Critical Control Points of Livestock & Forage Production

Shelby Filley
OSU Extension Service
Critical Control Points

1. Ranch Economics
2. Forage Management
3. General Nutrition
4. General Health
5. Beef Cattle Management
6. Sheep Management
7. Marketing
Profile of a Profitable Producer

Dr. Harlan Hughes
North Dakota State University

- Reported profitability by certain management practices
- High-profit producers followed practices at a high rate
- Low-profit producers followed practices at a low rate
Self Assessment ✤ Keep Score

Grade yourself on attention you give each Critical Control Point

- 0 = no attention
- 1 = minimal attention
- 2 = moderate attention
- 3 = lots of attention

Consider giving more attention to low scoring areas
CCP #1 - Ranch Economics

a. Unit Cost of Production - One of the most important critical control points to manage

Production costs

Yield

b. Enterprise Budget Sheets
c. Benchmarks
Our work is to determine what impacts…

- Production costs
- Yield
OSU Enterprise Budget Sheets

http://oregonstate.edu/dept/EconInfo/ent_budget

Welcome to the Oregon State University Extension Service Agricultural Information Network Enterprise Budget website! Click on the map to open the Enterprise Budget for a region. To narrow your search, use the search form below. For more information, contact: bart.eleveld@oregonstate.edu

Enhanced Search

EM Number: [ ]
Pub. Date within: [ ]

Search  Reset
Benchmarks – compared to others or potential, what is your...

- Cost of production
- Yield and growth data
  - Breed/variety averages
  - Industry Standards (SPA)
- Market Price
CCP #1 – Ranch Economics

d. Risk Management
  ✷ Livestock Insurance
  ✷ Forward Contracting
  ✷ Chicago Mercantile Exchange
  ✷ other
CCP #1 - Ranch Economics
Score yourself (0, 1, 2, or 3)

a. Unit cost of production
b. Enterprise budget sheets
c. Benchmarks
d. Risk Management
   • Insurance
   • Contracts
CCP #2 - Forage Production (hay and pasture)

a. Yield Estimates (current and potential yield for cost-benefit analysis)

b. Soil testing and prescription fertilizing

c. Select proper forage for the site

d. Proper field preparation (weed control, fertility, planting requirements)
CCP #2 - Forage Production (hay and pasture)

a. Yield Estimates (current and potential yield for cost-benefit analysis)

b. Soil testing and prescription fertilizing

c. Select proper forage for the site

d. Proper field preparation (weed control, fertility, planting requirements)
Soils
Maps

166E-Nonpareil loam
12 – 30 % slopes
Moderate permeability

170C-Oakland silt loam
3 – 12 % slopes
Moderately slow permeability

http://websoilsurvey.nrcs.usda.gov
Hay Yield = No. bales × bale wt. / ac

= 800 bales × 60 lb/bale / 10 acres

= 4,800 lbs/ ac

= 2.4 t/a
## Animal Unit (AU)

<table>
<thead>
<tr>
<th>Description</th>
<th>AU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 lb cow</td>
<td>1.0</td>
</tr>
<tr>
<td>500 lb feeder steer</td>
<td>0.6</td>
</tr>
<tr>
<td>5 - 7 sheep</td>
<td>1.0</td>
</tr>
<tr>
<td>1,000 lb horse</td>
<td>1.5</td>
</tr>
</tbody>
</table>
CCP #2 - Forage Production
(hay and pasture)

a. Yield Estimates (current and potential yield for cost-benefit analysis)

b. Soil testing and prescription fertilizing

c. Select proper forage for the site

d. Proper field preparation (weed control, fertility, planting requirements)
Cost Benefit Analysis

10 acre field

- $35 soil test
- $100/T lime
- Guess 2 T/acre
- Soil test indicates 1 T/acre needed
- Difference is 1 T/acre X 10 acre X $100/T = $1000 savings in materials

If add too little, future production will suffer...
## Acidifying Potential for Fertilizers

<table>
<thead>
<tr>
<th>Fertilizer</th>
<th>Grade</th>
<th>*Acidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium Sulfate</td>
<td>21-0-0-24</td>
<td>110</td>
</tr>
<tr>
<td>Urea</td>
<td>46-0-0</td>
<td>71</td>
</tr>
<tr>
<td>Ammonium Nitrate</td>
<td>34-0-0</td>
<td>62</td>
</tr>
</tbody>
</table>

