Planning for Resilience: Using scenarios for the Northern Plains Beef System

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Our Process

Gather team & available data

Focus group 1: determine scenarios

Model scenarios

Focus group 2: determine management options

Develop Extension Program Plan
Potential Beef Futures
First Focus Group
Overall drivers

- Economics
- Regulation & tax implications
- People
- Local ranch conditions

- Considered outside of our project scope
<table>
<thead>
<tr>
<th>Component</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow/calf</td>
<td>great calving conditions</td>
</tr>
<tr>
<td>Feedlot cattle</td>
<td>good cattle conditions</td>
</tr>
<tr>
<td>Feed</td>
<td>moderate use</td>
</tr>
<tr>
<td>Forage</td>
<td>winter kill</td>
</tr>
<tr>
<td>Annual crops</td>
<td>good stalk grazing, poor germination</td>
</tr>
<tr>
<td>Pasture/range</td>
<td>delayed spring grazing</td>
</tr>
<tr>
<td>Logistics</td>
<td>good conditions</td>
</tr>
<tr>
<td>Lot conditions</td>
<td>dust</td>
</tr>
<tr>
<td>Manure storage</td>
<td>good conditions</td>
</tr>
<tr>
<td>People</td>
<td>bundled but normal</td>
</tr>
<tr>
<td>Pests</td>
<td>fewer overwintering</td>
</tr>
<tr>
<td>Water</td>
<td>less recharge</td>
</tr>
<tr>
<td><strong>Cow/calf</strong></td>
<td>poor calf health</td>
</tr>
<tr>
<td><strong>Feedlot cattle</strong></td>
<td>poor feed efficiency, health</td>
</tr>
<tr>
<td><strong>Feed</strong></td>
<td>high use</td>
</tr>
<tr>
<td><strong>Forage</strong></td>
<td>good conditions</td>
</tr>
<tr>
<td><strong>Annual crops</strong></td>
<td>poor stalk grazing, delayed planting</td>
</tr>
<tr>
<td><strong>Pasture/range</strong></td>
<td>poor stockpile grazing, spring mud</td>
</tr>
<tr>
<td><strong>Logistics</strong></td>
<td>snow removal, slick, mud, more maintenance, road closures</td>
</tr>
<tr>
<td><strong>Lot conditions</strong></td>
<td>snow &amp; mud</td>
</tr>
<tr>
<td><strong>Manure storage</strong></td>
<td>overfilling storage, inability to spread</td>
</tr>
<tr>
<td><strong>People</strong></td>
<td>more labor needs in poor conditions</td>
</tr>
<tr>
<td><strong>Pests</strong></td>
<td>fewer overwintering</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>flooding</td>
</tr>
</tbody>
</table>
Cow/calf: excellent calving conditions
Feedlot cattle: excellent cattle conditions
Feed: smallest stored feed use
Forage: good conditions
Annual crops: good conditions
Pasture/range: good conditions unless not enough moisture for growth, wildfire risk
Logistics: good conditions
Lot conditions: dust
Manure storage: good conditions
People: happy
Pests: more overwintering
Water: less recharge

"Great cattle weather!"
"I tell you what, I've lost more crops and livestock to wet than dry."
Cow/calf: excellent conditions
Feedlot cattle: excellent conditions
Feed: Expensive
Forage: less quantity but good quality
Annual crops: poor growth
Pasture/range: poor growth, expensive supplemental feed
Logistics: good conditions
Lot conditions: dust
Manure storage: good conditions
People: more cow/calf labor
Pests: fewer pests
Water: water shortages
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cow/calf</strong></td>
<td>good conditions, potential for health problems</td>
</tr>
<tr>
<td><strong>Feedlot cattle</strong></td>
<td>good conditions, potential for hoof &amp; health problems</td>
</tr>
<tr>
<td><strong>Feed</strong></td>
<td>Spoilage</td>
</tr>
<tr>
<td><strong>Forage</strong></td>
<td>good growth, potential quality problems</td>
</tr>
<tr>
<td><strong>Annual crops</strong></td>
<td>reduced growth, erosion, nutrient loss</td>
</tr>
<tr>
<td><strong>Pasture/range</strong></td>
<td>favors cool season, invasives, pugging</td>
</tr>
<tr>
<td><strong>Logistics</strong></td>
<td>more maintenance, road closures</td>
</tr>
<tr>
<td><strong>Lot conditions</strong></td>
<td>mud</td>
</tr>
<tr>
<td><strong>Manure storage</strong></td>
<td>overfilling storage, inability to spread, odor</td>
</tr>
<tr>
<td><strong>People</strong></td>
<td>more labor</td>
</tr>
<tr>
<td><strong>Pests</strong></td>
<td>fewer pests, more parasites</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>flooding</td>
</tr>
</tbody>
</table>
"Droughts are the hardest, there is nothing left to sell."

