Crop Insurance Update: How should we in Extension talk about crop insurance to farmers?

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Goal Today

- Overview how my crop insurance extension has evolved over the last few years
- Seeking feedback on what you think
  - Especially seeking ideas on what you find that works and does not work in your efforts
- Generate discussion on crop insurance and risk management extension education

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Overview

- Present slides from my presentations to give you an idea of what I do
- Go very fast
- Focus on the method of presentation, not on the content of the slides

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Crop Insurance Extension

- What is crop insurance & risk management
  - Explain policies and terminology
- Hints for using crop insurance in 20XX
- Benefits of crop insurance
  - Histograms and average net returns by coverage level for different average yields
  - Average net returns for GRP
- Practices and Experience with crop insurance
  - Typical farmer practices with crop insurance
  - Farmer loss ratios with crop insurance

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Types of Policies

- APH (MPCI): Actual Production History
  - Individual Yield Insurance
- CRC: Crop Revenue Coverage
  - Individual Revenue Insurance
- GRP: Group Risk Plan
  - Area-wide (County) Yield Insurance
- GRIP: Group Risk Income Protection
  - Area-wide (County) Revenue Insurance

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Four Main Types of Policies

	Individual	Area-Wide (County)
Yield	**APH** Actual Production History	**GRP** Group Risk Plan
Revenue	**CRC** Crop Revenue Coverage	**GRIP** Group Risk Income Protection

Catastrophic coverage (CAT)
50% coverage level 55% price election
APH, GRP, GRIP (not CRC)

AGR-Lite: Insure Schedule F income

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Your Choices

- Once choose which (if any) policy you want, you then have other choices
  - Coverage Level: sets your guarantee level, or your "deductible"
  - Price Election: how much you want to be paid when you have a loss
  - Unit Structure: legally define how group insured fields
    - Optional, Basic, or Enterprise units

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Crop Insurance/Risk Management for Vegetable Producers

- Primarily Education
- What is Risk? What is Risk Management?
- Where crop insurance fits into risk management for vegetable growers
- Explain specifics of AGR-Lite

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Major Categories of Agricultural Risk

1. Production and Technical Risk
2. Market and Price Risk
3. Financial Risk
4. Human Resource Risk
5. Legal and Institutional Risk

Go over each and provide examples

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Tools to Manage Risks

Numerous risk management tools exist, but they generally fall into these 3 categories

1) Reduce variability of outcomes
2) Maintain decision making flexibility
3) Improve risk bearing capability

I'll overview some tools to manage these risks and how they fit into these categories to give you the idea

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Example Tools to Reduce Income Variability

- Insurance
  - Crop insurance (more on this later)
  - Business liability insurance
- Inputs
  - Productive and protective inputs
  - Legal advice
- Diversification

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Summary and Outputs

- Fact Sheets and meeting overheads
- An Overview of Federal Crop Insurance in Wisconsin: 22 page summary of everything
- Does not seem to go very far
  - Either already know it, or too detailed and beyond them
- Gets me phone calls and emails for crop insurance questions

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Hints for Using Crop Insurance

- Boil it down to two pages with bullet points of recommendations

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Hints for Using Crop Insurance in 2008

- Why think about crop insurance this year?
- Yield Risk: (probably) the same as it has always been
- Price Risk: increased because volatility has increased with crop prices
- Investment Risk: high input costs mean larger investment in planted fields: want more protection against crop failure/loss

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CRC Revenue Insurance will be popular

- Price and investment risks are more important this year
- CRC offers price risk protection based on CBOT futures prices
- CRC offers a revenue guarantee to protect your investment in crop inputs
- Can market more aggressively since you will have the grain or the indemnities to buy grain at existing market prices if you have a yield loss
- Dairy/Livestock farmers: CRC means can buy grain at existing market prices if have yield loss

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Crop Insurance Hints for 2008

- Coverage Level for APH and CRC
  - 70-75% most popular and typically maximizes expected returns (or pretty close)
  - Sometimes 65% or 80% are better, but often not by much in terms of expected returns
  - 80% and 85% CRC often quite expensive and don't increase expected returns that much
- Price Election for APH: take 100%
  - Most poplar, maximizes expected returns
  - If have a loss, want largest payment possible

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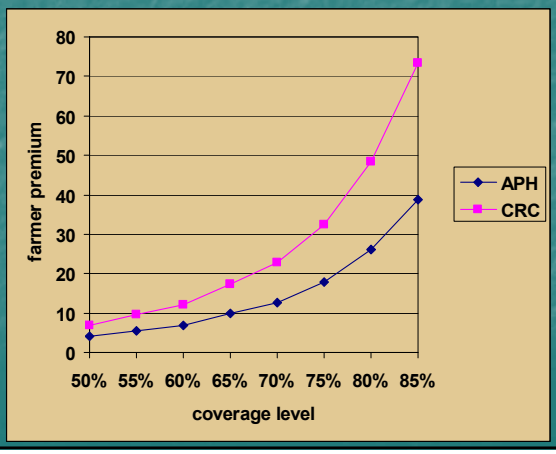
- Premiums much higher in 2008
- Premiums are proportional to prices: 10% price increase = 10% premium increase
- Rise fast after 75% coverage (less subsidy)



Calumet County 2007 farmer premiums for corn with 150 bu/A APH yield

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Unit Structure

- All coverage is at the unit level: if total yield for a unit falls below its guarantee, triggers indemnity payments
- Units: Optional, Basic, and Enterprise Units
- Get as many Optional Units as you can
  - More likely trigger a payment if have a loss
  - Worth slightly larger cost for optional units
  - WI data: larger farms, CRC with many units

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GRP/GRIP

- Yield Basis: Value of GRP/GRIP depends on how your yield moves with county yield
- Potentially useful for irrigated farmers or those with short (or no) yield histories
  - Offset irrigation costs in dry years
  - Use while build yield history
  - Combine GRP/GRIP with crop hail
  - GRIP: cheap way to get price protection
- Larger/low risk farms use it as well

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GRP/GRIP for Corn in Wisconsin

- Important issue for Corn: Which county yield do you choose to insure, yield per planted acre or yield per harvested acre?
- Only in Wisconsin is there a choice
- Because of dairy, in years with marginal corn yields, poorer corn chopped for silage
  - Yield per harvested acre can remain high, even though it's a bad year
- Which is better? Depends on the county!