*Pounds of 100 score lime needed to neutralize the acidity produced by fertilizer application of 100 lb/ac
CCP #2 Forage

c) Forage Selection
- Drainage
- Irrigation
- Animal type

d) Field Prep
- Weed Control
- Soil test and incorporate fertilizer and lime
- Well-prepared seed bed
- Seeding rate, depth, etc.
CCP #2 - Forage Production
Score yourself (0, 1, 2, or 3)

a. Yield estimates
b. Soil test for fertilizer
c. Forage Selection
d. Field prep
CCP #2 Forage Production (continued)

e. Harvest management
   • forage quality
   • stand longevity

f. Weed ID and Control
   • Positive ID
   • Herbicide selection and cost analysis
Weed Control schemes

- Cost of Weed Control
- Cost of no Weed Control
Cost of Weeds

- Weed-free field
  - 4 T/ac yield x $100/T
  - $400/ac

- 10% weeds in field
  - 3.6 T/ac x $90/T
  - $324/ac

- $76/ac for weed control
Herbicide cost comparison

- List herbicides for your specific weeds
- Determine cost of treatment (and re-treatment) per acre
- Choose most cost effective materials
LIKE MAURY SAID, A FIELD WITHOUT WEEDS MAKES YOU BIGGER FASTER.

WHATEVER HAPPENED TO MAURY?

CIMARRON™ MAX IS HERE.
CCP #2 - Forage Production

Score yourself (0, 1, 2, or 3)

e. Harvest Management

f. Weed ID & Control
CCP #3

- General Nutrition - Improve forage utilization, animal performance, and cost savings by
  a. Testing hay
  b. Balancing livestock rations
  c. Mineral Assessment
  d. Purchase supplements based on cost per pound of nutrient needed
  e. Creep feeding cost-benefit analysis
Hay Probe
Core 15–20 sub-samples
The Nutrition Puzzle

COMPONENTS OF FEED

WATER

ASH OR MINERALS

PROTEIN

FAT

DRY MATTER

SUGARS & STARCHES

FIBER

ANIMAL REQUIREMENTS

MAINTENANCE

GROWTH

PREGNANCY & REPRODUCTION

PRODUCTION
Testing Hay/Feeding Appropriately

- Savings average $18/head
- One producer reduced feeding cost by $38/cow by substituting a low-quality forage (grass seed straw) for 25% of his feed
- Another sold 90 tons of high quality hay determined to be in excess of his needs
- A third reduced the cost per pound gain on weaned calves by adding barley to a forage-based program
- A forth purchased Orchard grass straw, sold alfalfa, and profited $4,000
d. Mineral Assessment

- Mixes differ in salt and other mineral content
- Inspect the label
- Does the mix you are using match the animals you are feeding? Sheep vs. other livestock
- Does the mix contain minerals your animals need?
- Are animals consuming to needs?
e. Cost per lb of nutrient
   • Protein content (%CP)
   • 2000 lb x %CP = Lb CP
   • $/lb CP

f. Cost-Benefit of creep feeding
   • Feed conversions 6:1 to 10:1
CCP #3 – General Nutrition
Score yourself (0, 1, 2, or 3)

a. Test Hay

b. Balance Rations

c. Mineral Assessment

d. Price supplements on cost per pound of nutrient

e. Creep feeding cost-benefit analysis
CCP #4
Score (0, 1, 2, or 3)

a. General Health
- Work with veterinarian
- Routine and Emergency Plans
- Cost analysis of options
- Internal and external parasites
- Bacterial and viral diseases
- Bio-security

b. Farm Safety
CCP #5 - Beef Cattle Production

I. Reproduction
   a. Well-defined breeding/calving season
   b. Calving Interval 365 d
   c. Pregnancy Testing
   d. Heifer Development
   e. Body Condition Score (energy reserves)
Beef Cow Efficiency

- Number of calves per cow/year
- Calving interval

Holcomb Brothers Ranch
Cow Reproduction Timeline

CD 1
0
OPEN

CD 2
365 DAYS
82
PREGNANT (283 d GESTATION)
STEER CALF WEANING WEIGHTS (WYOMING STUDY)

Period in calving season

- 1st 21 days: 451
- 2nd 21 days: 408
- 3rd 21 days: 377
- 4th 21 days: 350
EFFICIENCY

RELATIONSHIP OF BCS TO BEEF COW PERFORMANCE AND INCOME

<table>
<thead>
<tr>
<th>BCS</th>
<th>Pregnancy rate (%)</th>
<th>Calving interval (days)</th>
<th>Calf ADG (lb)</th>
<th>Calf WW (lb)</th>
<th>Calf price ($/100/lb)</th>
<th>$/cow exposed</th>
<th>Income per calf x pregnancy rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>43</td>
<td>414</td>
<td>1.60</td>
<td>374</td>
<td>96</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>61</td>
<td>381</td>
<td>1.75</td>
<td>460</td>
<td>86</td>
<td>241</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>86</td>
<td>364</td>
<td>1.85</td>
<td>514</td>
<td>81</td>
<td>358</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>93</td>
<td>364</td>
<td>1.85</td>
<td>514</td>
<td>81</td>
<td>387</td>
<td></td>
</tr>
</tbody>
</table>

1Income per calf x pregnancy rate.
Early Weaning?

