Planning for Resilience:

Using scenarios for the Northern Plains Beef System

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University of Nebraska - Lincoln

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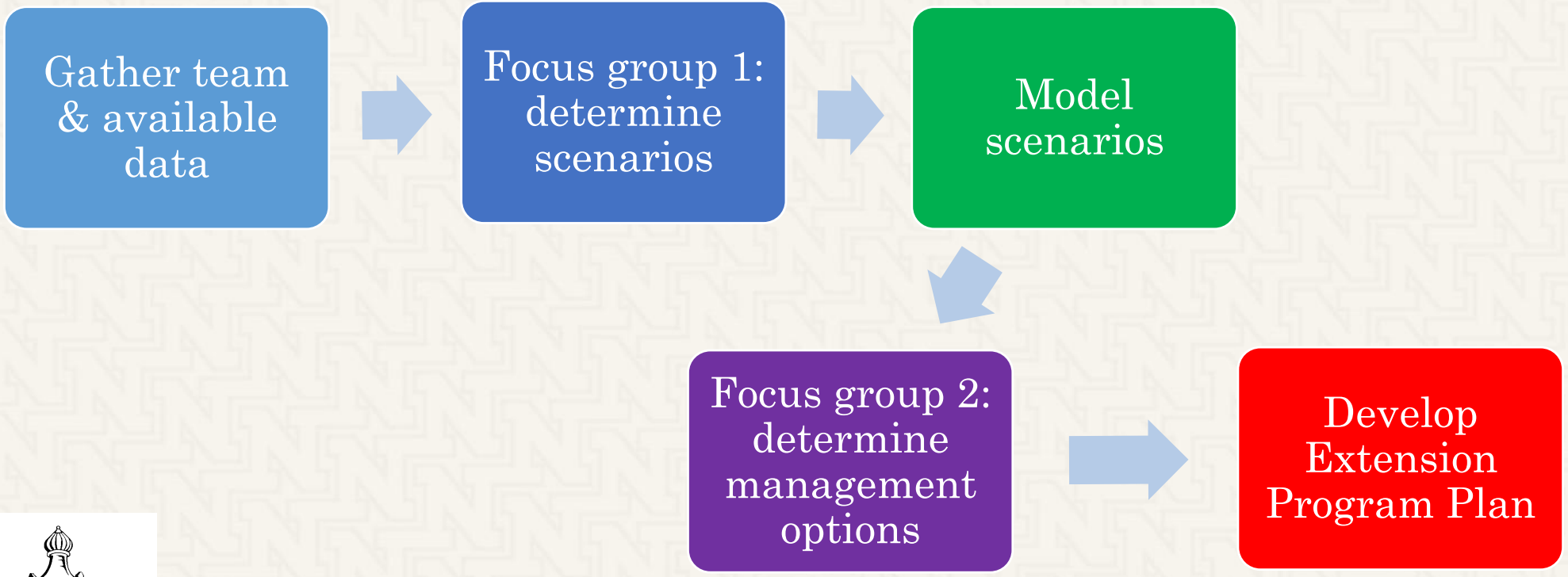
Our Process



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Potential Beef Futures

First Focus Group

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Overall drivers

- **Economics**
- **Regulation & tax implications**
- **People**
- **Local ranch conditions**
  - Considered outside of our project scope