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Summary and Outputs

- Fact Sheets and meeting overheads
- Parts get quoted in newspapers
- Seems to get more "traffic"
- Does not change much from year to year, so hard to write/update

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Benefits of crop insurance

- Benefits of crop insurance
  - Histograms and average net returns by coverage level for different average yields
  - Average net returns for GRP

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Benefit of Crop Insurance

- Crop yield is uncertain: money borrowed, inputs bought, crop planted without knowing for certain how much yield will you get at harvest
- Each possible yield has a probability and farmers usually have some idea of the likelihood of each yield outcome
- Implies a yield distribution or histogram

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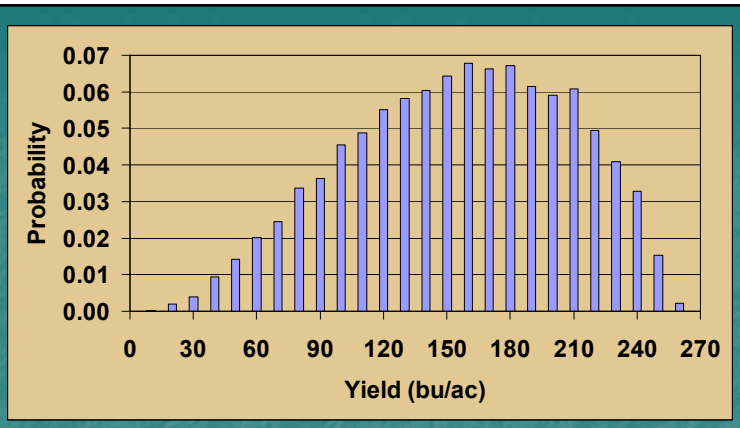

Corn Yield Histogram

Monte Carlo simulations in Excel using a Beta distribution

Average Yield 150 bu/ac, Standard Deviation 52.5 bu/ac

Coefficient of Variation (CV) = StDev/Avg = 35%

Minimum 0 bu/ac, Maximum 255 bu/ac

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Effect of Crop Insurance

- With crop insurance you pay a premium no matter what happens, and receive an indemnity only if your yield is below the yield guarantee
- The premium reduces your returns in all outcomes (shifts the distribution down/left)
- The indemnity puts a "floor" on your returns so you will receive at least your yield guarantee (piles up histogram at the yield guarantee)

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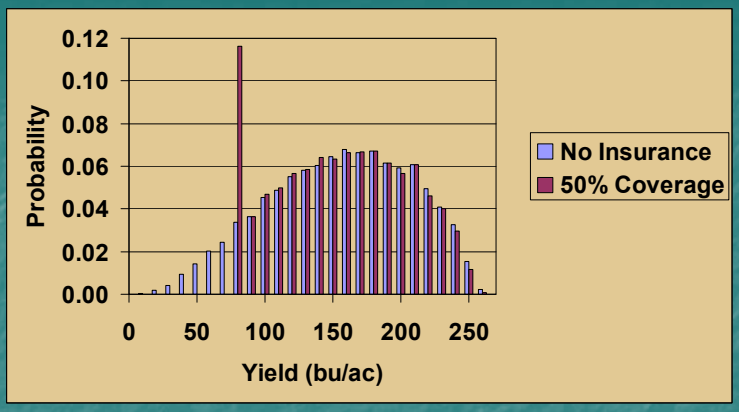

Same yield distribution as before, plus crop insurance

Yield guarantee = 50% coverage X 150 bu/ac = 75 bu/ac
See "pile up" of yield outcomes at the 75 bu/ac guarantee

Hard to see the slight shift due to the premium reducing returns, clearest at right end: blue higher than maroon bars

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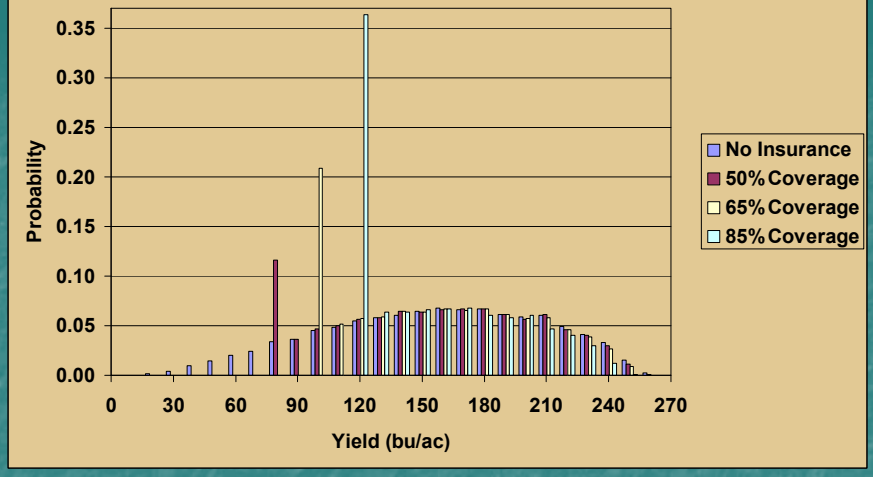

Effect of Coverage Level: Higher coverage shifts yield "floor" right (75 bu, 98 bu, 128 bu), makes higher "pile" at the floor since receive indemnities more often

- Hard to see effect of higher premiums on upper end

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Main Point and Next Question

- Crop insurance reduces risk by eliminating low yield outcomes for a relatively small price (the premium)
- Higher coverage levels give greater risk reduction, but have higher premiums
- Government subsidizes premiums, so crop insurance is supposed to be a winning bet.
- **Is this true???—Do you on average make money with APH???**

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Is APH worth it?

- Monte Carlo simulations to estimate net return = average indemnity – premium
- Corn price: $3.30/bu
- Vary mean yields
  - 120 to 160 bu/ac dryland corn
  - 170 to 210 irrigated corn
  - 30 to 50 bu/ac dryland soybeans
- Yield Coefficient of Variation (CV)
  - 25% to 35% for dryland corn and soybeans
  - 20% to 35% for irrigated corn

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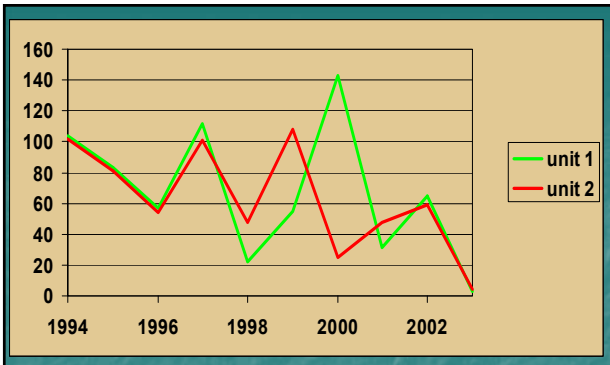

