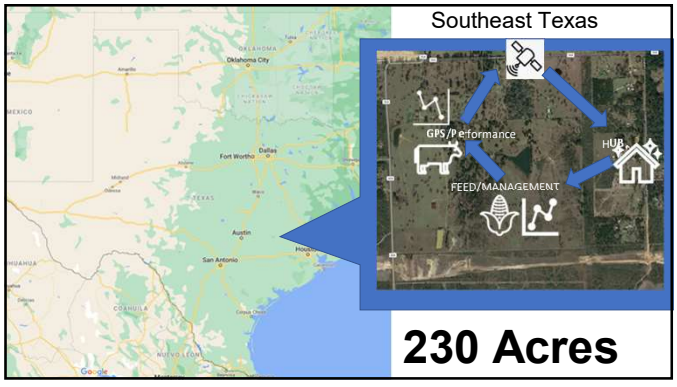
1

Grazing Systems Lack Infrastructure

2



3

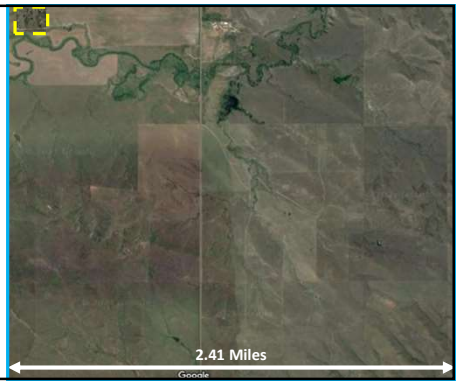
230 Acres

4

South Dakota

Average Pasture Size

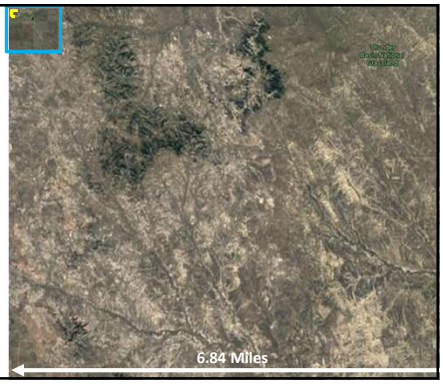
3,731 Acres



5

Wyoming

30,000 Acres



6

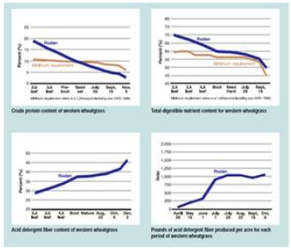
Challenges: Heterogenous Landscapes

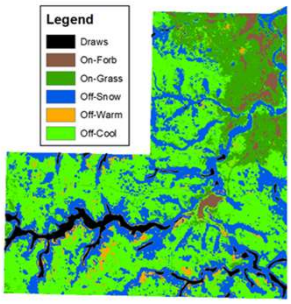
1) Topography

7

Challenges

- Diversity in forage resources and minerals

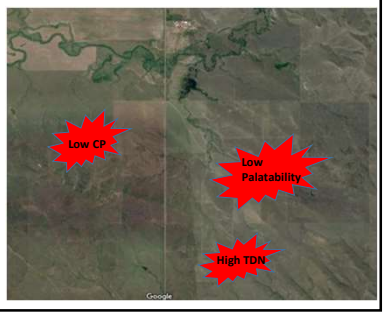




8

Challenges

- Conditions are **dynamic**
- Much less control over feed
- Animals are exposed



9

MANAGEMENT INTERVENTIONS TO ACHIEVE RANCH GOALS

10

Proceedings, The Range Beef Cow Symposium XVIII
December 9, 10, and 11, 2003, Mitchell, Nebraska

THE TWO BEST AND WORST DECISIONS I HAVE MADE IN MY OPERATION

Barry H. Dunn
South Dakota State University
Brookings, SD

INTRODUCTION

Since hindsight is always 20:20, important decisions made over a long career in the ranching business have gained a clarity that was surely missing while in the midst of making them. Or have they? With the destinations of the chosen paths clear, but the destinations of those paths not taken only a distant memory of what might have been, rationalization becomes a powerful force in evaluation. While ranch managers search for the perfect lenses to gain strategic advantages for the future, the lenses used to view the past are often clouded with blame, self-doubt, and perhaps, jealousy. And many times, the glass we try to view the past with is not a lens at all, but a dirty mirror. "I made the best decision I could have with the information I had at the time," has long been the rallying call of those who deny themselves the opportunity to learn, or in their heart of hearts, wish for a second chance. The rare opportunity to manage the precious natural resources, grazing livestock, invested capitol, and human resources that make up a beef cattle ranching operation demands better. An honest appraisal of the past is a difficult challenge. And yet, the ability to conduct such an appraisal of the past is clearly a high leverage point for future success.