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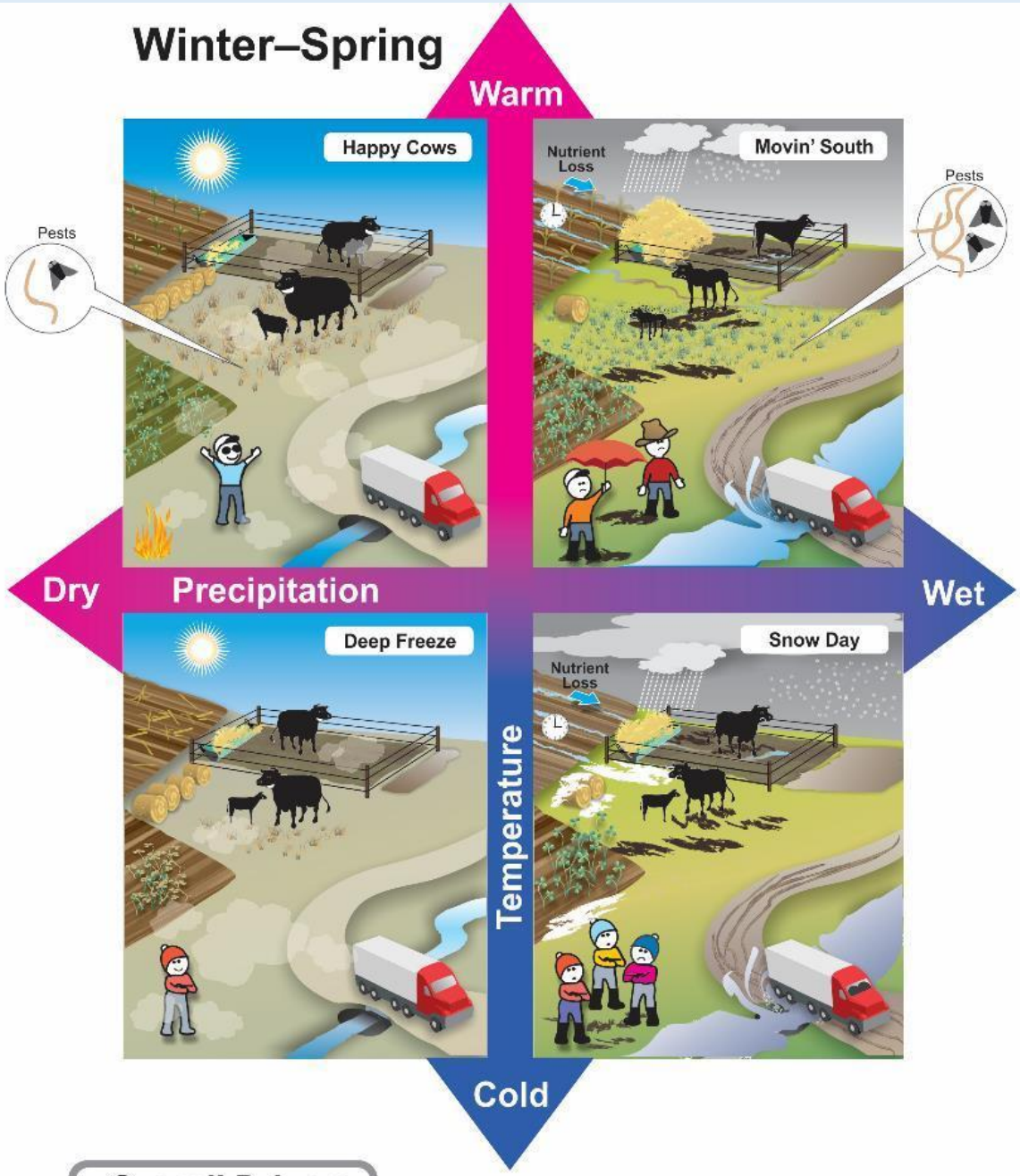
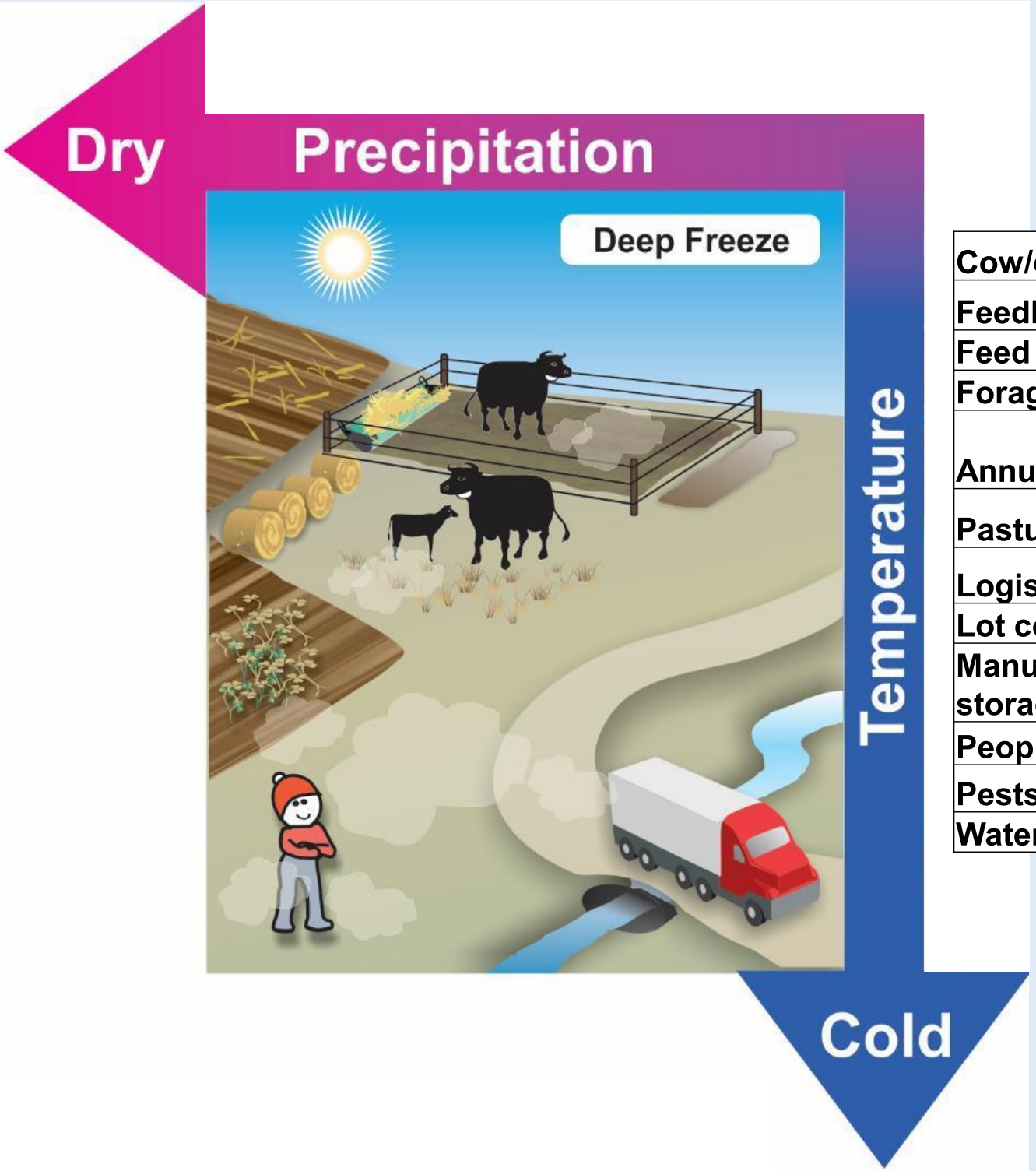
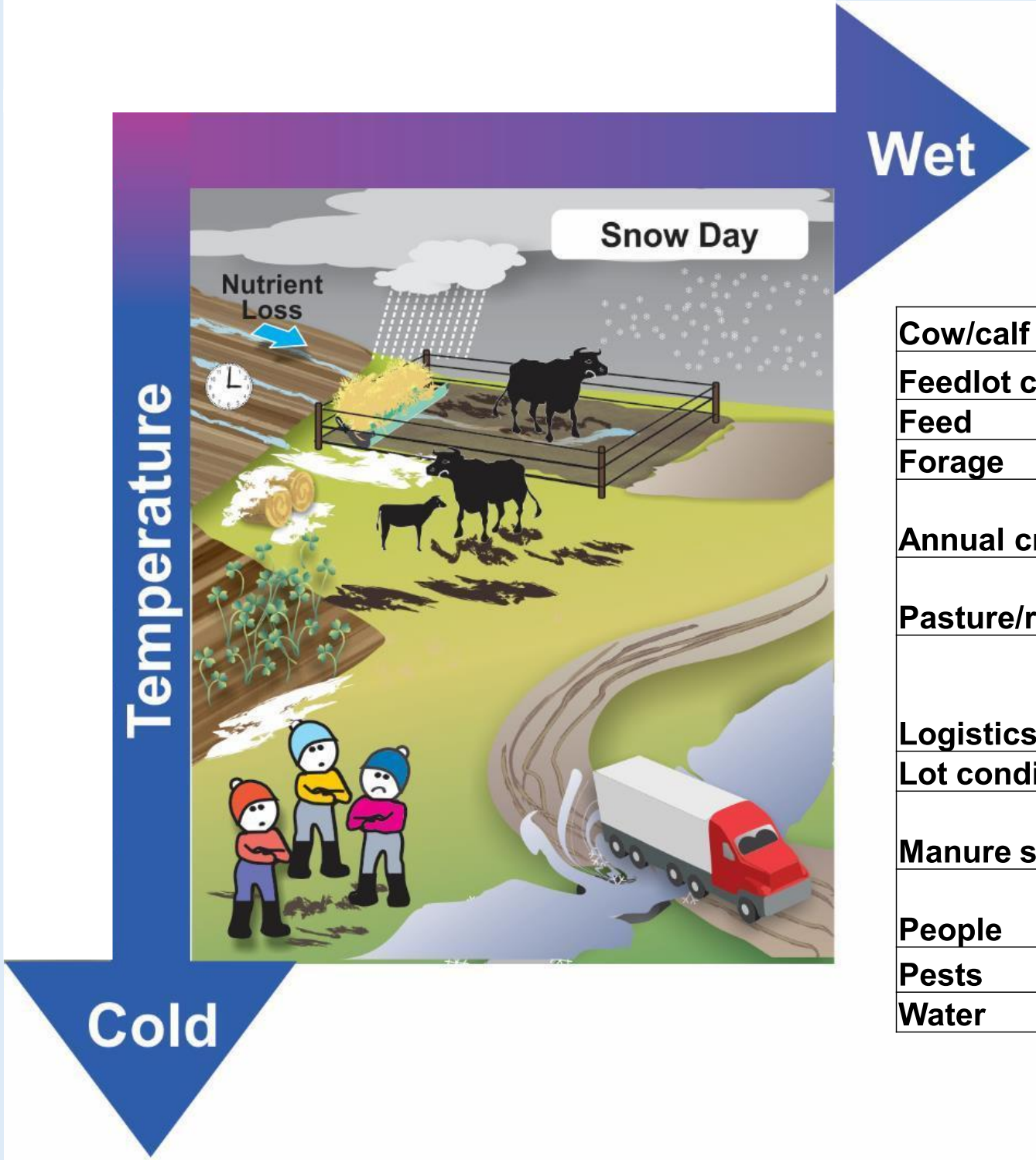