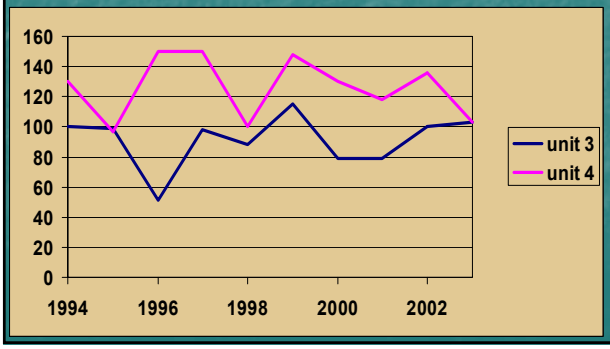

What do variable yields look like?

	unit 1	unit 2
avg	67.5	63.0
stdev	43.6	34.6
cv	65%	55%

	unit 3	unit 4
avg	91.2	126
stdev	17.9	20.8
cv	20%	16%

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APH Net Return ($/ac) Dryland Corn, **High** Risk Adams County

Coverage Level	Average Yield (bu/ac) 120	130	140	150	160
50%	-0.41	-0.25	-0.10	0.03	0.17
55%	-0.30	-0.07	0.13	0.33	0.52
60%	0.13	0.43	0.71	0.98	1.23
65%	0.27	0.66	1.03	1.39	1.73
70%	**0.68**	1.19	1.67	2.13	2.57
75%	0.62	**1.28**	**1.90**	**2.49**	**3.05**
80%	-0.15	0.69	1.49	2.24	2.95
85%	-3.03	-1.93	-0.91	0.05	0.95

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APH Net Return ($/ac) Soybeans **High** Risk Adams County

Coverage Level	Average Yield (bu/ac) 170	180	190	200	210
50%	0.13	0.20	0.26	0.31	0.37
55%	0.21	0.30	0.38	0.47	0.54
60%	0.32	0.44	0.56	0.67	0.78
65%	0.37	0.54	0.69	0.85	0.99
70%	**0.44**	0.65	0.86	1.06	1.25
75%	0.38	**0.67**	**0.92**	**1.18**	**1.41**
80%	0.11	0.46	0.78	1.09	1.38
85%	-0.54	-0.08	0.30	0.68	1.02

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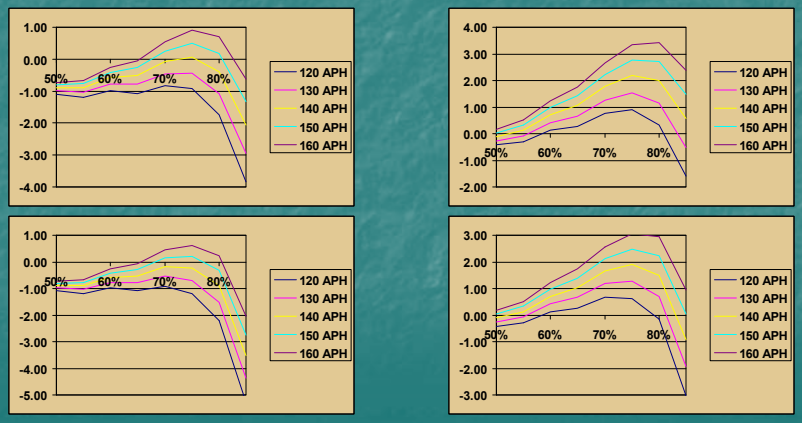
Corn APH Net Returns ($/ac) by Coverage Level

Medium Risk (left) and High Risk (right)

Adams (top) and Juneau (btm)



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APH for Dryland Corn in Adams and Juneau Counties

- To make money on average with APH, need
  - Higher yield risk/variability (more indemnities)
  - Higher average yield (lower premiums)
- Best deal is 70%-80% coverage
- On average, will not make or lose much money (± about $3/ac)
  - Avoid high coverage levels with low average yield
  - Higher coverage levels better with higher average yield
- **Remember: APH still gives risk benefit of no low yields (creates yield "floor")**

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Do similar analysis for GRP

- Average GRP net return (bu/ac) by county
  - Linear time trend regression of county yield and estimated standard error of regression
- WI: for corn must choose yield per planted acre vs yield per harvested acre

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Is GRP a good deal for my Corn and Soybeans?

- Bulletins posted on my webpage (soybeans soon)
- Analyze county yield data and estimate the expected return to GRP in bu/ac for each Wisconsin county that has GRP
- Expected return = long run average net return to GRP if everything constant over many years
- If GRP is valuable for a county, GRIP will be valuable too, as it adds price protection
- If GRP is not valuable for a county, GRIP can still make sense, to get the price protection

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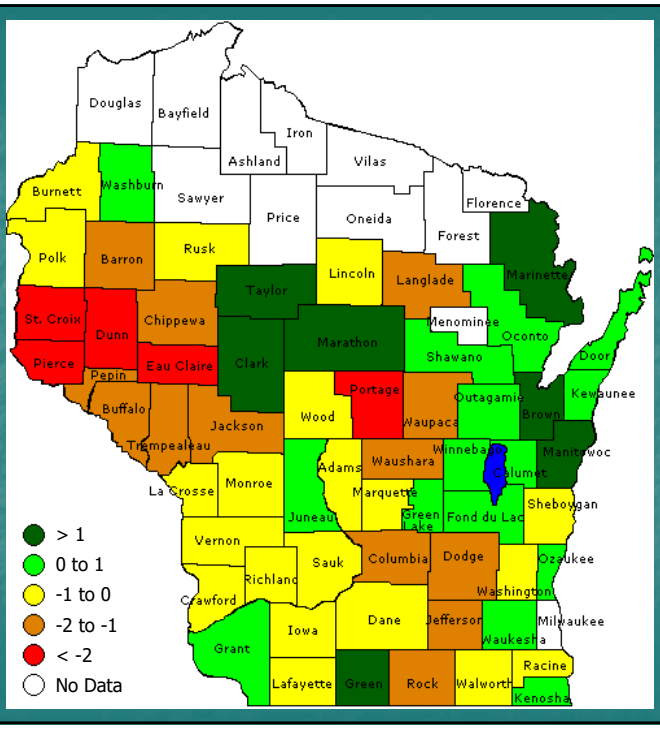
Expected Net Return (bu/ac) to corn GRP using the **Harvested Acres Option**, **regression** estimated expected yield