11

Implementing many management interventions simultaneously

Choosing one high leverage solution

12

13

" Does the management intervention maintain or improve meat quality and beef productivity

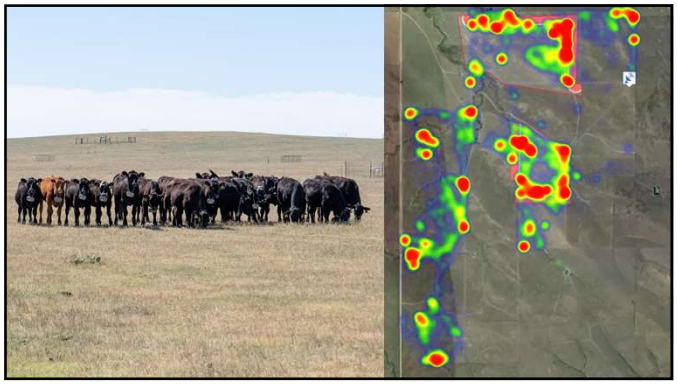
-Dr. Amanda Blair

14

Virtual Fencing Systems

- Allows users to 'draw' fence boundaries
- Animals receive sound/shock stimulus

15



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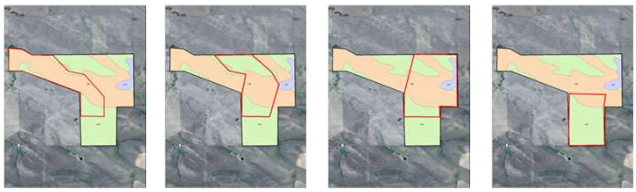
Rotational Grazing



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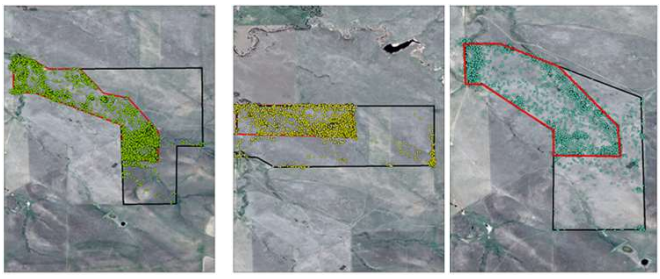
Virtual Fencing: Effectiveness

(Ehlert et al., 2024)



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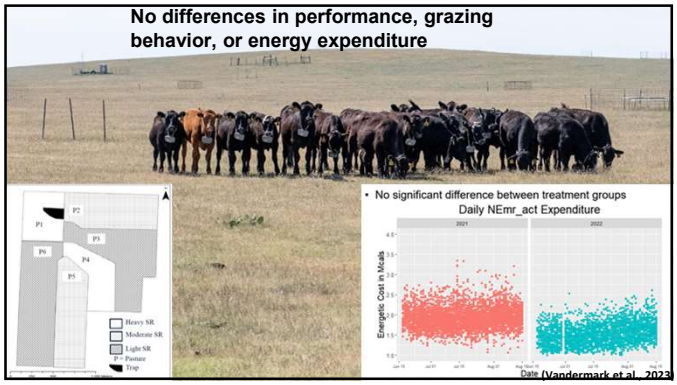

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Huge Management Potential

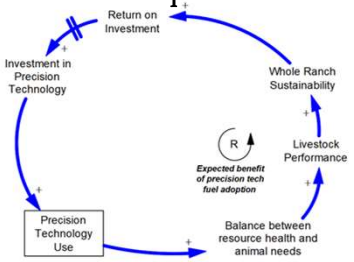
1. Real-time animal tracking
2. Protection of environmentally sensitive areas
3. Targeted grazing

20

Wow, that's "*really neat*" what does it mean for my ranch and consumers?

21

Expected benefit of precision tech fuel adoption



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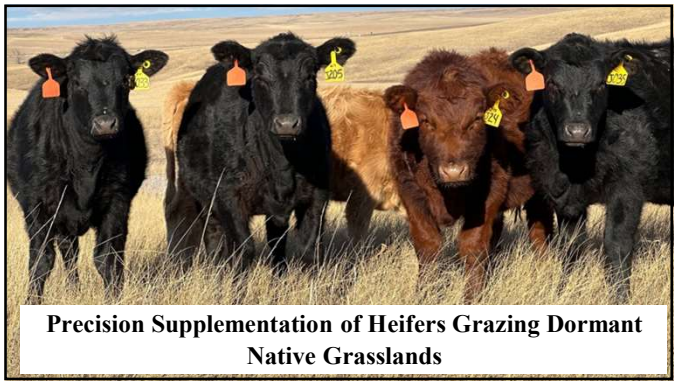
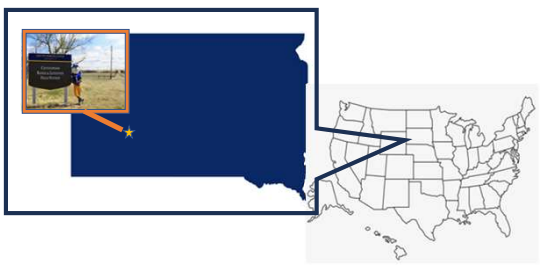


