Risk Management Strategies

Nebraska Ranch Practicum
Gudmundsen Sandhills Laboratory
September 6, 2023

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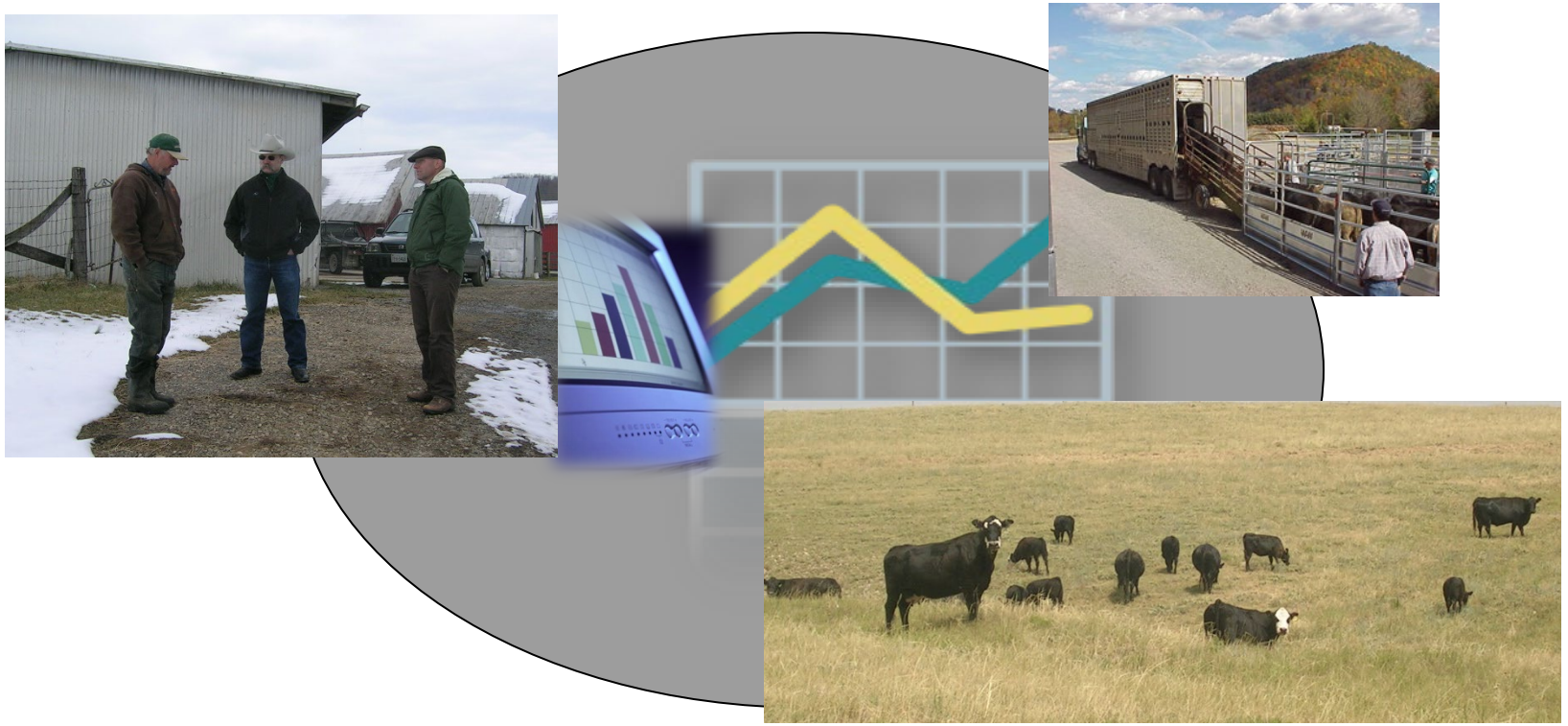
CENTER FOR AGRICULTURAL PROFITABILITY
Institute of Agriculture and Natural Resources

NORTH CENTRAL EXTENSION RISK MANAGEMENT EDUCATION

USDA United States Department of Agriculture
National Institute of Food and Agriculture