Winter–Spring
Warm
Happy Cows
Pests
Nutrient Loss
Movin' South
Pests
Dry
Precipitation
Wet
Deep Freeze
Nutrient Loss
Snow Day
Temperature
Cold
Overall Drivers
Economics
Regulations
Taxes
People
Local Conditions

EXTENSION



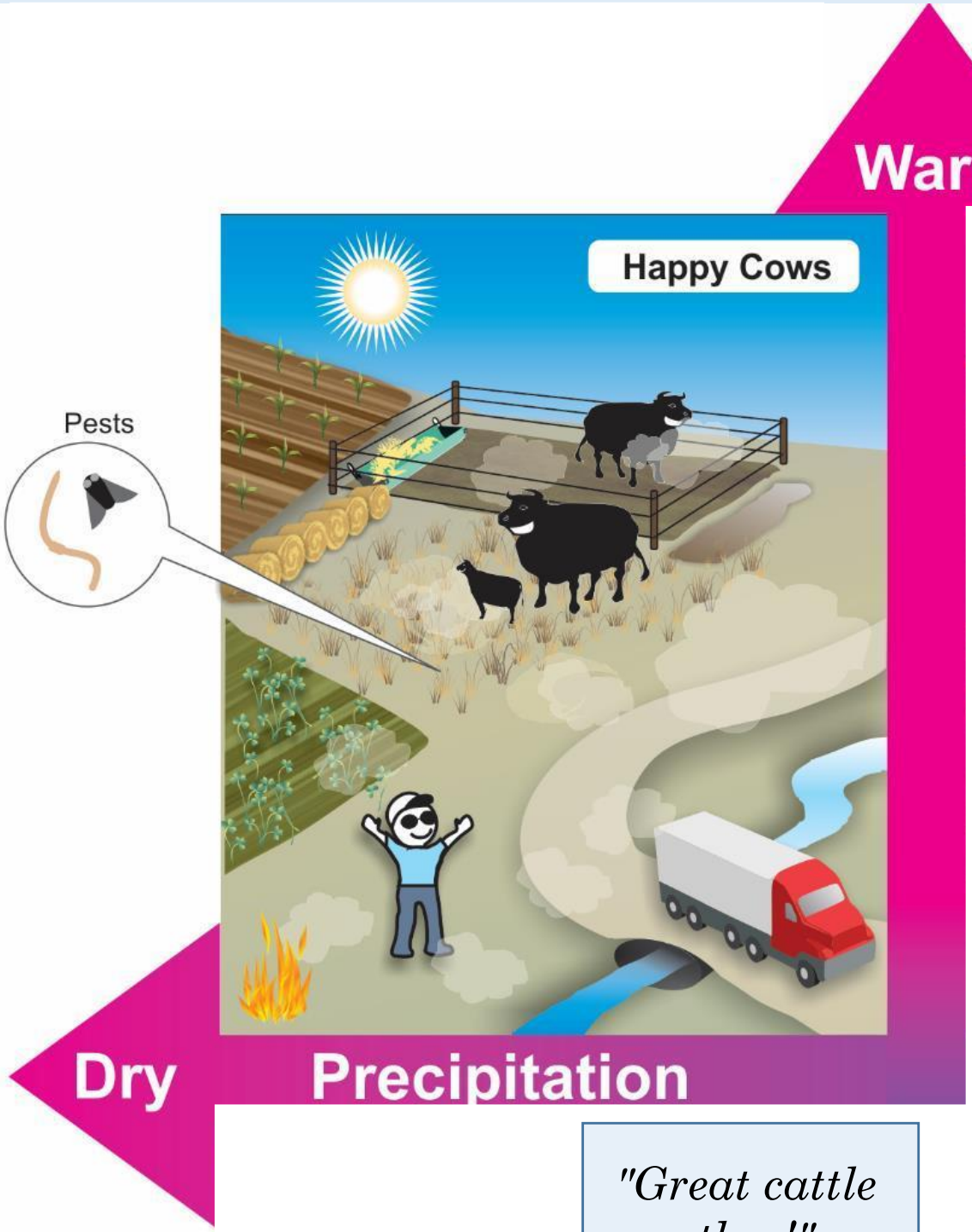
Cow/calf	great calving conditions
Feedlot cattle	good cattle conditions
Feed	moderate use
Forage	winter kill
Annual crops	good stalk grazing, poor germination
Pasture/range	delayed spring grazing
Logistics	good conditions
Lot conditions	dust
Manure storage	good conditions
People	bundled but normal
Pests	fewer overwintering
Water	less recharge

N EXTENSION



Cow/calf	poor calf health
Feedlot cattle	poor feed efficiency, health
Feed	high use
Forage	good conditions
Annual crops	poor stalk grazing, delayed planting
Pasture/range	poor stockpile grazing, spring mud
Logistics	snow removal, slick, mud, more maintence, road closures
Lot conditions	snow & mud
Manure storage	overfilling storage, inability to spread
People	more labor needs in poor conditions
Pests	fewer overwintering
Water	flooding