Precision Supplementation of Heifers Grazing Dormant Native Grasslands

23

Study Area – SDSU Cottonwood Field Station SD



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Heifer development programs are an expensive management decision for cow-calf producers

Low-Input Forage-Based Systems

- More cost effective to develop heifers on pasture than on corn residue or in a dry lot.
- $45/hd savings (Mathis, 2008; Funston, 2011)
- Net income $45 greater for backgrounding (Mathis, 2008)
- Pasture vs Corn residue
- $36/hd savings (Summers, 2014)

WINTER SEASON: Lack of nutrients in the forage
→ limit heifer growth rate and development

Protein or energy **supplement**

Goal: Reach 60-65% Mature Body Weight

25

Individual Supplementation

Control

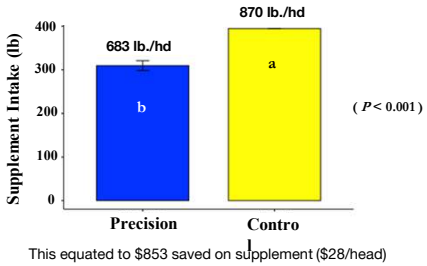
Precision

- 60 Black Angus heifers (Initial body weight = 523 lb.)
- Water source equipped with SmartScales™

- Dormant native range
- POET Dakota Gold DDGS Pellets
  - Offered **5 lb./hd/d**

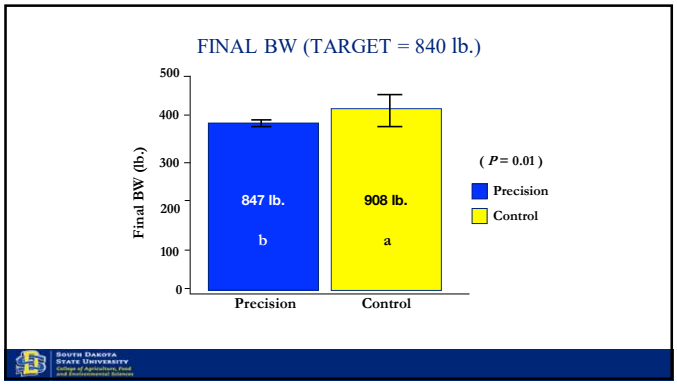
26

TOTAL INDIVIDUAL INTAKE



This equated to $853 saved on supplement ($28/head)

27


FINAL BW (TARGET = 840 lb.)
Final BW (lb.)
500
400
300
200
100
0
847 lb.
b
908 lb.
a
Precision
Control
(P = 0.01)
Precision
Control
South Dakota State University

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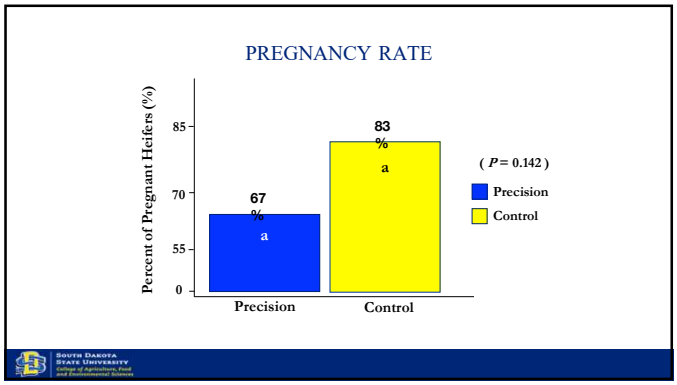
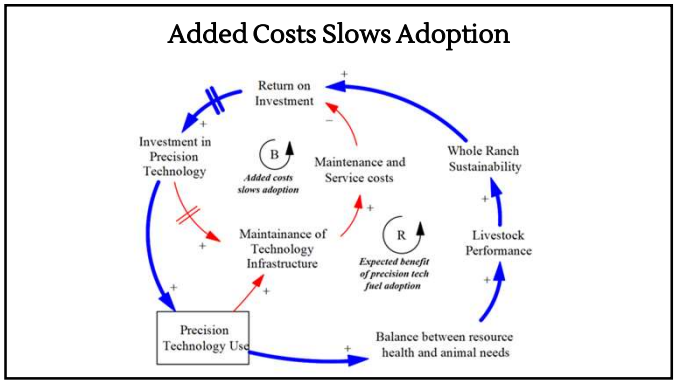