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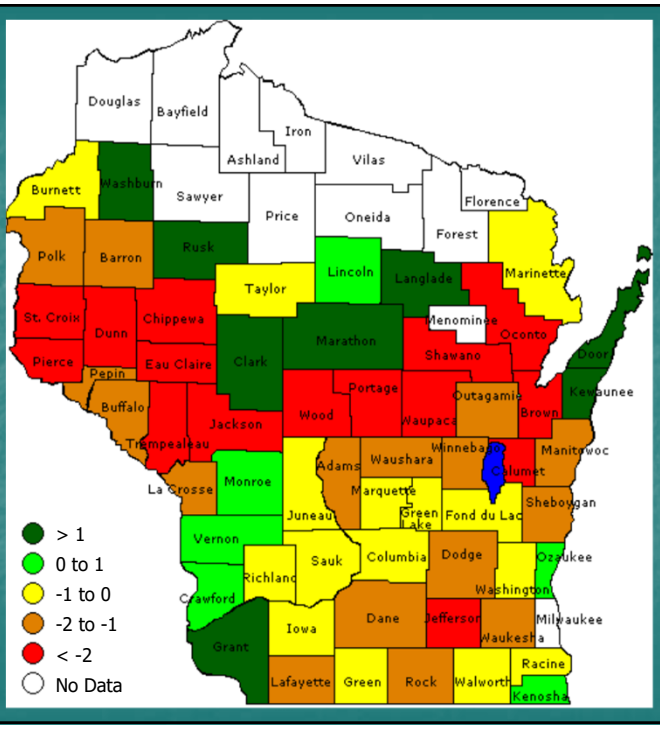
Expected Net Return (bu/ac) to corn GRP using the **Planted Acres Option**, **regression** estimated expected yield



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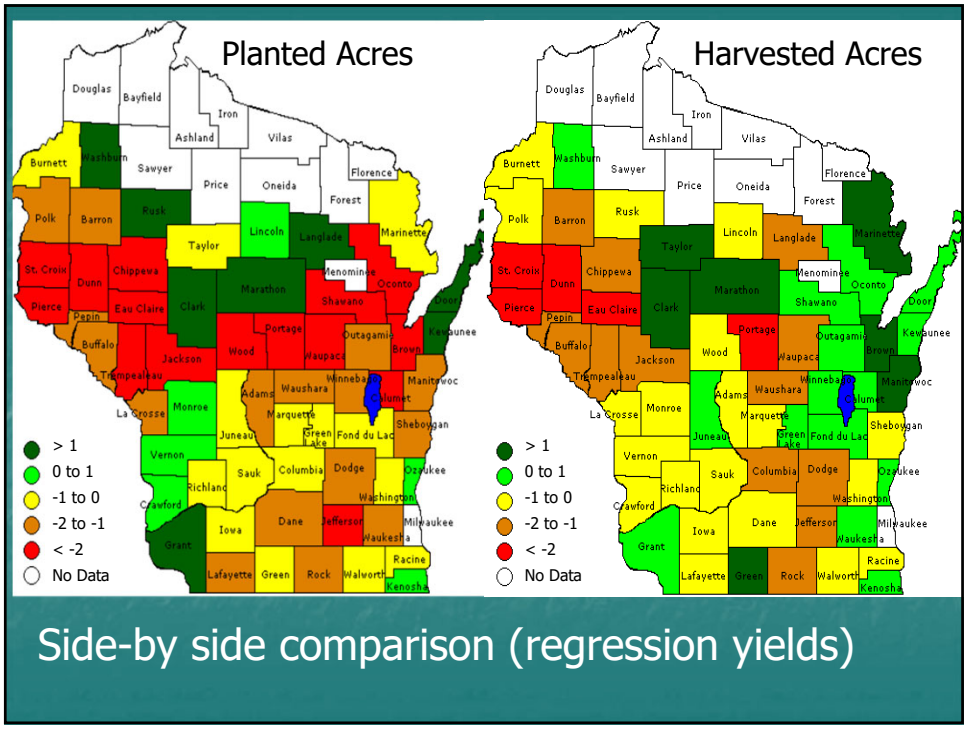

Side-by side comparison (regression yields)

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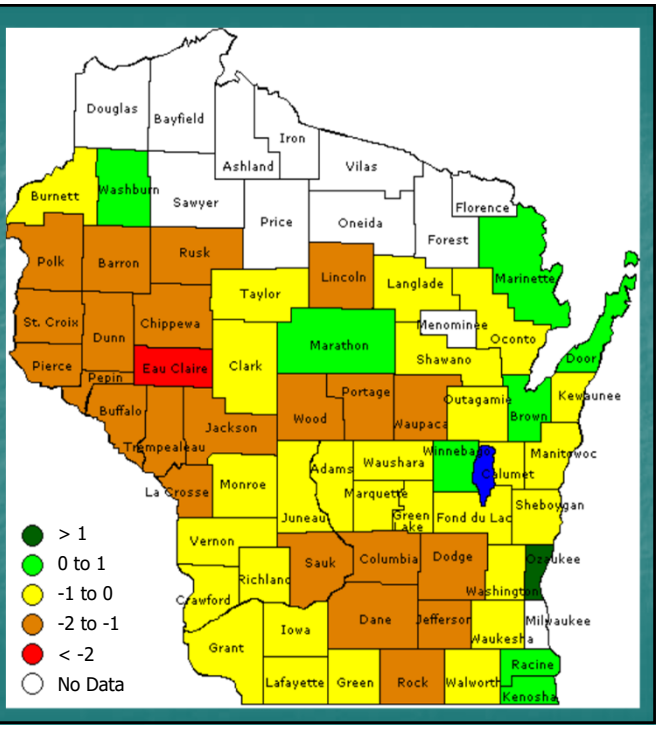
Expected Net Return (bu/ac) to corn GRP using the **Harvested Acres Option**, **RMA** estimated expected yield



