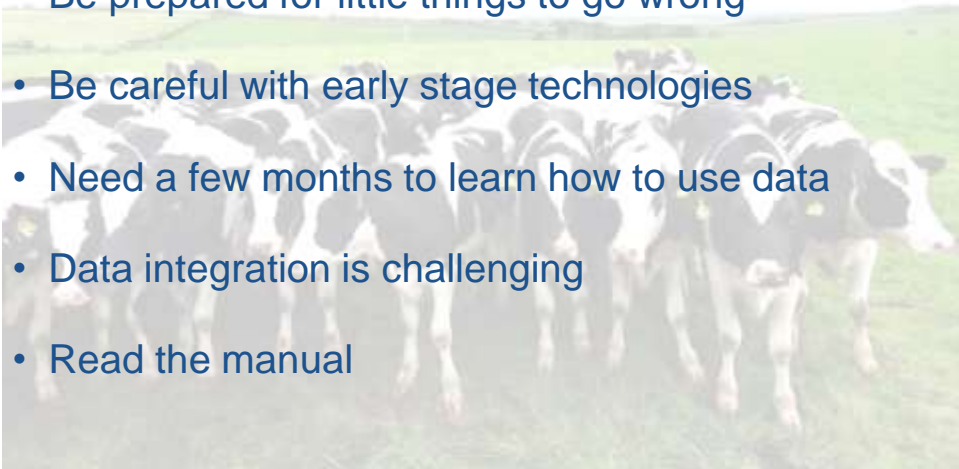


- Too many single measurement systems
- Lack of large-scale commercial field trials and demonstrations
- Technology marketed without adequate interpretation of biological significance of data
- Information provided with no clear action plan



Lessons Learned

- Be prepared for little things to go wrong
- Be careful with early stage technologies
- Need a few months to learn how to use data
- Data integration is challenging
- Read the manual





Sociological Factors




- Labor savings and potential quality of life improvements affect investment decisions (Cantin, 2008)
- Insufficient market research
- Farmers overwhelmed by too many options (Banhazi and Black, 2009)
 - Which technology should I adopt?
 - End up adopting those that are interesting or where they have an expertise
 - Not necessarily the most profitable ones

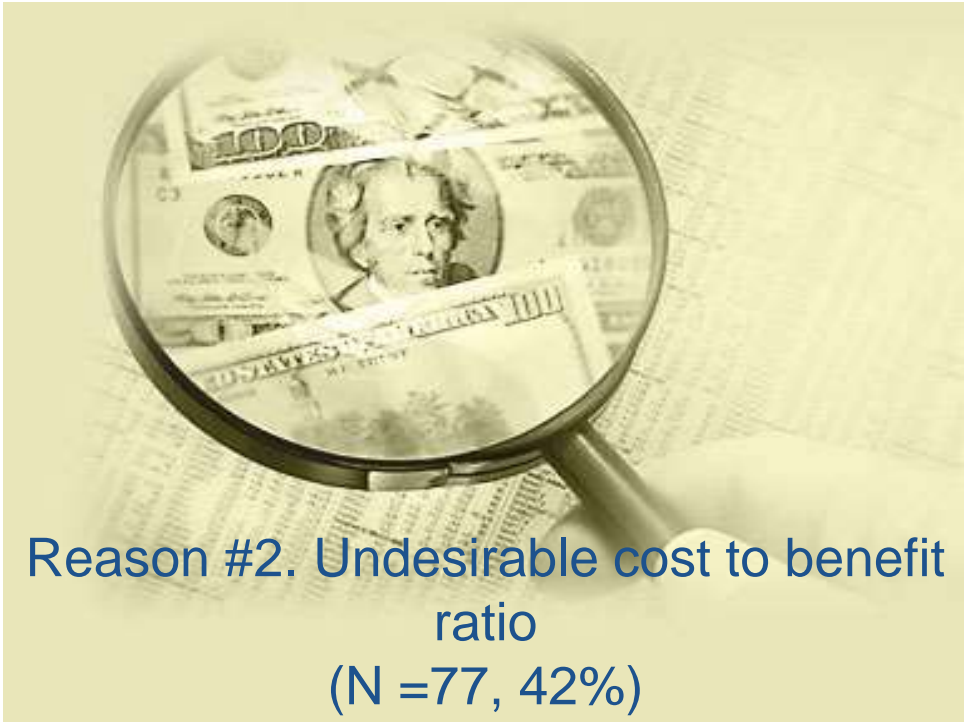


Why Have
Adoption Rates
Been Slow?