Making Good Decisions in the Presence of Uncertainty



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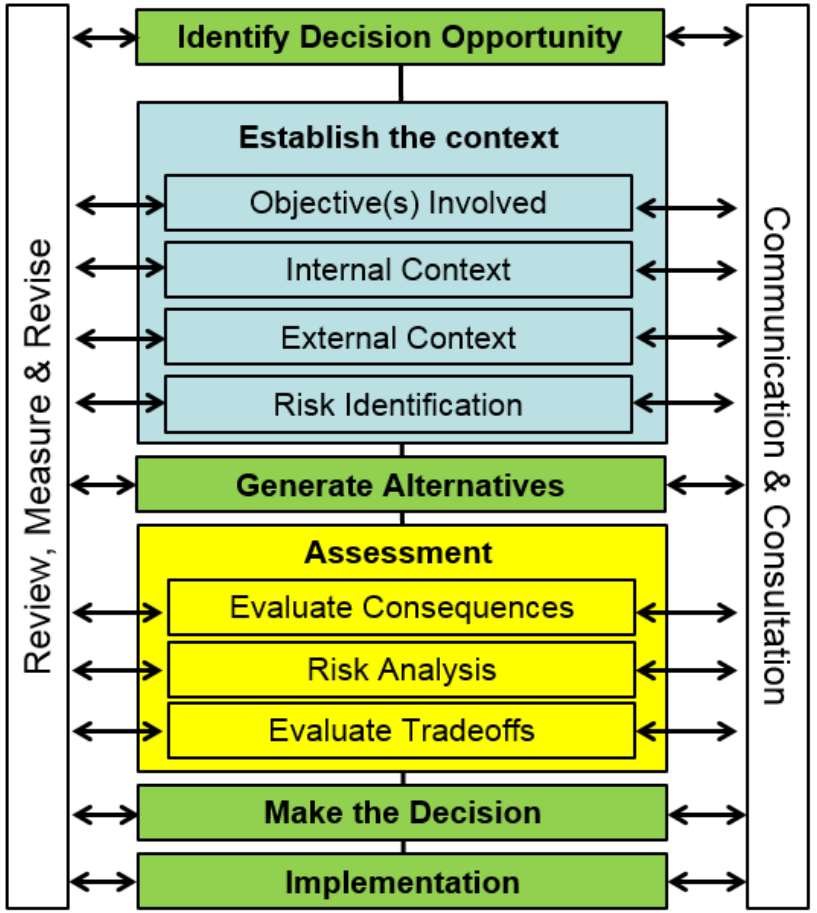
Five Key Principles of a Good Risk Management Culture

- Ability to anticipate decisions
- Adequate resources and capacity to respond to changing conditions
- Free flow of information into and throughout the organization
- Willingness to learn and adapt
- Risk management is embedded in all decision-making processes



Sources of Risk in Agriculture

1. Marketing/Price Risk
2. Production Risk
3. Institutional/Legal Risk
4. Human Risk

Business Risk

5. Financial Risk

Strategies for Managing Risk

1. Avoid it
2. Transfer it outside the business
   a) Insurance
   b) Contracting
3. Control it
   a) Control the probability
   b) Control the impact
      1) Increase reserves
      2) Maintain flexibility
      3) Diversification
4. Accept it

Risk Management Response	Relative Ranking by Study (1=top)		
	Top Crop Manager Workshop 1999 (Musser and Patrick, 2002)	Beef producers in Texas and Nebraska (Hall et al., 2003)	National Study- ERS- Agricultural Resource Management Study, 1996 data. (Harwood et al., 1999))[a]
Being a low-cost producer	1	1	
Liability Insurance	2		
Government program participation	3		
Forward Contracting or Pricing	4	ns[b]	3
Flexible production technologies	5 (tie)		
Futures- hedging, options	5 (tie)	ns	4
Life Insurance	6		
Debt-leverage management	7		
Maintain animal health		1	
Cash/credit Reserves		3	1
Off-farm investments		4	
Specialization in management		5	
Diversify Enterprises		ns	2

a- ERS survey based on actual use rather than on preferences.
b- Rated but neutral or less importance in the study

Federal Insurance/Program Tools

- Crop insurance (USDA-Risk Management Agency)
  - Livestock Risk Protection (LRP) insurance
  - Rainfall Index (RI) insurance
    - Pasture, Rangeland, and Forage
    - Annual Forage
  - Whole Farm Revenue Protection (WFRP)

rma.usda.gov

- Farm Service Agency (FSA) Programs
  - Noninsured Crop Disaster Assistance Program (NAP)
  - Livestock Forage Disaster Program (LFP)
  - Livestock Indemnity Program (LIP)
  - Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish (ELAP)
  - Conservation Programs (NRCS)

fsa.usda.gov

Financial Risk

- Financial risk is the extra risk that results from financial obligations associated with financing.
- Contributing factors include
  - Anything that would negatively affect cash flow and the ability to meet debt obligations or other financial responsibility
- Controls
  - Maintaining a financial cushion
  - Practicing leasing and contract strategies
  - Maintaining up-to-date financial information

Institutional Risk

- Anything that changes the rules of the game.
- Contributing factors include
  - Changes in social attitudes
  - Changing regulations about land use and environmental quality
  - Changes in government programs
  - The possibilities of lawsuits for accidents or misuse of chemicals

Institutional Risk

- Controls
  - Maintaining a liability insurance program
  - Keeping informed of new regulations and interpretations of the law

Human Risk

- Any risk attributed to the humans involved in the operation.
- Contributing factors include
  - The possibilities of losing a key employee
  - Health issues/injury risk
  - Morale or the mental state of the work force
  - Skill set and training of employees

Human Risk

- Any risk attributed to the humans involved in the operation.