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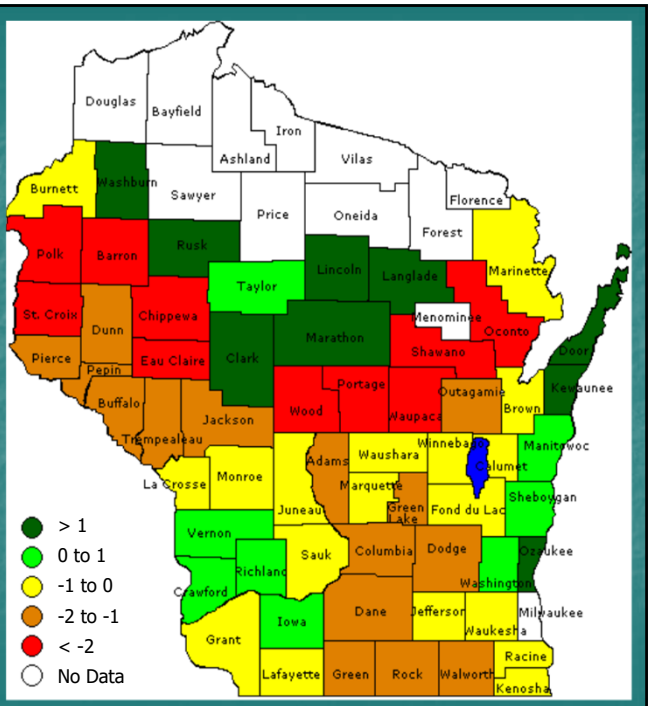
Expected Net Return (bu/ac) to corn GRP using the **Planted Acres Option**, **RMA** estimated expected yield



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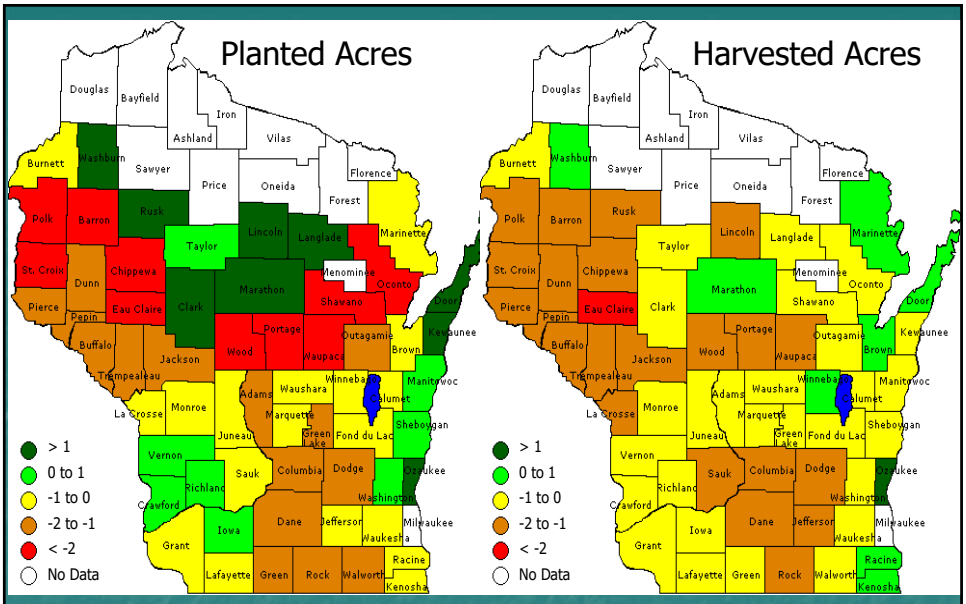

Side-by side comparison (RMA yields)

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Summary and Outputs

- Fact Sheets and meeting overheads
- Tables of numbers and plots of net returns by coverage level: Too complicated!!!
- GRP maps pretty, but small market
- Still only presents average net return to crop insurance—ignores risk benefit

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Practices and Experience

- What are farmers are doing with crop insurance?
  - Typical practices
- What does crop insurance do for farmers?
  - Loss ratios
- Let farmers compare themselves to "typical" WI farmer

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Wisconsin farmers and crop insurance

- Relative to neighboring states, WI a low participation state in crop insurance
- CRC the most popular coverage, then APH, then GRIP, then GRP
- APH CAT policies used by sizeable minority

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WI vs. neighboring states

% planted acres insured in **2007**

State	Corn	Soybeans	Wheat
IA	92%	75%	24%
IL	78%	71%	47%
MN	91%	93%	91%
MI	67%	66%	56%
WI	**64%**	**70%**	**41%**

WI in 2004: 54% corn, 63% Soybeans, 33% Wheat

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WI corn policies in **2008**

	% planted acres	% insured acres	% policies sold	Avg. Units/Policy
APH CAT	6.5%	10.9%	10.7%	1.03
APH BuyUp	12.2%	20.5%	30.9%	2.43
CRC BuyUp	40.7%	68.3%	61.3%	3.24
GRIP BuyUp	4.9%	8.3%	4.6%	1.21
GRP CAT	0.2%	0.4%	0.1%	1.00
GRP BuyUp	1.5%	2.6%	3.1%	1.11
All Total	60%			2.83

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WI Farmer Practices

- Lots of WI grain acres could be insured
- CRC most popular among those buying insurance
  - Slightly larger than average sized farms buy it
  - Use more than average number of units
- APH popular among smaller farms
  - Use fewer than average number of units
- GRIP (and GRP) popular among largest farms

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Crop Insurance in Dane County 2008

Crop	Acres	Policies	Liability
Corn (1st)	62.3%	41.9%	69.6%
Forage Prd (3rd/4th)	5.5%	7.1%	2.3%
Forage Seeding	0.3%	1.3%	0.1%
Green Peas	0.1%	0.6%	0.1%
Hybrid Seedcorn	0.7%	0.4%	0.8%
Oats	0.0%	0.2%	0.0%
Soybeans (2nd)	26.8%	32.3%	22.9%
Sweet Corn	0.1%	0.5%	0.1%
Tobacco	0.3%	6.6%	1.7%
Wheat (3rd/4th)	3.9%	8.9%	2.2%
Total	100.0%	100.0%	100.0%

Using 2007 Dane County acres: Corn = 63%, Soybeans = 79% acres insured in 2008

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Policies in Dane County 2008

Crop	Plan	Acres	Policies	Liability	Acres	Policies	Liability
Corn	APH	29,336	192	9,312,799	24%	32%	14%
Corn	CRC	88,062	377	53,244,266	71%	63%	79%
Corn	GRIP	6,142	24	4,542,276	5%	4%	7%
Corn	GRP	622	6	475,320	1%	1%	1%
Soybeans	APH	10,845	118	2,665,874	20%	26%	12%
Soybeans	CRC	41,555	335	18,827,303	78%	73%	84%
Soybeans	GRIP	833	7	706,663	2%	2%	3%
Soybeans	GRP	132	2	82,417	0%	0%	0%

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Corn Coverage Levels in Dane County 2008

	CRC		APH	
Cvg	Policies	Acres	Policies	Acres
50	1	215	78	17,868
55	1	94	2	89
60	6	777	1	285
65	44	9,065	52	5,957
70	147	32,588	40	3,651
75	146	33,329	19	1,486
80	20	6,802		
85	12	5,192		

Most Popular

CRC: 70%-75%

APH: 50% CAT and then 65%

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Crop Insurance in Dane County