<table>
<thead>
<tr>
<th>Summer–Fall</th>
<th>Hot</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pests</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Dry</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Precipitation</strong></td>
<td></td>
</tr>
<tr>
<td><strong>It’s a Dry Heat</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Cow/calf**
- heat stress, dust pneumonia, reproductive problems

**Feedlot cattle**
- heat stress, poor performance, dust pneumonia

**Feed**
- Expensive

**Forage**
- poor growth, invasives

**Annual crops**
- poor growth

**Pasture/range**
- poor growth, favors warm season, invasives, wildfire, expensive supplemental feed

**Logistics**
- heat stress during transport

**Lot conditions**
- dust

**Manure storage**
- good conditions

**People**
- more cow/calf labor

**Pests**
- grasshoppers/flies

**Water**
- water shortages
<table>
<thead>
<tr>
<th>Category</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow/calf</td>
<td>heat stress, health, reproductive problems</td>
</tr>
<tr>
<td>Feedlot cattle</td>
<td>heat stress, poor performance, hoof &amp; health problems, death loss</td>
</tr>
<tr>
<td>Feed</td>
<td>moderate use, spoilage</td>
</tr>
<tr>
<td>Forage</td>
<td>good growth, potential quality problems, invasives</td>
</tr>
<tr>
<td>Annual crops</td>
<td>good growth, potential pollination failures, nutrient loss</td>
</tr>
<tr>
<td>Pasture/range</td>
<td>good growth, pugging, invasives</td>
</tr>
<tr>
<td>Logistics</td>
<td>heat stress, more maintenance, road closures</td>
</tr>
<tr>
<td>Lot conditions</td>
<td>mud, runoff</td>
</tr>
<tr>
<td>Manure storage</td>
<td>overfilling storage, inability to spread, odor</td>
</tr>
<tr>
<td>People</td>
<td>hot</td>
</tr>
<tr>
<td>Pests</td>
<td>flies, new diseases</td>
</tr>
<tr>
<td>Water</td>
<td>flooding</td>
</tr>
</tbody>
</table>
Management Options
Management Options

Diversification
- Calving date
- Monitoring
- Cover/forage cropping
- Alternative feeds/rations
- Parasite mngt
- Disease mngt
- Rotational grazing
- Stocking rate/timing
- Windbreaks
- Land use change

Legend:
- Orange – applies to single scenario
- Blue - applies across two scenarios
- Green – applies across all scenarios
- Bold – discussed frequently (>5)

Sprinklers
Grasshopper mngt

Wean early
Dust mngt
Drought plan
Ship out of region (summer)
Water plan/monitor
Irrigation
Supplemental feeds
Dry lot cows

Cover feed & bunks
Mud mngt
Manure storage mngt
Barns (winter)
Bedding
Shipping out of regions (winter)
Calving location/Sandhills calving
The process
Our process

Phase 1: Gather a team

**University of Nebraska**
- Biological Systems Engineering
- Animal Science
- Agronomy
- Climatology
- Extension – Climate and Beef teams

**South Dakota State University**
- Agricultural and Biosystems Engineering
- Extension

**Funding**
- USDA Northern Plains Climate Hub
- USDA NIFA Animal Agriculture in a Changing Climate
Our process

Phase 1: Gather available data

Historical & projected climate trends
Impacts to beef system
Focus groups

• **Participants**
  - 15-20 participants
  - beef farmers and ranchers
  - veterinarians/animal health professionals
  - equipment manufacturers
  - lenders/insurance

• **Locations**
Focus group 1 process

- Ground rules
- Begin by sharing their weather stories
Focus group 1 process

- **Short (10-20 min) presentations**
  - Local and regional climate trends & projections
  - Potential impacts to the beef system
  - Process for creating scenarios

- **Small groups (5-7) work through scenarios**
  - Our team transcribed
Sorting and Prioritizing

• Season

• Climate Drivers
  • 20 total but 84% of impacts were with two
  • Precipitation & Temperature

• Area of farm impacted

• Positive or negative impact

• Frequency discussed
Modeling

- Integrated Farm Systems Model
- Use state trends and projections
- Range of economic and performance impacts
- Farm sensitivity analysis
Management Options
Second Focus Group
Focus group 2: Process

• Same ground rules
• Start discussion of what has made their operation resilient
• Overview of scenarios
Focus group 2: Brainstorming Management Options

- **Doing now**
- **Might consider**
  - Need more educational materials
  - Need more research
Focus group two: Categorizing Options

Adapted from Global Business Network (GBN)
Extension Program Plan

• Identifying gaps in Extension and Research
• Prioritizing new programming or resources

“It takes a team to be resilient.”
Questions?

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