N EXTENSION

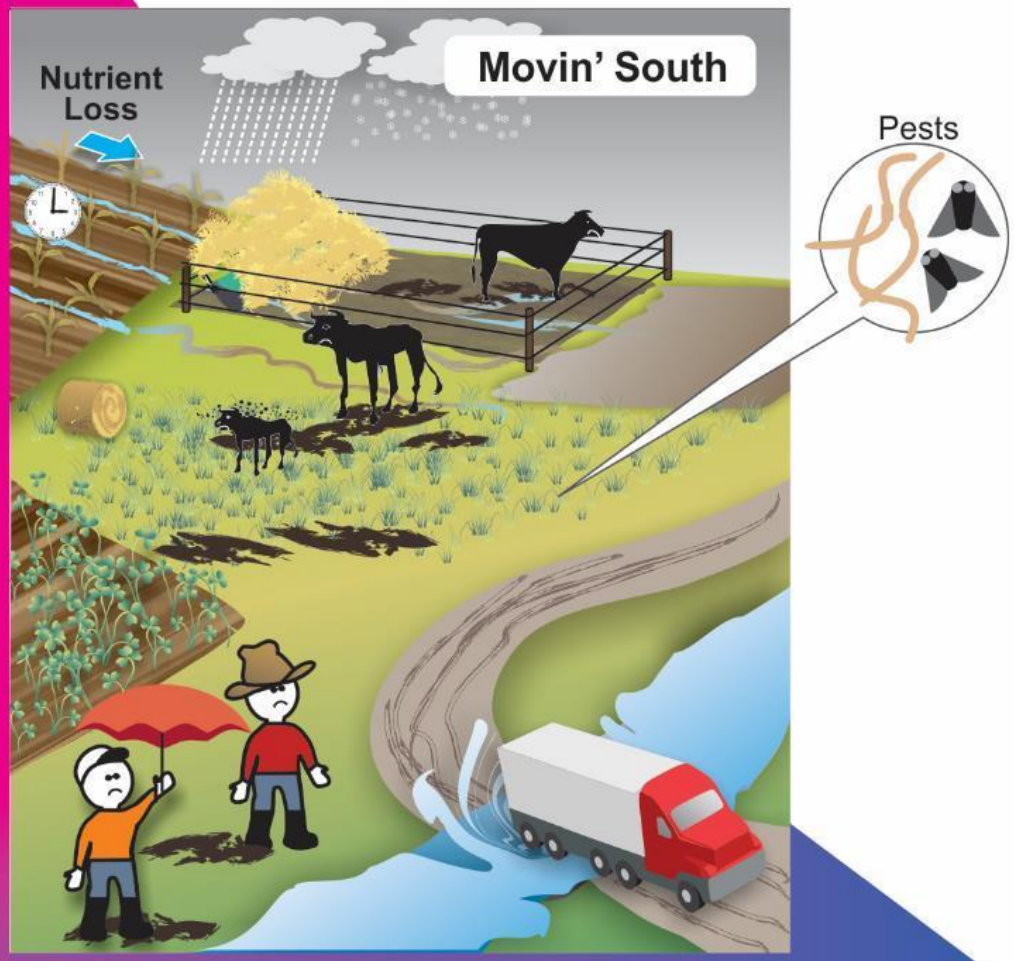


Cow/calf	excellent calving conditions
Feedlot cattle	excellent cattle conditions
Feed	smallest stored feed use
Forage	good conditions
Annual crops	good conditions
Pasture/range	good conditions unless not enough moisture for growth, wildfire risk
Logistics	good conditions
Lot conditions	dust
Manure storage	good conditions
People	happy
Pests	more overwintering
Water	less recharge

"Great cattle weather!"