- Corn and soybeans by far most important
- CRC most popular, then APH, then GRIP
  - GRIP and CRC: larger farms and higher yields
  - APH: smaller farms and lower yields
- Coverage Levels
  - CRC: 70%-75% corn and soybeans
  - APH: CAT/50% corn, then 65%
  - APF: 65% soybeans
- Dane County a lot like the rest of the state

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Experience with Crop Insurance

- Loss Ratio measures insurance performance
- Loss Ratio = Indemnities/Premiums
  - Loss Ratio of 1.5 means for every $1.00 in premiums collected, policy pays out $1.50
- Crop insurance: Subsidized premiums, farmers and government each pay part
  - Program loss ratio
    = Indemnity/(Govt. + Farmer Premium)
  - Farmer loss ratio = Indemnity/Farmer Premium

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WI Crop Insurance for Corn in **2007**

	total prem. /A	farmer prem. /A	indem./A	program loss ratio	farmer loss ratio
APH CAT	7.48	--	1.97	0.26	--
APH BuyUp	28.30	11.48	29.64	1.05	2.58
CRC BuyUp	53.03	23.16	42.75	0.81	1.85
GRIP BuyUp	65.90	29.52	29.49	0.45	1.00
GRP CAT	2.20	--	0.00	0.00	--
GRP BuyUp	11.20	4.84	2.44	0.22	0.50
All Total	45.48	19.50	30.97	0.68	1.59

-- Farmers pay no per acre premiums, so no farmer loss ratio.

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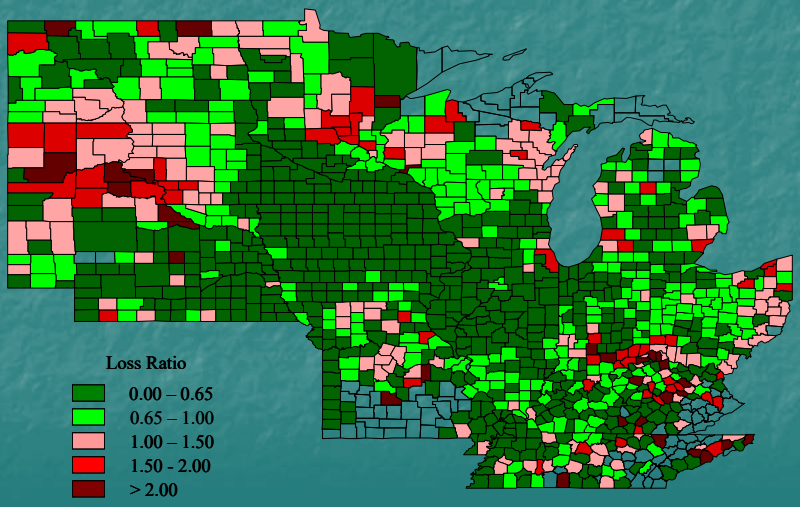
APH+CRC+RA Average County (Program) Loss Ratios for Corn 1995-2007



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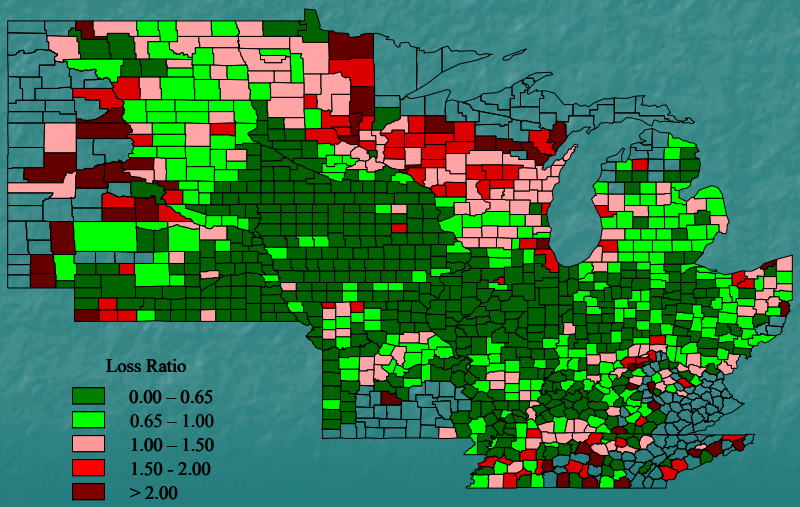
APH+CRC+RA Average County (Program) Loss Ratios for Soybeans 1995-2007



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Main Point

- Farmers, on average over the whole state, generally win on crop insurance policies
  - Especially in the north
  - Especially for soybeans
- Main corn/soybean counties "carry" the crop insurance program for the remaining counties
  - NE, IA, IL, MN

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WI Vegetable Crop Participation

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WI Potatoes: low participation

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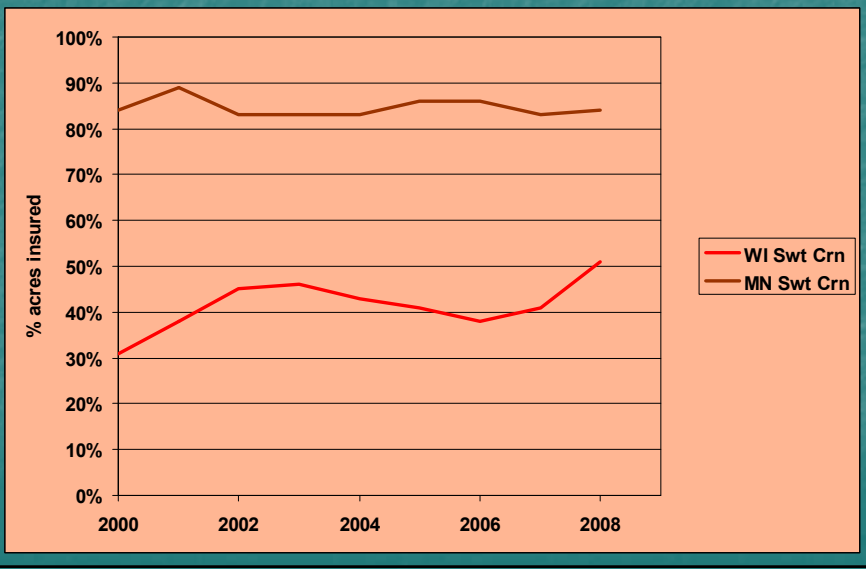
WI Sweet Corn: low participation



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Low Participation for WI Green Peas, but not for WI Snap Beans