- Controls
  - A backup management plan
  - A plan to deal with the possible loss of a key employee
  - Maintaining a health and life insurance program
  - Establishing and maintaining an estate plan
  - A good employee benefit package

Production Risk

- Fluctuations in yield (physical quantities of production)
- Contributing factors
  - Weather
  - Timing of operations
  - Pests
  - Disease
  - Genetics
  - Wildlife

- Controls
  - Selecting low production risk enterprises
  - Using low-risk production practices
  - Diversification
  - Maintaining flexibility and extra capacity
  - Utilizing land over a widespread area
  - Crop insurance

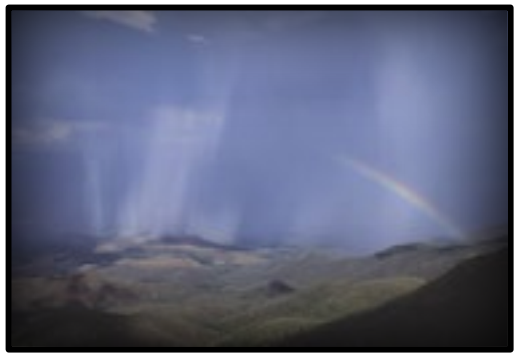
2022 Crop Year

Nebraska Crop Insurance State Profile

Program	Availability	Insured Acres
Annual Forage	All counties	22,475
Forage Production	9 counties	3,000
Forage Seeding	39 counties	4,576
Pasture, Rangeland, Forage	All counties	4,497,273

Precipitation Risk Management Programs

- Pasture, Rangeland, Forage (PRF) insurance
- Annual Forage Insurance Program



Rainfall Index

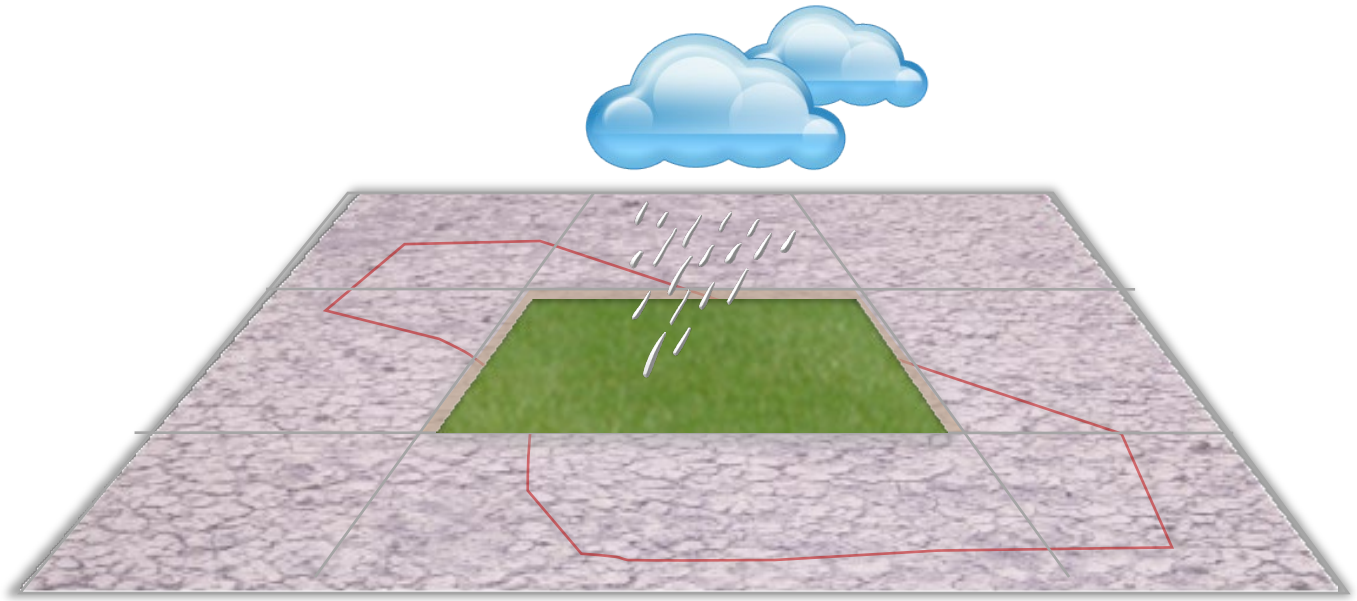
USDA
U.S. Department of Agriculture
Risk Management Agency

PRF Insurance

- Provides coverage for perennial forage (pasture, rangeland, forage) used for livestock grazing or haying.
- Sign up deadline December 1 in all counties for coverage in the following calendar year.
- Utilizes a grid-level rainfall index to determine precipitation for coverage purposes. It does not directly measure actual production loss for each operation.
- Coverage available for two-month rainfall index intervals covering the calendar year with coverage up to 90% of normal.
- Each grid is 0.25 degrees in latitude by 0.25 degrees in longitude, (~ 17 by 17 miles at the equator).
- Subsidy levels 51% to 59% depending on coverage.