EXTENSION

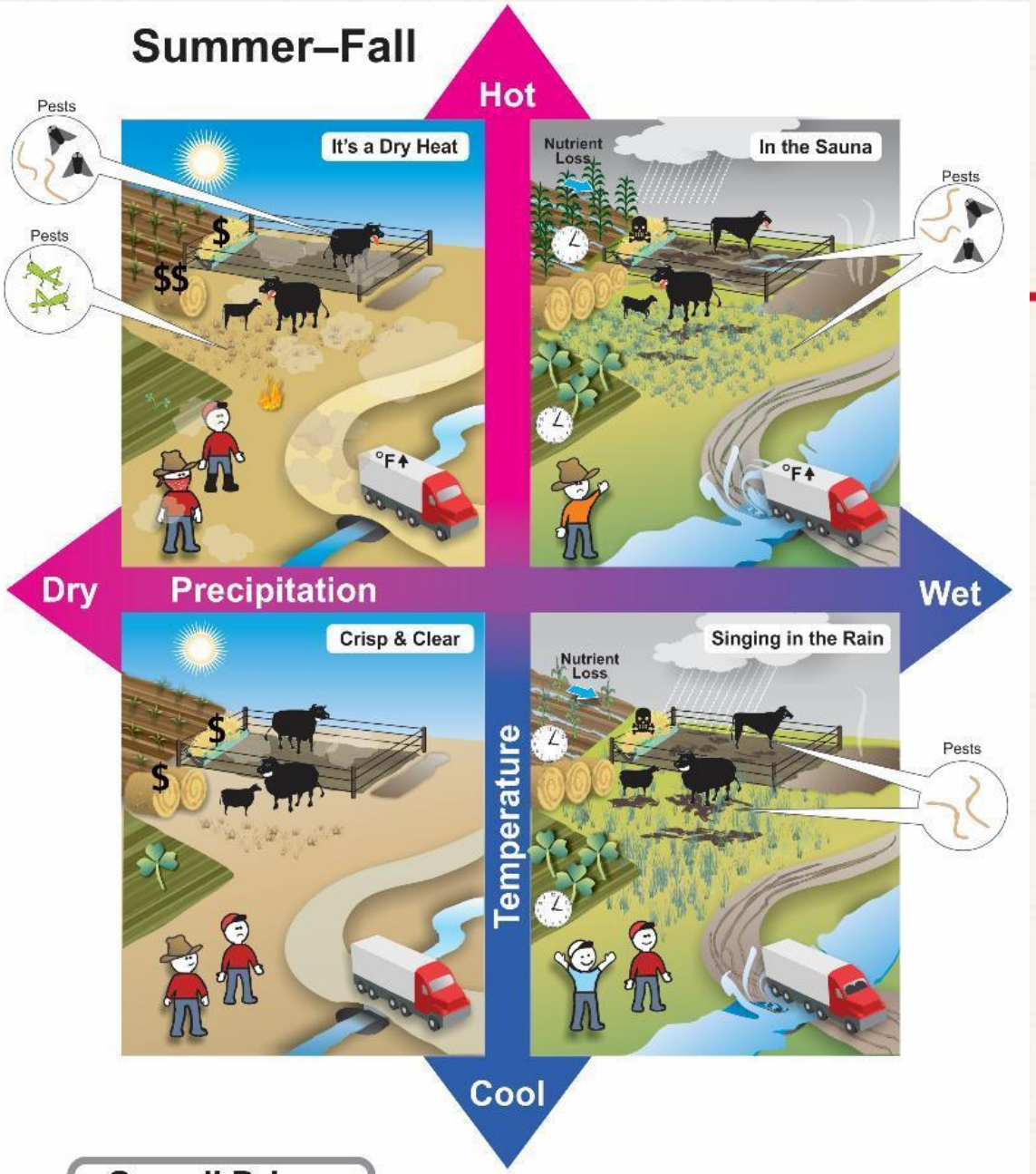
Warm

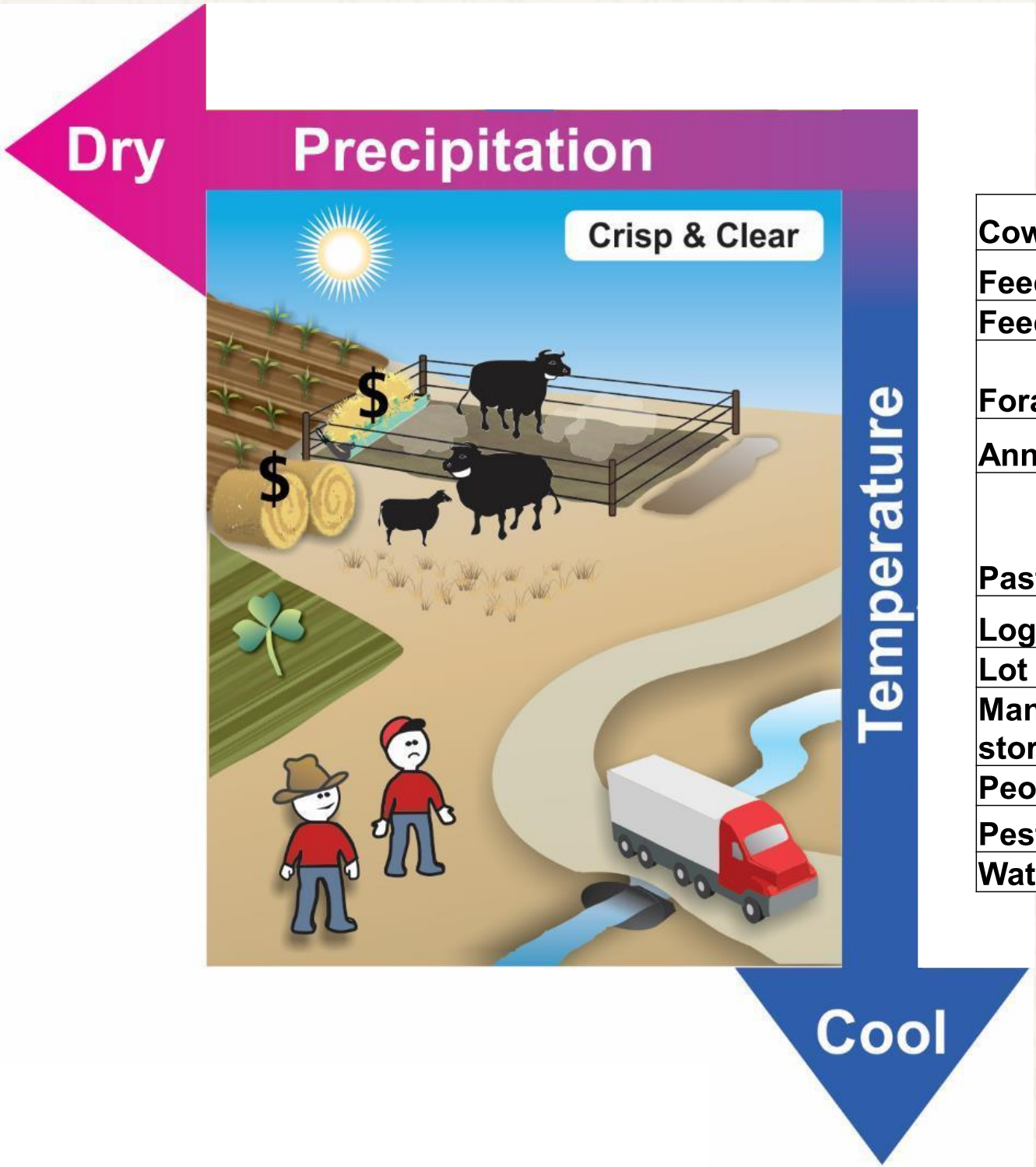


Cow/calf	poor calf health
Feedlot cattle	poor performance, hoof & health problems
Feed	highest feed use, spoilage
Forage	winter kill
Annual crops	poor stalk grazing, erosion, delayed planting
Pasture/range	poor stockpile grazing, trampling
Logistics	mud and higher maintenance, road closures
Lot conditions	mud
Manure storage	overfilling storage, inability to spread
People	more labor in poor conditions
Pests	more overwintering, more lice
Water	flooding

"I tell you what, I've lost more crops and livestock to wet than dry."

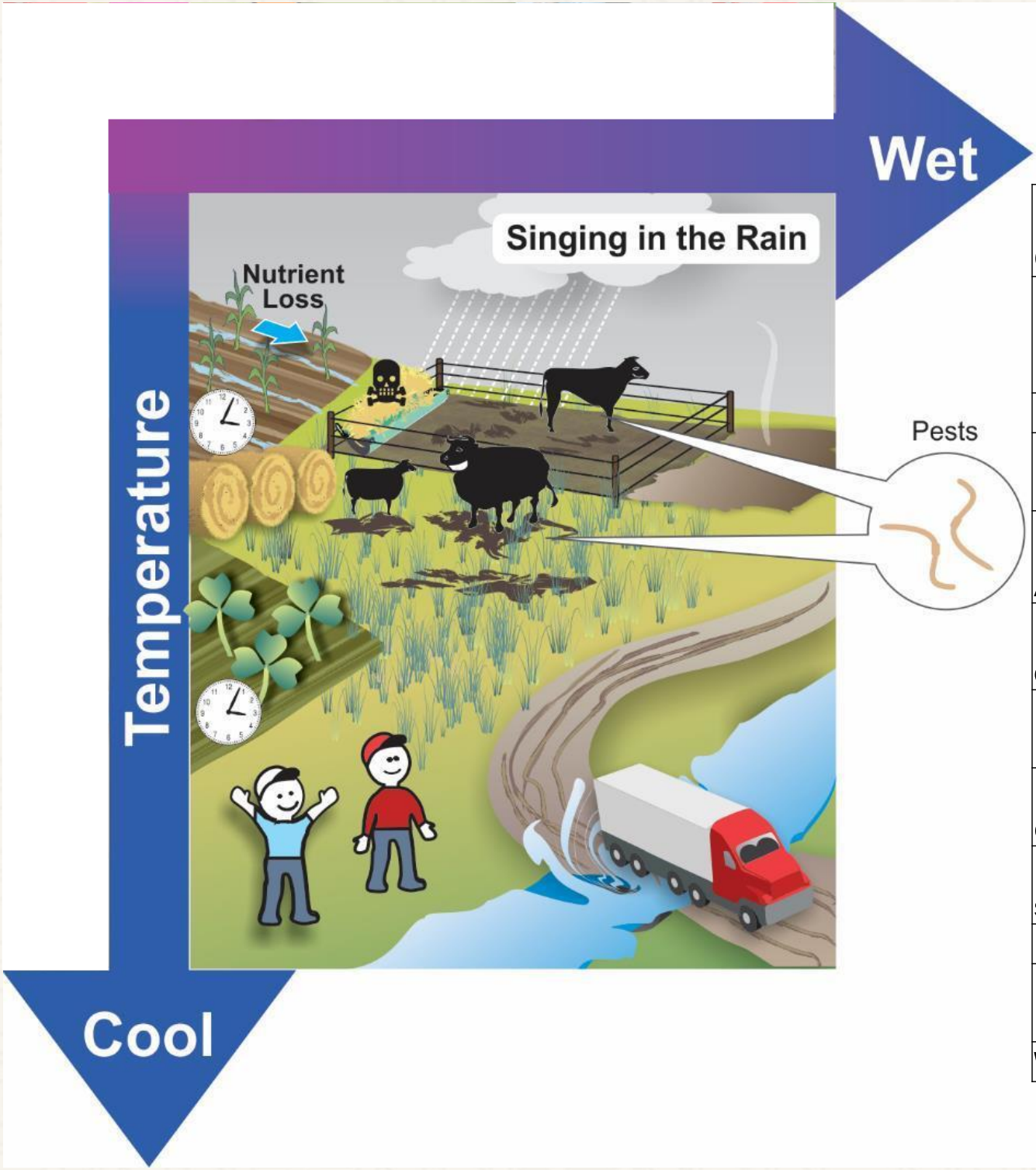
N EXTENSION


Summer–Fall
Hot
Pests
Pests
It's a Dry Heat
$
$$
°F
Nutrient Loss
In the Sauna
Pests
°F
Dry
Precipitation
Wet
Crisp & Clear
$
$
Nutrient Loss
Singing in the Rain
Pests
Temperature
Cool
Overall Drivers
$
Economics
Regulations
Taxes
People
Local Conditions



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

N EXTENSION



Cow/calf	good conditions, potential for health problems
Feedlot cattle	good conditions, potental for hoof & health problems
Feed	Spoilage
Forage	good growth, potential quality problems
Annual crops	reduced growth, erosion, nutrient loss
Pasture/range	favors cool season, invasives, pugging
Logistics	more maintenance, road closures
Lot conditions	mud
Manure storage	overfilling storage, inability to spread, odor
People	more labor
Pests	fewer pests, more parasites
Water	flooding