Rebecca Russell

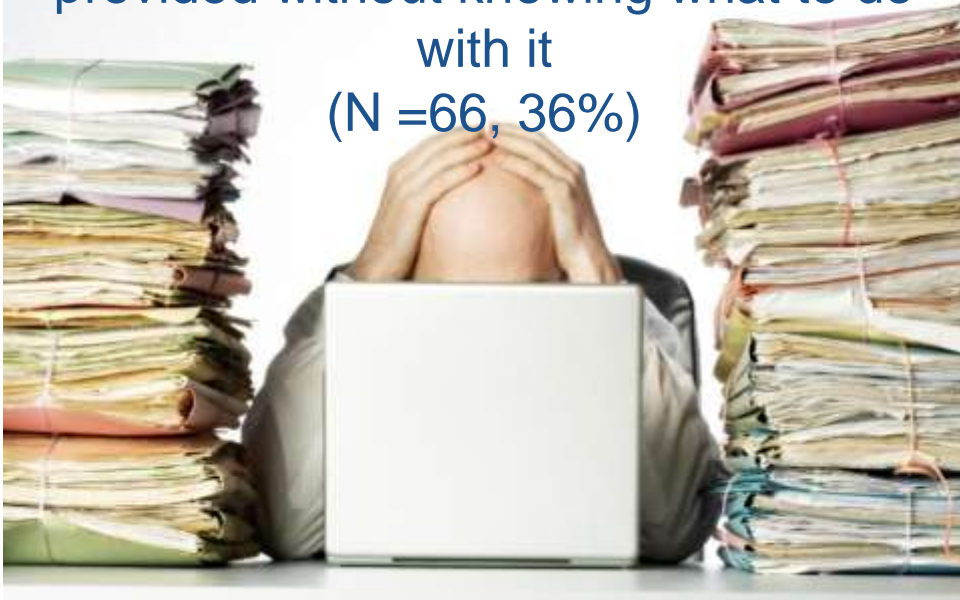
A billboard sign on a tall black pole against a clear blue sky. The sign is white with a rounded top and contains text in blue font.

Reason #1. Not familiar with
technologies that are available
(N =101, 55%)

A magnifying glass with a wooden handle is held over a stack of US dollar bills. The lens is focused on a portrait of a man on a bill, likely a \$5 bill. The background is a light yellowish-green color.

Reason #2. Undesirable cost to benefit
ratio
(N =77, 42%)

Reason #3. Too much information
provided without knowing what to do
with it
(N =66, 36%)



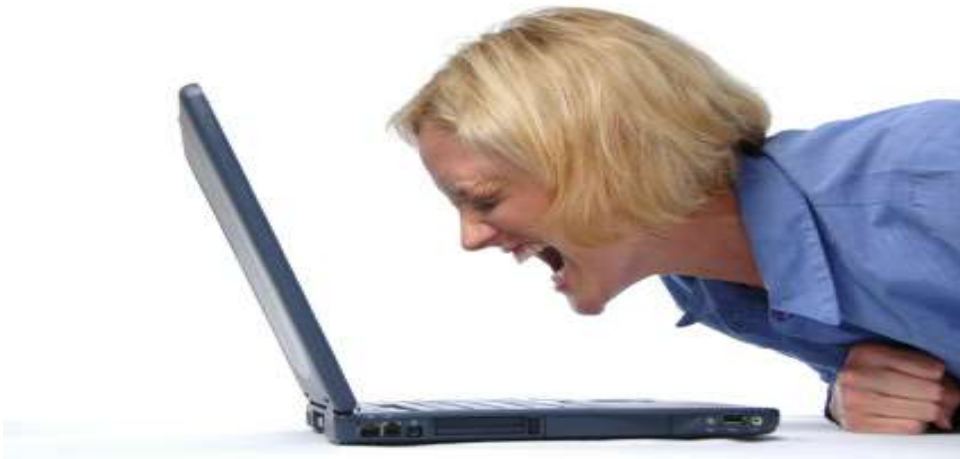
Reason #4. Not enough time to
spend on technology
(N =56, 30%)



Reason #5. Lack of perceived
economic value
(N =55, 30%)



Reason #6. Too Difficult or Complex
to Use
(N =53, 29%)



Reason #7. Poor technical
support/training
(N =52, 28%)



Reason #8. Better
alternatives/easier to accomplish
manually
(N =43, 23%)



Reason #9. Failure in fitting with
farmer patterns of work
(N =40, 22%)



Reason #10. Fear of
technology/computer illiteracy
(N =39, 21%)



Reason #11. Not reliable or flexible
enough
(N =33, 18%)



Reason #99. Wrong College
Degree
(N =289, 100%)





Customer Service is Key



- More important than the gadget
- Computer literacy
- Not engineers
- Time limits
- Failure of hardware and software



"Can I return these?...They're nice and all, but they just scare the snot out of me."



Cautious Optimism



- Critics say it is too technical or challenging
- We are just beginning
- Precision Dairy won't change cows or people
- Will change how they work together
- Improve farmer and cow well-being



Path to Success

- Continue this rapid innovation
- Maintain realistic expectations
- Respond to farmer questions and feedback
- Never lose sight of the cow
- Educate, communicate, and collaborate



Future Vision

- New era in dairy management
- Exciting technologies
- Improved quality of life
- New ways of monitoring and improving animal health, well-being, and reproduction
- Analytics as competitive advantage
- Economics and human factors are key



Questions?



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