<table>
<thead>
<tr>
<th>NEVADA STUDY</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Early Weaning (EW)</th>
<th>Late Weaning (LW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weaning date</td>
<td>150 d</td>
<td>205+ d</td>
</tr>
<tr>
<td>% at BCS 4+ or 5 at LW date (Sept 2)</td>
<td>77%</td>
<td>29%</td>
</tr>
<tr>
<td>Oct 2</td>
<td>77%</td>
<td>29%</td>
</tr>
<tr>
<td>Nov 23</td>
<td>77%</td>
<td>29%</td>
</tr>
<tr>
<td>Calves 205 d adjusted WW</td>
<td>401 lbs</td>
<td>421 lbs</td>
</tr>
<tr>
<td>20 lbs at $1.00/lb</td>
<td>$20</td>
<td>-</td>
</tr>
<tr>
<td>Additional calf feed costs</td>
<td>$15/hd</td>
<td>-</td>
</tr>
<tr>
<td>Feed cost to increase BCS of LW heifers</td>
<td>-</td>
<td>$100</td>
</tr>
<tr>
<td>Advantage</td>
<td>$65</td>
<td></td>
</tr>
</tbody>
</table>
CCP #5 - Beef Cattle Production

I. Reproduction
   a. Well-defined breeding/calving season
   b. Calving Interval 365 d
   c. Pregnancy Testing
   d. Heifer Development
   e. Body Condition Score (energy reserves)
CCP #5 - Beef Cattle Production

II. Genetics – EPD
   a. Assess what you have
   b. Sire selection based on what you need
   c. Bull management
   d. Breeding Soundness Exam (BSE)
CCP #5 - Beef Cattle Production

III. Management
   a. Low stress livestock handling
   b. Good working facilities
   c. Managed weaning
   d. Pre-conditioning
   e. Planned culling priorities

Nutrition
CCP #6

Sheep Production

a. Reproduction
b. Genetics
c. Management
Two factors which have the greatest impact on the bottom line in sheep production:

- Number of lambs born
- Number of lambs weaned

J. Thompson, OSU Sheep Specialist
Number of lambs born

- Prolificacy
  - Genetics
  - Ewe age

- Embryo survival
  - Nutrition
  - Disease

- Ovulation rates
  - Breeding season
  - Nutrition
Breeding Season & Fertility
Rambouillet ewes in No. Idaho; Hulet et al. 1974

<table>
<thead>
<tr>
<th></th>
<th>Ewes in estrus (%)</th>
<th>Ewes ovulating (%)</th>
<th>Ovulation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>100</td>
<td>100</td>
<td>1.89</td>
</tr>
<tr>
<td>Feb</td>
<td>100</td>
<td>100</td>
<td>1.57</td>
</tr>
<tr>
<td>Mar</td>
<td>89</td>
<td>94</td>
<td>1.37</td>
</tr>
<tr>
<td>April</td>
<td>26</td>
<td>32</td>
<td>1.00</td>
</tr>
<tr>
<td>May</td>
<td>02</td>
<td>02</td>
<td>1.00</td>
</tr>
<tr>
<td>June</td>
<td>07</td>
<td>07</td>
<td>1.00</td>
</tr>
<tr>
<td>July</td>
<td>06</td>
<td>06</td>
<td>1.00</td>
</tr>
<tr>
<td>Aug</td>
<td>12</td>
<td>41</td>
<td>1.75</td>
</tr>
<tr>
<td>Sept</td>
<td>88</td>
<td>100</td>
<td>1.72</td>
</tr>
<tr>
<td>Oct</td>
<td>100</td>
<td>94</td>
<td>1.8</td>
</tr>
<tr>
<td>Nov</td>
<td>100</td>
<td>100</td>
<td>1.86</td>
</tr>
<tr>
<td>Dec</td>
<td>100</td>
<td>100</td>
<td>1.88</td>
</tr>
</tbody>
</table>
Ewe age and reproductive efficiency

Sidwell et al. 1962
Oregon State University research

- Ewe body condition score at lambing has an effect on total pounds of lamb weaned per ewe.