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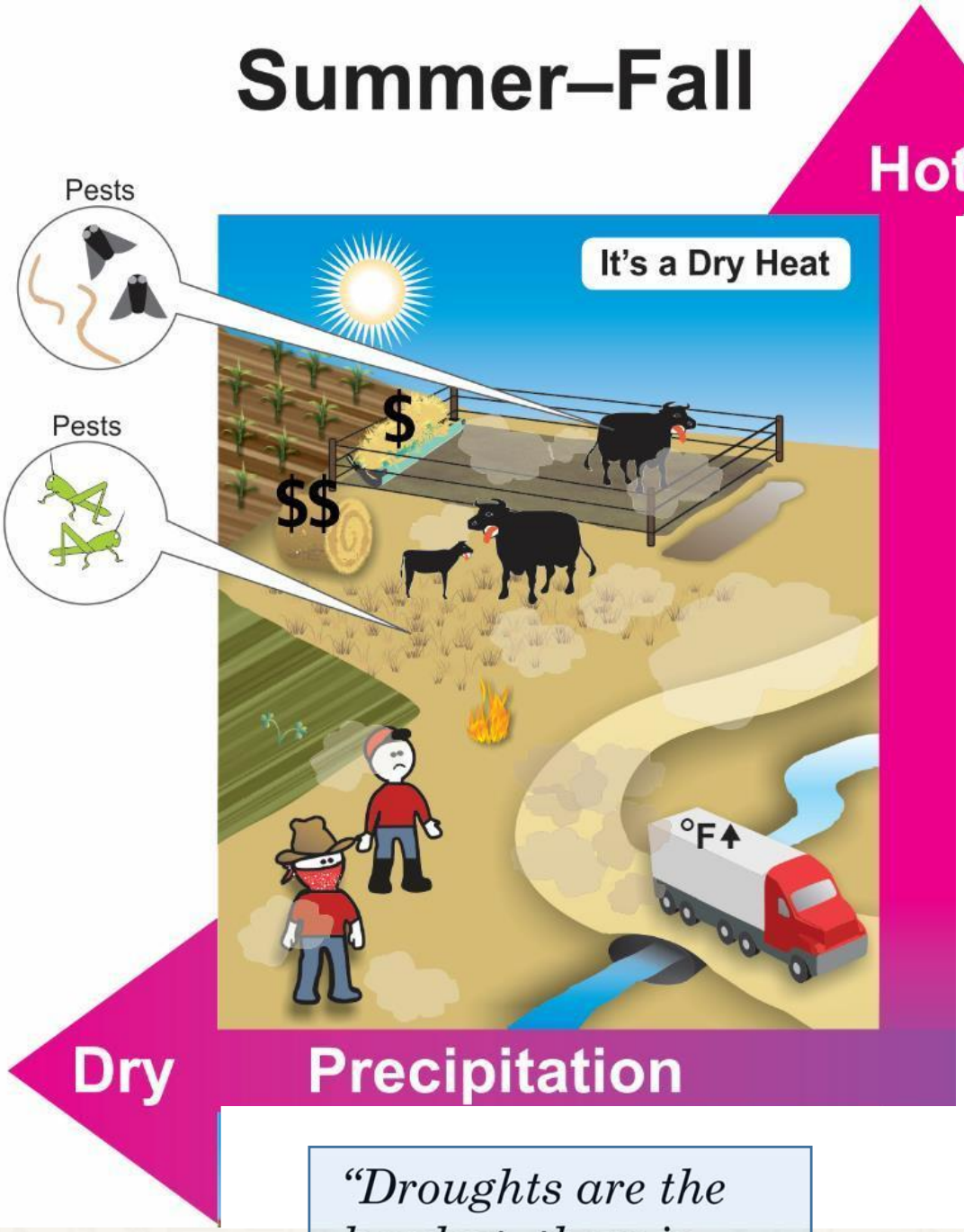
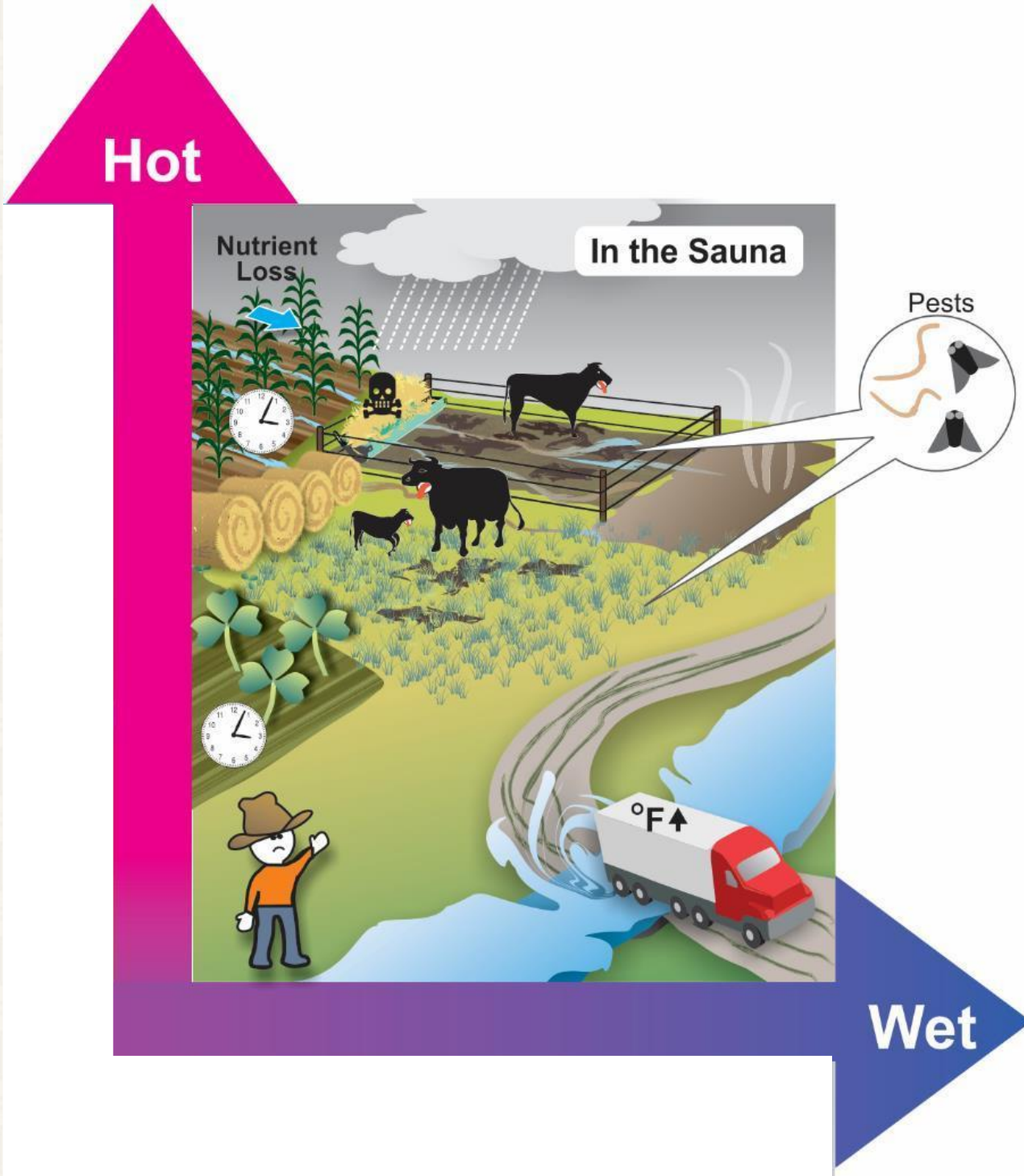
Summer–Fall



Cow/calf	heat stress, dust pneumonia, reproductive problems
Feedlot cattle	heat stress, poor performance, dust pnemonia
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

"Droughts are the hardest, there is nothing left to sell."