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Coverage Levels

Coverage Level	Potatoes	Sweet Corn	Snap Beans	Green Peas
50%	**40%**	**27%**	**33%**	**25%**
55%	2%	3%	2%	2%
60%	9%	9%	13%	11%
65%	12%	19%	**20%**	17%
70%	**21%**	**27%**	**20%**	**31%**
75%	16%	16%	13%	15%

50%/CAT and 70% most common

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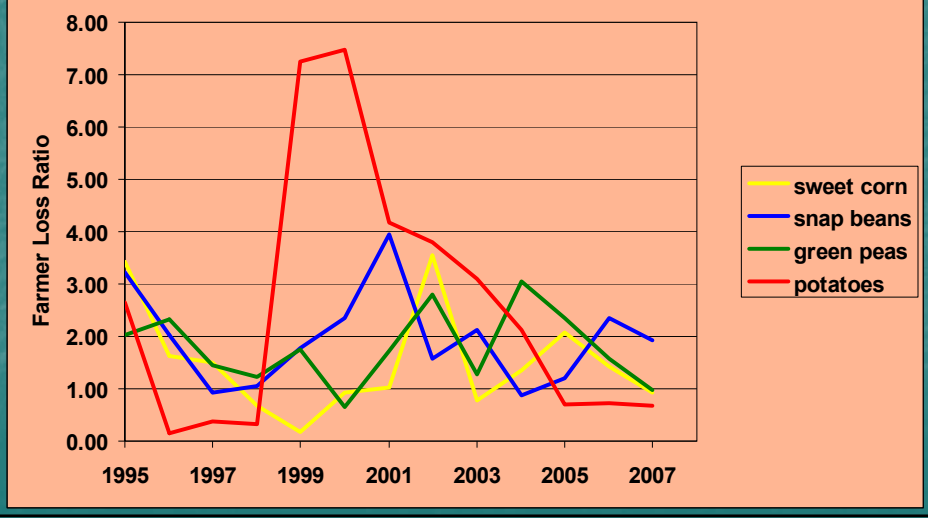
WI Farmer Loss Ratios for Vegetable Crops



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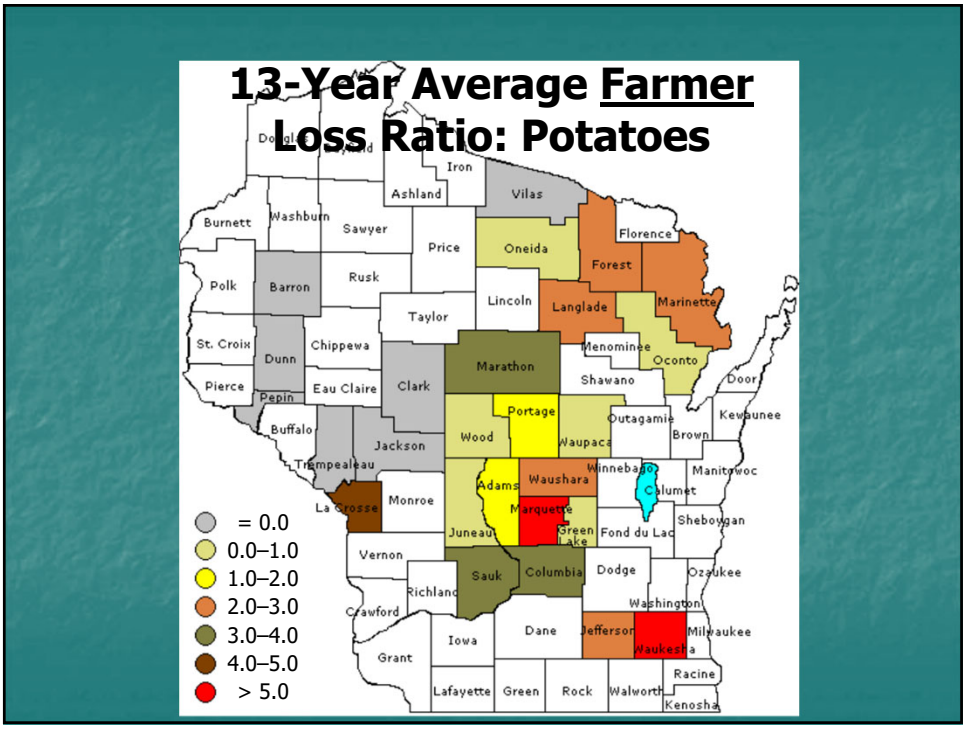

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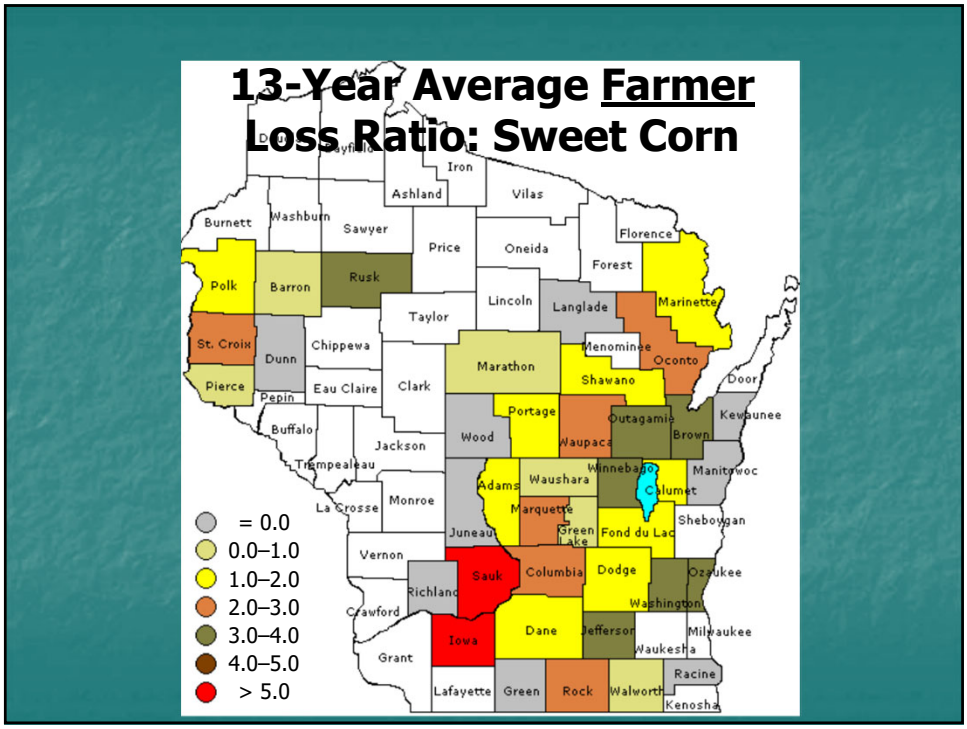
13-Year Average Farmer Loss Ratio: Sweet Corn
Iron
Ashland
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Marinette
St. Croix
Dunn
Chippewa
Marathon
Menominee
Oconto
Door
Pierce
Pepin
Eau Claire
Clark
Shawano
Portage
Outagamie
Kewaunee
Buffalo
Jackson
Wood
Waupaca
Brown
Trempealeau
Winnebago
Manitowoc
Adams
Waushara
Calumet
La Crosse
Monroe
Marquette
Sheboygan
Green Lake
Fond du Lac
Juneau
Vernon
Sauk
Columbia
Dodge
Ozaukee
Richland
Washington
Crawford
Dane
Jefferson
Milwaukee
Iowa
Waukesha
Grant
Racine
Lafayette
Green
Rock
Walworth
Kenosha
= 0.0
0.0–1.0
1.0–2.0
2.0–3.0
3.0–4.0
4.0–5.0
> 5.0