- Ewes with a body condition score of 3 to 4 at lambing lost fewer offspring and weaned more pounds of lamb than those with a condition score of 2.5 or less.
Condition 3 (Average) Spinous processes are smooth and rounded and one can feel individual processes only with pressure. Transverse processes are smooth and well covered, and firm pressure is needed to feel over the ends. Loin eye muscle is full with some fat cover.
### Suggested Condition Scores

<table>
<thead>
<tr>
<th>Production Cycle</th>
<th>Optimum Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breeding</td>
<td>3 - 4</td>
</tr>
<tr>
<td>Early - Mid Gestation</td>
<td>2.5 - 4</td>
</tr>
<tr>
<td>Lambing</td>
<td></td>
</tr>
<tr>
<td>singles</td>
<td>3.0 - 3.5</td>
</tr>
<tr>
<td>twins</td>
<td>3.5 - 4</td>
</tr>
<tr>
<td>Weaning</td>
<td>2 or higher</td>
</tr>
</tbody>
</table>
Nutritional Efficiency

- Affected by percentage of lamb crop raised
- Ewes need to be maintained regardless of number/weight of lambs marketed
- Spread the “overhead” or maintenance cost of the ewe over more and heavier lambs
Nutritional Efficiency

(Labeled figure showing pounds of feed per pound of lamb at 80 lbs. and 120 lbs. slaughter weight, comparing single lamb to twin lambs. Adapted from Hogue - 1986.)
CCP #6 - Sheep Production

Evaluation of Flock Production

- % of ewes exposed that lamb (96 – 100%?)
- % of ewes that settle on 1st cycle (100% ?)
- % of lamb crop born of ewes exposed (?)
- % of lamb crop born of ewes lambing
- % of lamb mortality from birth to weaning
- Average weaning weight

Clues to management needs
CCP #6 – Sheep Production
More information…

- Evaluation of Flock Production
- ASIA Sheep Production Handbook

- Sheep Management Calendar
- OSU Sheep Management Guide
CCP #6 – Sheep Production

- Body Condition Score
  - Adjust if necessary, flushing guide,
- Rams
  - Breeding Soundness, marking harness,
- Ewe records
  - lambing rate, lambs raised,
- Lamb records
  - Numbers, weaning weights,
  - Carcass & growth characteristics
CCP #7 - General Marketing

a. Choose a market

b. Produce a product to match it

Score (0, 1, 2, or 3)
# Pricing Grid for Fed Cattle

<table>
<thead>
<tr>
<th>Quality Grade</th>
<th>Yield Grade</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime</td>
<td>11.00</td>
<td>9.00</td>
<td>6.00</td>
<td>-14.00</td>
<td>-19.00</td>
<td></td>
</tr>
<tr>
<td>Choice</td>
<td>5.00</td>
<td>3.00</td>
<td>Base</td>
<td>-20.00</td>
<td>-25.00</td>
<td></td>
</tr>
<tr>
<td>Select</td>
<td>-1.00</td>
<td>-3.00</td>
<td>-6.00</td>
<td>-26.00</td>
<td>-31.00</td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>-11.00</td>
<td>-13.00</td>
<td>-16.00</td>
<td>-36.00</td>
<td>-41.00</td>
<td></td>
</tr>
<tr>
<td>Dark Cutters</td>
<td></td>
<td></td>
<td></td>
<td>-20.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 550 lbs</td>
<td></td>
<td></td>
<td></td>
<td>-10.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 950 lbs</td>
<td></td>
<td></td>
<td></td>
<td>-20.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CCP #7 - General Marketing

c. Know your product
   • Genetics (purebred seedstock)
   • Animal type (Frame and Muscle Scores, Feeder Cattle grades)
   • Meat science (yield and quality grade)
   • Collect feedback on yours

d. Tell your story

e. Join a cooperative or alliance
Marketing Strategies

Jim Robb’s Marketing Presentation

Market fluctuations over time

Patterns??

Market reports
Sources of Market Information

Livestock Market Information Center
http://lmic.info

Agricultural Marketing Service
www.ams.usda.gov

OSU Extension Service Marketing collection
https://extension.oregonstate.edu/collection/services-livestock-auction-scales-marketing
Critical Control Points

1. Ranch Economics
2. Forage Management
3. General Nutrition
4. General Health
5. Beef Cattle Management
6. Sheep Management
7. Marketing
It pays to stay informed!

- **OSU Extension Service**
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  - [https://extension.oregonstate.edu/](https://extension.oregonstate.edu/)

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