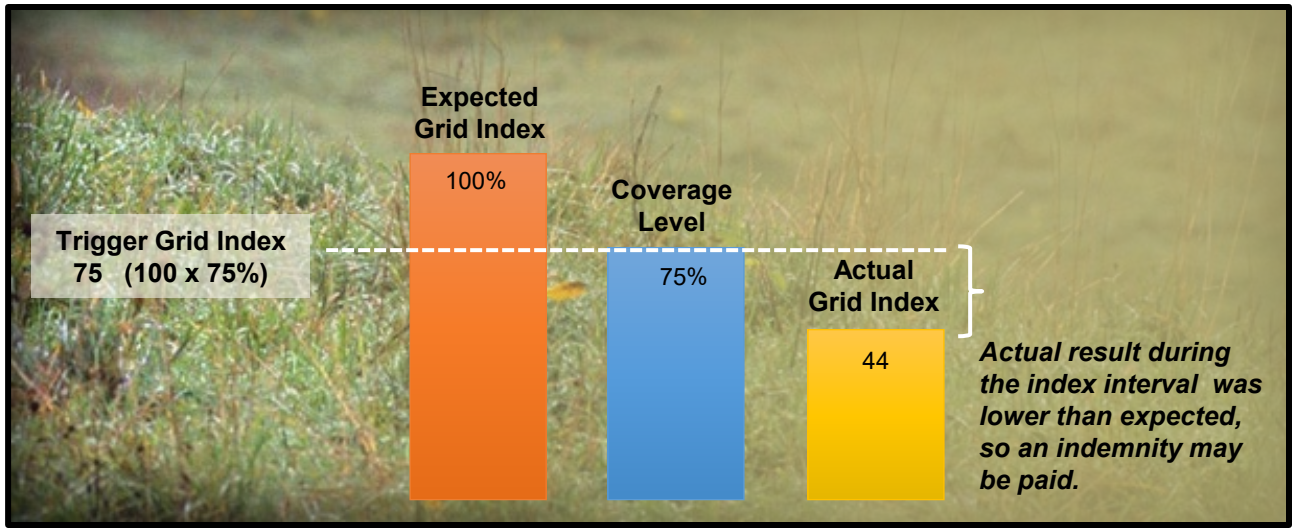
Rainfall Index (RI) Insurance

- Historical data for a grid is used to determine the expected index value for precipitation.



Using Grid Indices

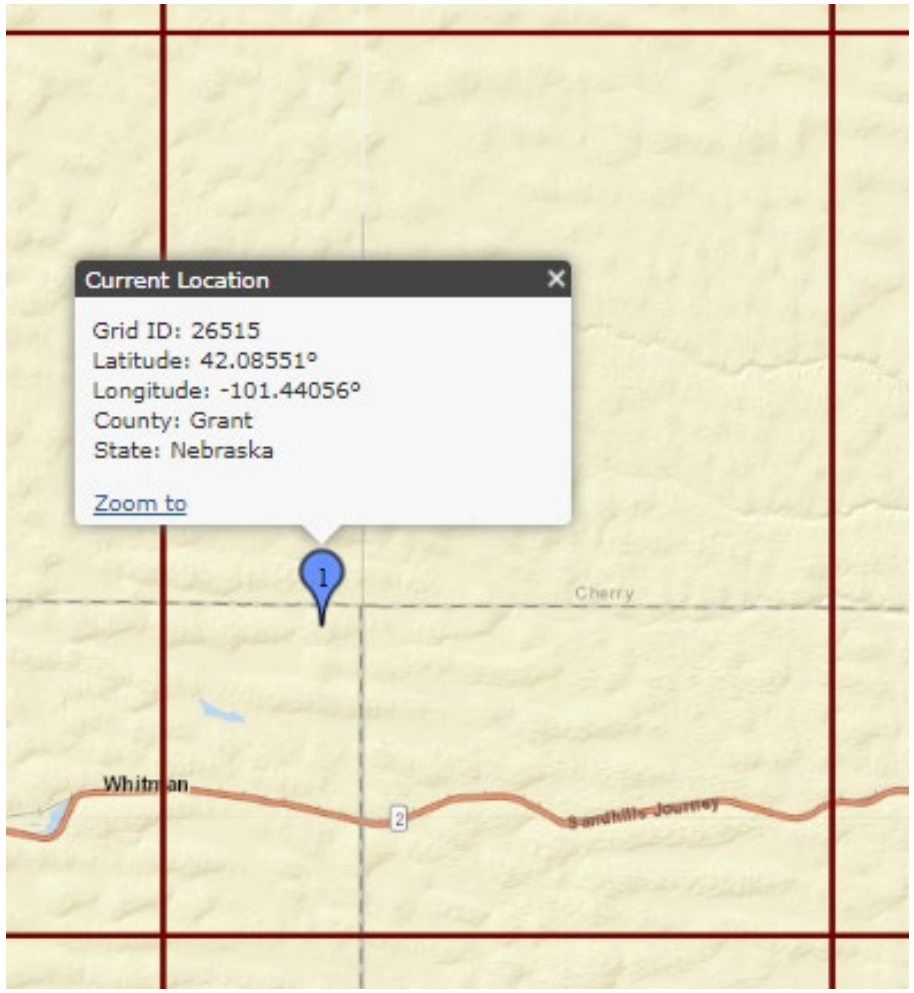
- The expected grid index is compared to the final grid index. Producers may receive an indemnity if the actual final index falls below the trigger grid index, which is adjusted based on the coverage level.