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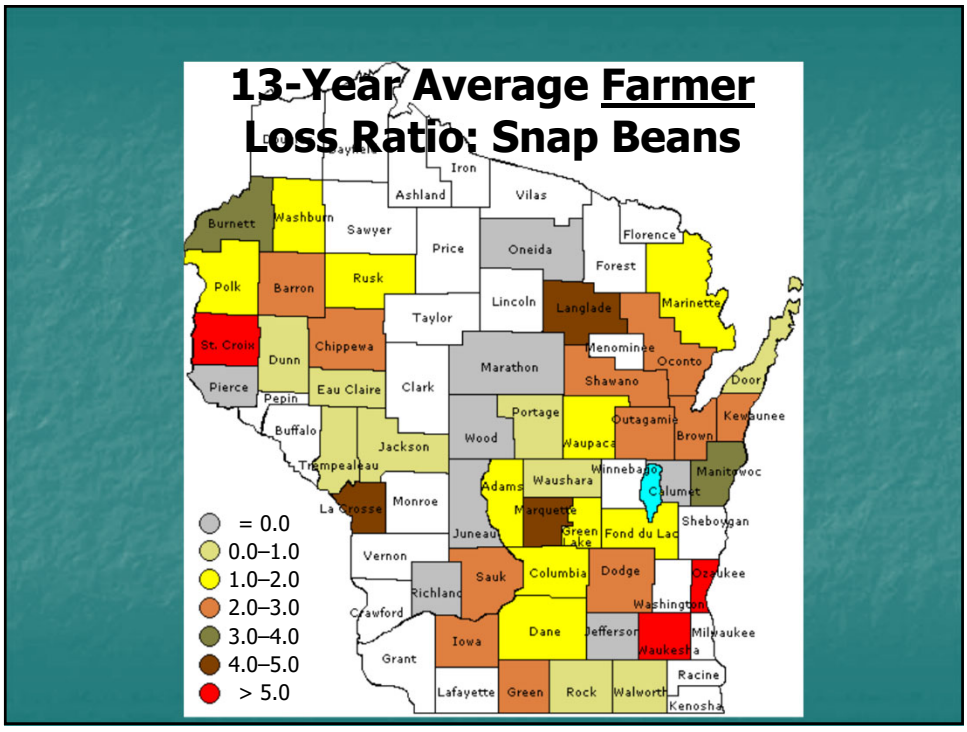
13-Year Average Farmer Loss Ratio: Snap Beans
Iron
Ashland
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Marinette
St. Croix
Dunn
Chippewa
Marathon
Menominee
Oconto
Door
Pierce
Pepin
Eau Claire
Clark
Shawano
Portage
Outagamie
Kewaunee
Buffalo
Jackson
Wood
Waupaca
Brown
Trempealeau
Winnebago
Manitowoc
Adams
Waushara
Calumet
La Crosse
Monroe
Marquette
Sheboygan
Green Lake
Fond du Lac
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Kenosha
= 0.0
0.0–1.0
1.0–2.0
2.0–3.0
3.0–4.0
4.0–5.0
> 5.0

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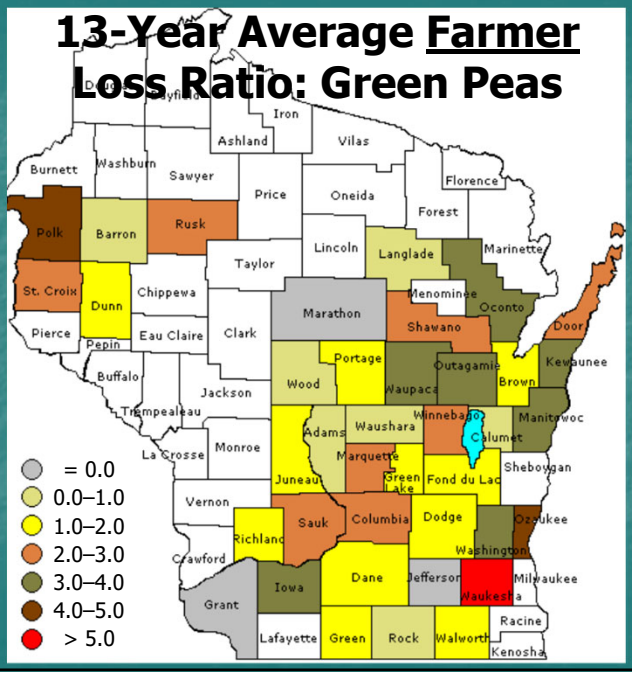
13-Year Average Farmer Loss Ratio: Green Peas



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Summary of Farmer Loss Ratios

- On average across WI, farmers generally make money with crop insurance
- In some counties and for some crops, this has not been the case
- Insurance has risk management benefits not captured by the loss ratio
  - Not only increases average net returns, also reduces net returns variability with yield floor
- Consider at least CAT: $300/crop/county
- Use as many Optional units as possible

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Summary and Outputs

- Meeting overheads
- Maps are pretty
- Creates discussion

- Loss ratios are still only average net return to crop insurance, still ignores risk benefit

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How should we in Extension talk about crop insurance to farmers?

- "Hints for Using Crop Insurance in 20XX"
  - Most useful to boil it down to bullet points of basic recommendations
  - Need some data summary and/or empirical analysis to justify some of recommendations
- Farmer practices and loss ratio experience maps are interesting to many people

- Agricultural Policy and Risk Management Survey: Risk Management Information/Education Section

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Questions?

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