N EXTENSION



Cow/calf	heat stress, health, reproductive problems
Feedlot cattle	heat stress, poor performance, hoof & health problems, death loss
Feed	moderate use, spoilage
Forage	good growth, potential quality problems, invasives
Annual crops	good growth, potential pollenation failures, nutrient loss
Pasture/range	good growth, pugging, invasives
Logistics	heat stress, more maintenance, road closures
Lot conditions	mud, runoff
Manure storage	overfilling storage, inability to spread, odor
People	hot
Pests	flies, new diseases
Water	flooding

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Management Options

Management Options

Sprinklers
Grasshopper mngt

HOT

Genetics
Work & feed in cooler times
Barns (summer)/ shade
Mounds
Cool water
Longer season varieties

DRY

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

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

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

WET

COLD

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

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

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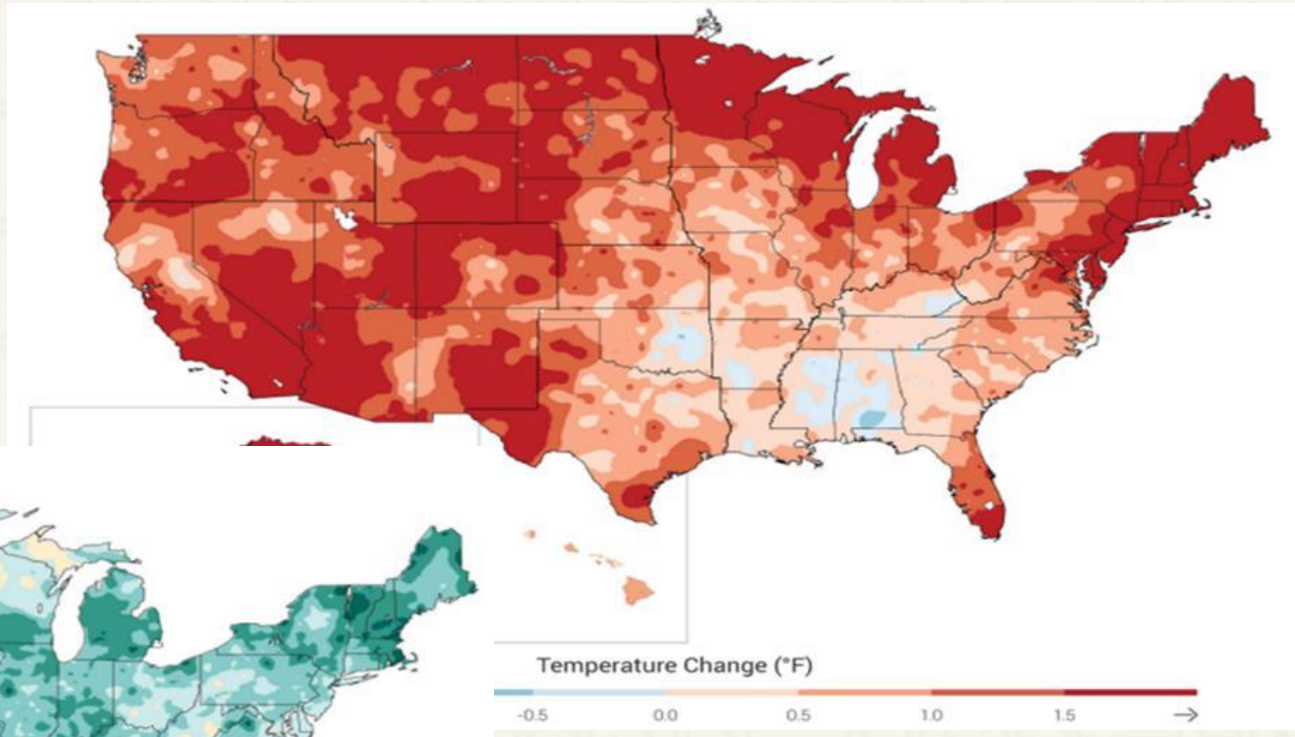
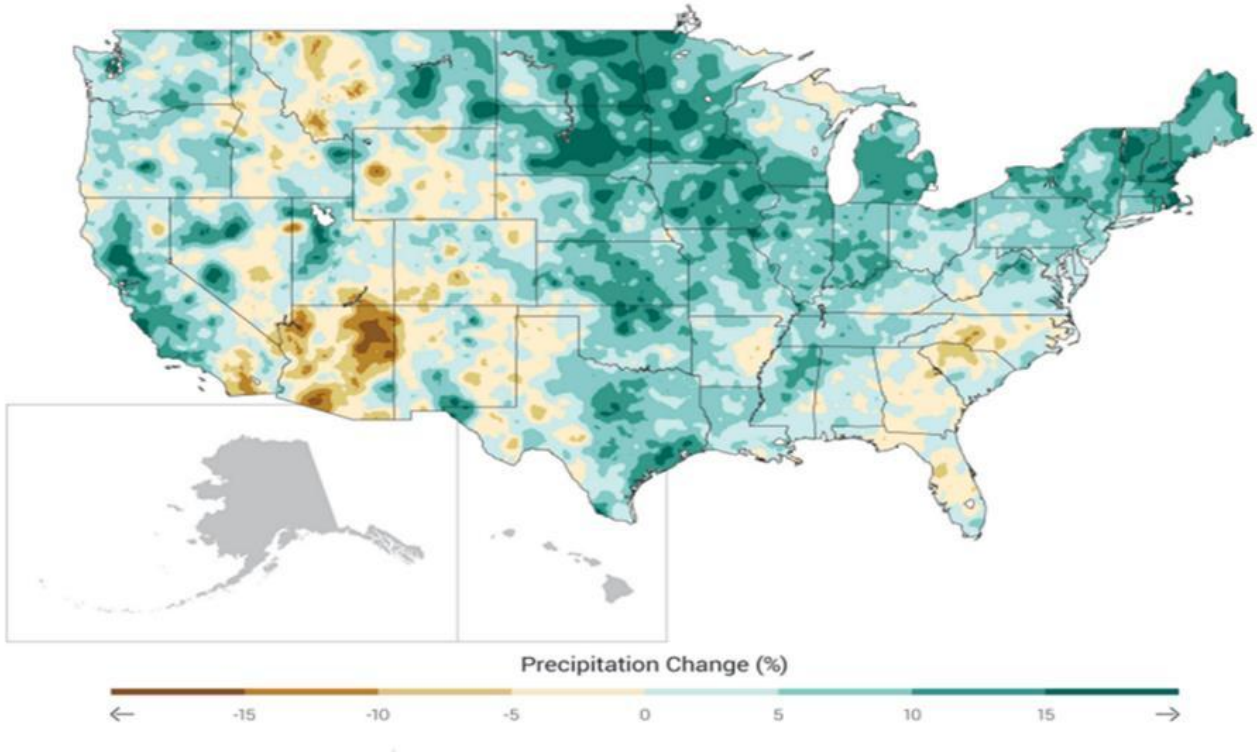
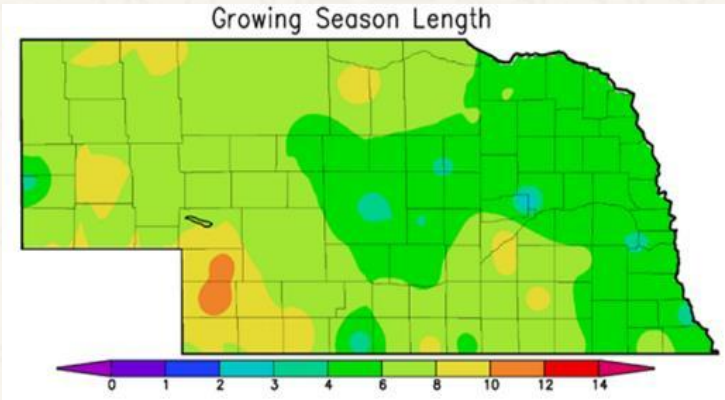
Our process