Example:

Gudmundsen
Sandhills
Laboratory
Grid: 26515

Counties:
Cherry
Grant
Hooker



PRF Sample Coverage (Grid 26515)

Production Information	
Intended Use	Grazing
Coverage Level	90%
Productivity Factor	100%
Base Value	$22.60
Amount of Protection	$20.34
Subsidy	51%

Base Strategy

Protection Table (per acre)

Index Interval	Percent of Value (%)	Policy Protection Per Unit	Premium Rate Per $100	Total Premium	Producer Premium
Jan-Feb	15%	$3.05	24.09	$0.73	$0.36
Mar-Apr	15%	$3.05	16.23	$0.50	$0.25
May-Jun	20%	$4.07	13.27	$0.54	$0.26
Jul-Aug	20%	$4.07	13.59	$0.55	$0.27
Sep-Oct	15%	$3.05	21.68	$0.66	$0.32
Nov-Dec	15%	$3.05	26.60	$0.81	$0.40
TOTAL	**100%**	**$20.34**	**N/A**	**$3.80**	**$1.86**

PRF Sample Coverage (Grid 26515)

Year	Indemnity
2021	$1.71
2020	$2.27
2019	$0.81
2018	$0.00
2017	$1.52
2016	$0.68
2015	$1.23
2014	$1.36
2013	$1.48
2012	$7.08

Year	Indemnity
2011	$1.32
2010	$0.71
2009	$1.22
2008	$3.26
2007	$1.28
2006	$5.02
2005	$7.96
2004	$1.68
2003	$7.77
2002	$10.59

Premium	$1.86
Average Indemnity	$2.95
Producer Loss Ratio	1.58

Net Positive
(Indemnity > Premium)
35% (7/20 years)

Base Strategy

PRF Sample Coverage (Grid 26515)

Production Information	
Intended Use	Grazing
Coverage Level	90%
Productivity Factor	100%
Base Value	$22.60
Amount of Protection	$20.34
Subsidy	51%

Growing Season Strategy

Protection Table (per acre)

Index Interval	Percent of Value (%)	Policy Protection Per Unit	Premium Rate Per $100	Total Premium	Producer Premium
Jan-Feb					
Mar-Apr					
May-Jun	50%	$10.17	13.27	$1.35	$0.66
Jul-Aug	50%	$10.17	13.59	$1.38	$0.68
Sep-Oct					
Nov-Dec					
TOTAL	**100%**	**$20.34**	**N/A**	**$2.73**	**$1.34**

PRF Sample Coverage (Grid 26515)

Year	Indemnity
2021	$0.64
2020	$0.70
2019	$0.00
2018	$0.00
2017	$1.45
2016	$0.00
2015	$2.24
2014	$0.00
2013	$0.00
2012	$11.22

Year	Indemnity
2011	$0.00
2010	$0.00
2009	$0.00
2008	$0.00
2007	$0.21
2006	$6.14
2005	$6.03
2004	$0.01
2003	$13.03
2002	$10.13

Premium	$1.34
Average Indemnity	$2.59
Producer Loss Ratio	1.93

Net Positive
(Indemnity > Premium)
35% (7/20 years)

Growing Season Strategy

PRF Sample Coverage (Grid 26515)

Production Information	
Intended Use	Grazing
Coverage Level	75%
Productivity Factor	100%
Base Value	$22.60
Amount of Protection	$16.95
Subsidy	59%