PREGNANCY RATE
Percent of Pregnant Heifers (%)
85
70
55
0
67 % a
83 % a
Precision
Control
(P = 0.142)
Precision
Control
South Dakota State University

29


Added Costs Slows Adoption
Return on Investment
Investment in Precision Technology
B
Added costs slows adoption
Maintenance and Service costs
Whole Ranch Sustainability
Maintainance of Technology Infrastructure
R
Expected benefit of precision tech fuel adoption
Livestock Performance
Precision Technology Use
Balance between resource health and animal needs

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Grazing Management Applications

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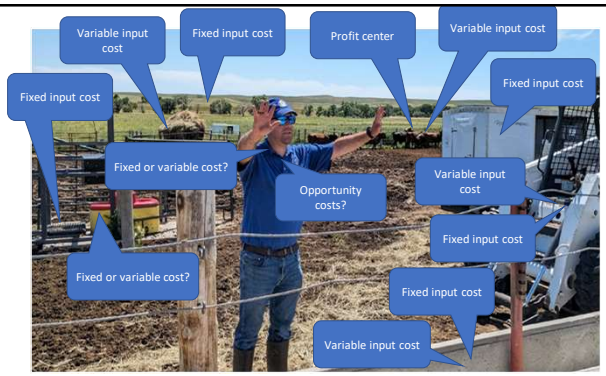
Investments in Precision Rangeland Grazing

32



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Investments in Precision Rangeland Grazing

34

Investments in Precision Rangeland Grazing

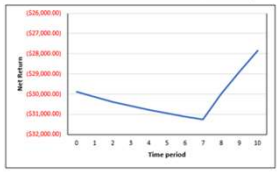
Case study: financial evaluation of precision investment using heifer pilot study data

35

Management Input	
Number of head/year	30
Super SmartFeed Producer	$29,900
Salvage value	$5,000
Super SmartFeed liquidation value at year 10	$0
Service hours needed per year	8
Total feeding days (per lot) on management/labor (conventional)	175
Total feeding days (per lot) on management/labor (precision)	8
Distance to feeder (miles roundtrip)	1.5
Management value ($ per year)	$60,000
Labor cost ($ hour)	$15
Set-up time per trip (min)	75
Allocation to Management or Variable Labor? (0=labor, 1=mgmt)	0
Assume management opportunity cost reduction yields profit activity	0
Tax rate	17.6%

# of SmartFeeders	1
Total investment	$29,900

NPV	($27,861.05)
IRR	($0.15)
ROI	($0.93)
BCR	$0.07
Payback period (yrs)	146.6



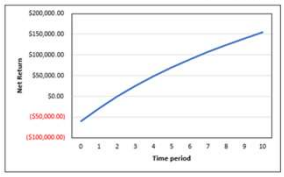
Payback Period = 147 Years

36

Management input	
Number of head/year	240
Super SmartFeed Producer	$29,900
Salvage value	$5,000
Super SmartFeed liquidation value at year 10	$0
Service hours needed per year	8
Total feeding days (per lot) on management/labor (conventional)	175
Total feeding days (per lot) on management/labor (precision)	8
Distance to feeder (miles roundtrip)	1.5
Management value ($ per year)	$60,000
Labor cost ($ hour)	$15
Set-up time per trip (min)	75
Allocation to Management or Variable Labor? (0=labor, 1=mgmt)	0
Assume management opportunity cost reduction yields profit activity	0
Tax rate	17.6%

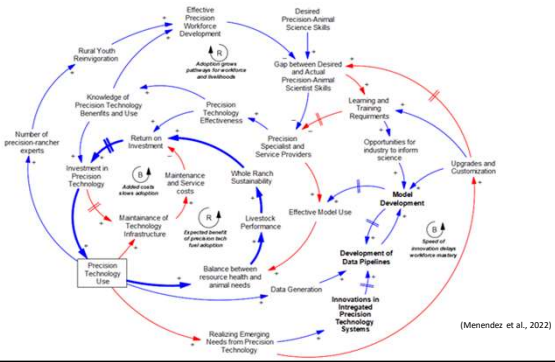
# of SmartFeeders	2
Total investment	$59,800

NPV	$154,168.76
IRR	$0.57
ROI	$2.58
BCR	$3.58
Payback period (yrs)	2.8



Payback Period = 2.8 Years

37



(Menendez et al., 2022)

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Five Steps for Considering Precision Livestock Technology Adoption

(Adapted from Menendez et al., 2022)

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Thank you!
Contact: hector.menendez@sdstate.edu
USDA-AFRI IDEAS Award# 2022-69014-36670

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