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**

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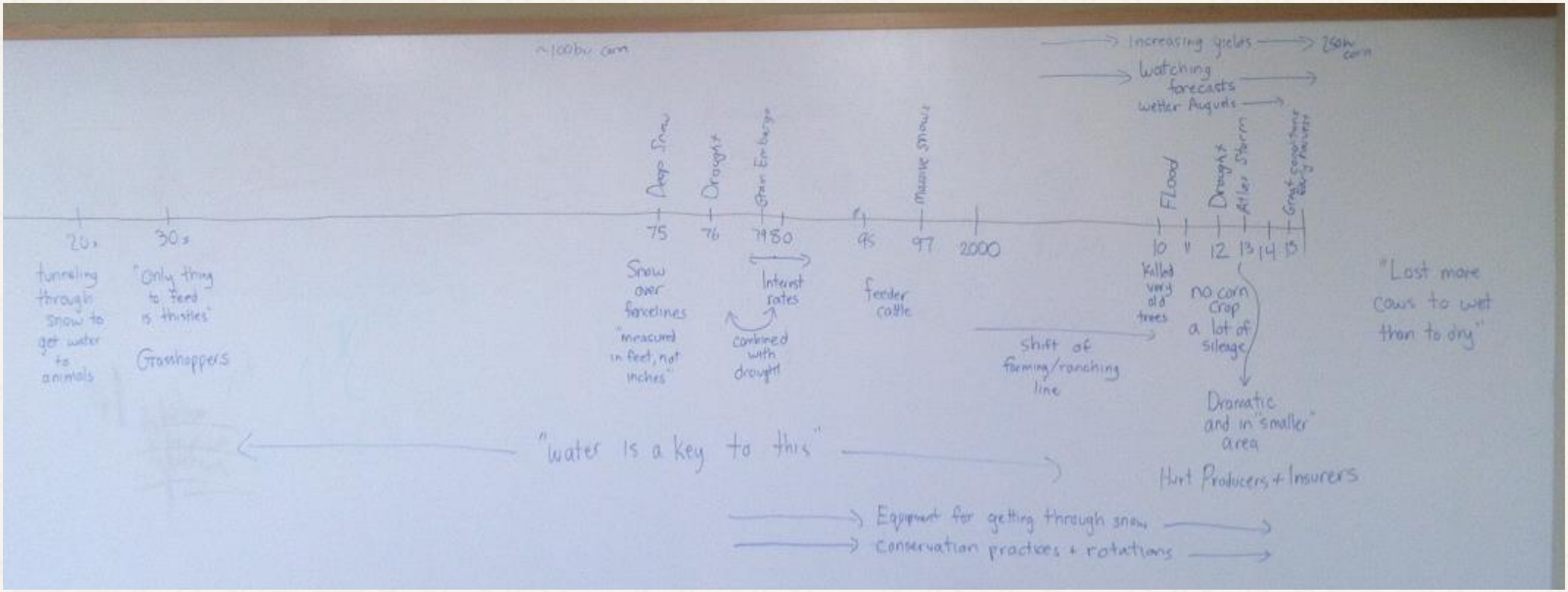
Focus group 1 process

- 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

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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**

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Modeling

- Integrated Farm Systems Model
- Use state trends and projections
- Range of economic and performance impacts
- Farm sensitivity analysis

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Management Options

Second Focus Group

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Focus group 2: Process

- Same ground rules
- Start discussion of what has made their operation resilient
- Overview of scenarios

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Focus group 2: Brainstorming Management Options

- **Doing now**
- **Might consider**
  - Need more educational materials
  - Need more research

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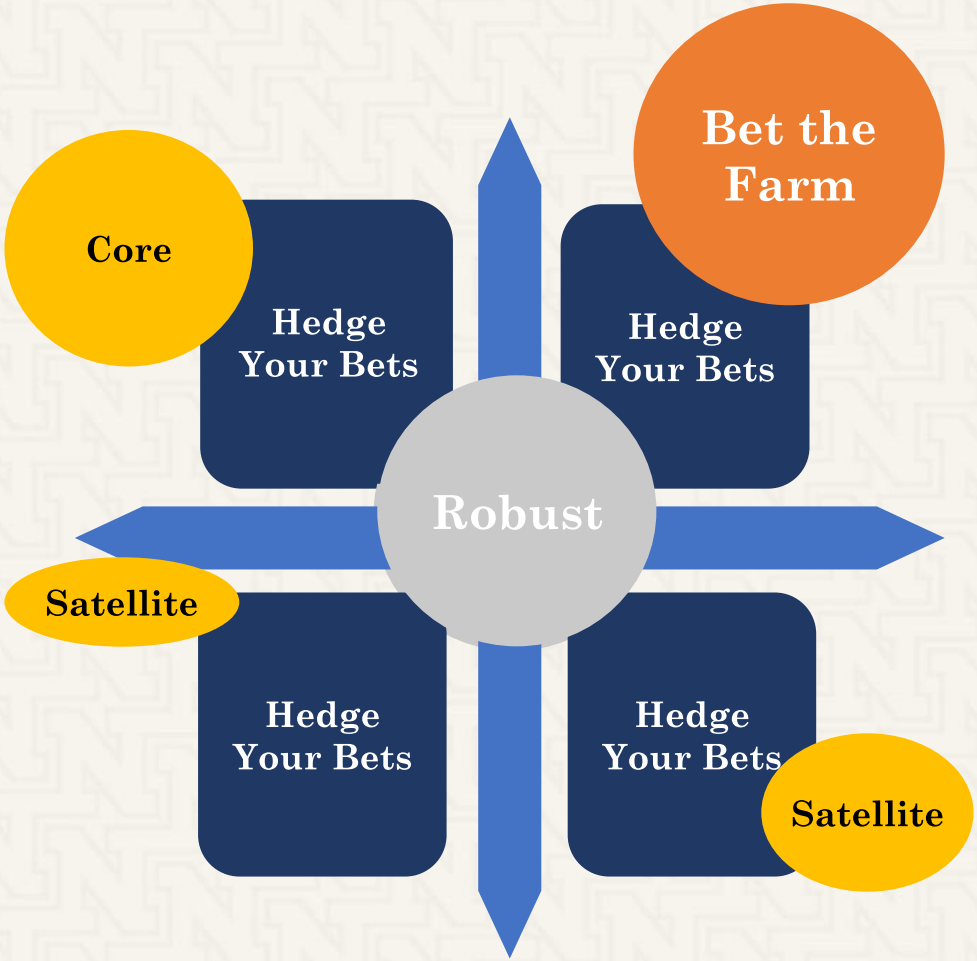
Focus group two: Categorizing Options



Adapted from Global Business Network (GBN)

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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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