Lower Coverage Base Strategy

Protection Table (per acre)

Index Interval	Percent of Value (%)	Policy Protection Per Unit	Premium Rate Per $100	Total Premium	Producer Premium
Jan-Feb	15%	$2.54	18.29	$0.47	$0.20
Mar-Apr	15%	$2.54	10.19	$0.26	$0.11
May-Jun	20%	$3.39	8.17	$0.28	$0.12
Jul-Aug	20%	$3.39	7.78	$0.26	$0.10
Sep-Oct	15%	$2.54	16.56	$0.42	$0.17
Nov-Dec	15%	$2.54	21.05	$0.54	$0.22
TOTAL	**100%**	**$16.95**	**N/A**	**$2.22**	**$0.92**

PRF Sample Coverage (Grid 26515)

Year	Indemnity
2021	$0.94
2020	$0.83
2019	$0.30
2018	$0.00
2017	$0.43
2016	$0.18
2015	$0.22
2014	$0.77
2013	$0.46
2012	$4.70

Year	Indemnity
2011	$0.81
2010	$0.20
2009	$0.72
2008	$2.24
2007	$0.68
2006	$2.65
2005	$5.76
2004	$1.18
2003	$5.41
2002	$7.20

Lower Coverage
Base Strategy

Premium	$0.92
Average Indemnity	$1.78
Producer Loss Ratio	1.94

Net Positive
(Indemnity > Premium)
40% (8/20 years)

2017-2021 PRF County Coverage Data

Cherry

Coverage Level	Policies Earning Premium	Policies Indemnified	Acres	Producer Loss Ratio
70%	4	2	56,571	0.45
75%	29	15	602,491	1.31
80%	7	4	64,039	0.33
85%	62	34	322,790	0.93
90%	48	32	498,673	0.40

Pasture, Rangeland, Forage Insurance
NEBRASKA Summary

Crop Year	Policies Earning Premium	Policies Indemnified	Acres	Total Premiums	Total Subsidies	Total Indemnities	Producer Loss Ratio
2013	2,362	1,840	3,464,062	$ 11,388,137	$ 6,001,684	$ 6,890,629	1.28
2014	1,243	779	1,864,877	$ 5,962,614	$ 3,125,538	$ 4,356,850	1.54
2015	1,101	679	1,796,745	$ 6,884,276	$ 3,631,584	$ 3,531,928	1.09
2016	1,001	711	1,590,989	$ 10,393,580	$ 5,500,791	$ 5,149,449	1.05
2017	1,134	922	2,178,807	$ 10,385,486	$ 5,468,531	$ 5,668,632	1.15
2018	1,066	532	2,164,797	$ 10,773,373	$ 5,668,503	$ 2,229,136	0.44
2019	1,084	512	2,216,647	$ 8,778,012	$ 4,624,190	$ 2,493,274	0.60
2020	1,280	998	1,880,200	$ 9,016,206	$ 4,764,296	$ 12,166,211	2.86
2021	1,951	1,744	3,553,498	$ 17,827,403	$ 9,410,597	$ 19,695,821	2.34
2022	2,547	2,319	4,499,646	$ 23,553,386	$ 12,369,925	$ 49,590,989	4.43
Average	**1,477**	**1,104**	**2,521,027**	**$ 11,496,247**	**$ 6,056,564**	**$ 11,177,292**	**2.05**

Source: USDA-RMA, Summary of Business, June 19, 2023

2021 PRF Insurance Summary - Nebraska

Cov. Level Percent	Policies Earning Premium	Policies Indemnified	Acres	Total Premiums	Total Subsidies	Total Indemnities	Producer Loss Ratio
70%	73	64	96,581	$ 230,471	$ 136,087	$ 244,194	2.59
75%	115	103	555,661	$ 1,666,401	$ 983,192	$ 1,367,538	2.00
80%	58	38	115,782	$ 343,195	$ 188,766	$ 298,521	1.93
85%	310	294	802,158	$ 3,795,951	$ 2,087,889	$ 3,979,622	2.33
90%	1,188	1,101	1,984,435	$ 11,795,198	$ 6,016,603	$ 13,817,880	2.39
Total	**1,744**	**1,600**	**3,554,617**	**$17,831,216**	**$ 9,412,537**	**$19,707,755**	**2.34**

Source: USDA-RMA, Summary of Business

2017-2021 PRF County Coverage Data

Southwest Counties: Chase, Dundy, Frontier, Furnas, Gosper, Hayes, Hitchcock, Red Willow

Coverage Level	Policies Earning Premium	Policies Indemnified	Acres	Producer Loss Ratio
70%	19	10	24,421	1.06
75%	14	13	7,306	2.40
80%	16	12	89,120	0.67
85%	76	73	104,297	2.50
90%	446	372	878,112	1.79

2017-2021 PRF County Coverage Data

Panhandle Counties: Banner, Box Butte, Cheyenne, Dawes, Deuel, Garden, Kimball, Scotts Bluff, Sheridan, Sioux

Coverage Level	Policies Earning Premium	Policies Indemnified	Acres	Producer Loss Ratio
70%	26	15	108,474	4.58
75%	209	201	850,007	2.88
80%	18	14	75,901	3.65
85%	115	104	454,161	2.29
90%	613	547	3,371,686	2.17

Market Risk

- Fluctuations in prices paid for inputs and received for outputs by the firm after committing to plan of action.
- Contributing factors include
  - National and regional production
  - Demand (including quality issues)
  - Government programs
  - Seasonal effects
- Controls
  - Forward pricing or contracting
  - Diversified market timing
  - Diversified production
  - Selecting low price risk enterprises
  - Obtaining market information
  - Marketing/value add agreements
  - Crop Insurance

Marketing Contracts

- Transfer risk outside the business
- National Price Risk (Chicago Mercantile Exchange or CME price)
  - Futures contract
  - Options contract
  - LRP insurance contract
- Local Price Risk
  - Cash contract
  - Basis contract

Futures Price
+ Basis
Local Cash Price

Livestock Risk Protection (LRP) Insurance for Cattle

- LRP insurance offers ***national price*** protection for cattle producers based on the CME Feeder Cattle index.
- Available in all counties across all states for:
  - Feeder Cattle Weight 1 (< 600 lbs.)
  - Feeder Cattle Weight 2 (600-900 lbs.)
  - Fed Cattle (> 900 lbs.)
- Operates like a (European) Put Option
  - Offered for 13, 17, 21, 26, 30, 34, 39, 43, 47 or 52-week periods
- Producers remain subject to ***basis price risk***

Table 1: Livestock Risk Protection Feeder Cattle Insurance (LRP-Feeder Cattle) Usage in Nebraska 2012-2023.

Year	Policies Sold	Policies Earning Prem	Quantity (Head)	Liabilities ($)	Total Prem ($)	Policies Indemnified	Indemnity ($)	Loss Ratio	Subsidy ($)	Subsidy (%)	Producer Prem ($)	Producer Loss Ratio
2012	1376	230	27202	27122685	773296	136	980198	1.27	100527	13%	672769	1.46
2013	1386	85	10386	10806100	282484	34	247183	0.88	36718	13%	245766	1.01
2014	1310	197	25398	32211424	701899	2	252	0.00	91247	13%	610652	0.00
2015	1457	141	15456	23890729	616680	69	872264	1.41	80165	13%	536515	1.63
2016	1402	75	9885	10773447	460552	67	625482	1.36	60411	13%	400141	1.56
2017	1552	191	21735	20816435	995861	50	195421	0.20	128310	13%	867551	0.23
2018	1224	117	15802	16967064	640475	45	406191	0.63	82998	13%	557477	0.73
2019	1238	69	9095	10390904	309240	47	584929	1.89	40691	13%	268549	2.18
2020	1237	46	7325	8403175	324531	18	224896	0.69	70725	22%	253806	0.89
2021	1721	291	62555	74252751	3126675	211	1144021	0.37	1105096	35%	2021579	0.57
2022	2595	599	200590	273807929	11230777	473	11175056	1.00	3952029	35%	7278748	1.54
2023*	2295	1376	494441	848720103	32548606	218	5948278	0.18	11330679	35%	21217927	0.28
AVERAGE	**1566**	**285**	**74989**	**113180229**	**4334256**	**114**	**1867014**	**0.43**	**1423300**	**33%**	**2910957**	**0.64**

*2023 is still in progress.

Source: https://www.rma.usda.gov/en/Information-Tools/Summary-of-Business, September 5, 2023.

LRP Example – early August to early November

LRP-Feeder Cattle Example Performance for Steers Weight 2 (600-900 lbs.) and Heifers Weight 1 (< 600 lbs.)												
Purchase Date	Expected Ending Value (Nov 5-7)	Actual Ending Value (Nov 5-7)	Net Change in Ending Value	Coverage Price	Indemnity	Total Premium	Subsidy[1]	Producer Premium	Net LRP Effect	Effective National Price	Deviation from Expected Ending Value	Indemnity Ratio (Indemnity /Producer Premium)
8/8/2005	105.335	116.06	$10.73	98.34	0	0.804	0.105	0.70	($0.70)	115.36	$10.03	0.00
8/7/2006	115.273	103.20	($12.07)	108.32	5.12	1.037	0.135	0.90	$4.22	107.42	($7.85)	5.69
8/6/2007	117.336	108.76	($8.58)	116.01	7.25	3.182	0.414	2.77	$4.48	113.24	($4.10)	2.62
8/6/2008	118.101	96.59	($21.51)	117.40	20.81	4.669	0.607	4.06	$16.75	113.34	($4.76)	5.13
8/6/2009	101.586	93.15	($8.44)	99.71	6.56	2.806	0.365	2.44	$4.12	97.27	($4.32)	2.69
8/6/2010	113.395	111.32	($2.08)	109.90	0	2.204	0.287	1.92	($1.92)	109.40	($4.00)	0.00
8/8/2011	135.654	141.97	$6.32	131.65	0	3.484	0.453	3.03	($3.03)	138.94	$3.29	0.00
8/6/2012	141.348	144.12	$2.77	122.85	0	0.441	0.057	0.38	($0.38)	143.74	$2.39	0.00
8/6/2013	160.211	164.59	$4.38	159.54	0	3.693	0.480	3.21	($3.21)	161.38	$1.17	0.00
8/6/2014	219.081	240.36	$21.28	216.93	0	5.764	0.749	5.01	($5.01)	235.35	$16.27	0.00
8/7/2015	206.948	188.47	($18.48)	200.82	12.35	3.776	0.491	3.29	$9.06	197.53	($9.42)	3.75
8/8/2016	142.000	126.46	($15.54)	140.68	14.22	5.786	0.752	5.03	$9.19	135.65	($6.35)	2.83
8/8/2017	144.965	159.01	$14.05	140.12	0	5.279	0.686	4.59	($4.59)	154.42	$9.45	0.00
8/6/2018	152.700	153.32	$0.62	151.88	0	5.083	0.661	4.42	($4.42)	148.90	($3.80)	0.00
8/6/2019	138.671	146.26	$7.59	137.97	0	5.669	1.134	4.54	($4.54)	141.72	$3.05	0.00
8/6/2020	146.970	136.63	($10.34)	145.85	9.22	5.526	1.934	3.59	$5.63	142.26	($4.71)	2.57
8/6/2021	166.700	154.62	($12.08)	165.43	10.81	5.944	2.080	3.86	$6.95	161.57	($5.13)	2.80
8/8/2022	188.763	176.59	($12.17)	187.69	11.10	6.481	2.268	4.21	$6.89	183.48	($5.28)	2.64
Average	**145.280**	**142.30**	**($2.98)**	**141.73**	**5.41**	**3.979**	**0.759**	**3.22**	**$2.19**	**144.50**	**($0.78)**	**1.68**

[1]Subsidy from 2005-18 is 13%, 2019 is 20%, 2020-22 is 35%.

Source: http://www3.rma.usda.gov/apps/livestock_reports/

Nebraska Ranch Practicum Marketing Exercise

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Institute of Agriculture and Natural Resources

July 6, 2023

Cattle Markets and Marketing Strategies Homework

Today, you are thinking about protecting price on the following calves:

293 head of 580 lb. Steers
195 head of 540 lb. Heifers

You expect to market these animals in mid-October at the local auction market.

Market Information:

- Current Nebraska Weekly Feeder Cattle Averages Auction Summary

500-600 lb.	Steers	$267.00
500-600 lb.	Heifers	$239.00

- Current October 2023 CME Feeder Cattle Futures Price $245.975
- Current LRP Feeder Cattle Insurance Expected Ending Values

Oct 25, 2023	Steers Weight 1	$270.570
Oct 25, 2023	Heifers Weight 1	$245.973

- Current put option price for October 2023 CME Feeder Cattle Futures

Strike Price: $246.00 Premium: $8.275

- Video auctions are offering for on ranch load out in mid-October (assume ending weight is certain)

Steers	$260.00
Heifers	$235.00

Potential Actions

A. Sell _____ 50,000-pound feeder cattle futures contract(s) at $245.975.

B. Purchase _____ 50,000 pound put option contract(s) at $246 for $8.275 per cwt.

C. Purchase LRP insurance contract(s) (see attached LRP offers on next page)

   a. Steers Weight 1 _____

      _____ head at 580 lbs. at $_____ coverage price for $_____ per cwt. premium

   b. Heifers Weight 1

      _____ head at 540 lbs. at $_____ coverage price for $_____ per cwt. premium

D. Sell on the video auction for October delivery.

   a. Sell _____ steers at $260.00 per cwt.

   b. Sell _____ heifers at $235.00 per cwt.

Current Marketing Opportunities

- Video Auction/Private Contract
  - Steers 550-600 lbs. October Delivery @ $290/cwt.
  - Heifers 500-540 lbs. October Delivery @ $265/cwt.
- CME Feeder Cattle Futures
  - October Feeder Cattle Futures Contract @ $254/cwt
  - Put Option for October Feeder Cattle Futures Contract with $254/cwt. strike price is trading @ $3.80/cwt.