MAKING SOUND CROP INSURANCE DECISIONS

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Executive Summary

After attending this session, farmers will be able to more appropriately select the crop insurance products and coverage levels for their farm.

- The session will begin with a description of crop insurance products including: (i) actual production history, (ii) income protection, (iii) crop revenue coverage, (iv) group risk plan, and (v) group risk income plan insurance. Descriptions will include example calculations of indemnity's payments from each product.

- The session will describe and demonstrate scenario analysis, an approach commonly used to evaluate crop insurance products. This approach is has many strengths, but a major shortcoming of scenario analysis is that all outcomes are not weighted by their chance of occurring. Failure to conduct this weighting can result in incorrect evaluations. A complete risk analysis overcomes this weakness.

- Risk analyses contained on *farmdoc* for each county in Illinois are described in this session. These analyses are included in the crop insurance section and are updated annually for use in the crop insurance signup season. Methods of interpreting this output will be discussed during the session.

- Guidelines for crop insurance choice will be given. Revenue products without guarantee increases (IP, RA-BP) should be used by farmers that do not aggressively hedge crops prior to harvest. Revenue products with guarantee increases (CRC, RA-HP) should be used by farmers who hedge aggressively prior to harvest. County-level products (GRP, GRIP) are excellent choices for farmsteads in strong financial position and whose yields track the county yield.

Making Sound Crop Insurance Decisions

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http://www.farmdoc.uiuc.edu/

Overview of Workshop

- Crop Insurance Products
- Scenario Analysis
- Simulation Analysis
- Application to Your Farm Operation

Multi-Peril Insurance for Corn, Soybeans

1. Farm products
   - Actual Production History (APH)
   - Income Protection (IP)
   - Revenue Assurance (RA)
   - Crop Revenue Coverage (CRC)
2. County level products
   - Group Risk Plan (GRP)
   - Group Risk Income Plan (GRIP)

Farm Insurance Products

1. Yield insurance
   -- Actual Production History (APH)
2. Revenue without guarantee increase
   -- Income Protection (IP)
   -- Revenue Assurance -- Base Price (RA-BP)
3. Revenue with guarantee increase
   -- Crop Revenue Coverage (CRC)
   -- Revenue Assurance -- Harvest Price (RA-HP)

APH Yield Guarantee

APH yield	140 bu.
Yield election	75%
Price	$2.00
Yield guarantee (140 bu. X .75)	105 bu.

APH Indemnity Payment

Yield guarantee	105 bu.
Indemnity price	$2.00
Actual yield	100 bu.
Payment	$10 **

**$30.75 = (105 guarantee – 100 bu yield) x 2.00

IP (RA-BP) Revenue Guarantee

APH yield	140 bu.
Base price	$2.46
Coverage level	75 %

Revenue guarantee $258

(140 bu. x $2.48 x .75)

Prices for Revenue Insurance Products

"Base" Prices:

Corn -- CBOT Dec. contract avg. in February

Soybeans -- CBOT Nov. contract avg. in Feb.

"Harvest" Prices:

Corn -- CBOT Dec. contract avg. in November

Soybeans -- CBOT Nov. contract avg. in October

IP (RA-BP) Gross Revenue

Harvest price	$2.05
Actual yield	100 bu.
Gross revenue	$205 **

** $205 = $2.05 x 100 bu.

IP (RA-BP) Indemnity Payment

Revenue guarantee	$258
Gross revenue	$205
Indemnity payment	$53 **

** (revenue guarantee – gross revenue)

Crop Revenue Coverage Revenue Assurance – Harvest Price

- Revenue insurance (pays when below a revenue guarantee)
- Increase in revenue guarantee
- Increase in guarantee good for "aggressive" users of forward contracts or futures contracts

CRC (RA-HP) Revenue Guarantee

APH yield	140 bu.
Base price	$2.46
Coverage level	75 percent

Revenue guarantee (harvest price < $2.46)

$258 = 140 bu. x $2.46 x .75

Revenue guarantee (harvest price > $2.46)

Harvest price = $2.80

$294 = 140 bu. x $2.80 x .75

CRC (RA-HP) Gross Revenue and Payment

Harvest price	$2.00
Actual yield	100 bu.
Gross revenue	$200
Revenue guarantee	$264
Payment (264 –200)	$64

CRC (RA-HP) Gross Revenue and Payment

Harvest price	$2.80
Actual yield	100 bu.
Gross revenue	$280
Revenue guarantee	$294
Payment (294 –280)	$14

Group Risk Plan (GRP)

Crop:	Corn
County:	Jefferson
Expected county yield:	97.6 bu.
Maximum protection level:	$256
Yield election:	90%
Protection level:	$256
Yield guarantee:	87.8 (97.6 x .90)

GRP Indemnities

Yield guarantee:	87.8 bu
Protection level:	256
Actual county yield:	80 bu.

Indemnity payment: $23

$256 x (87.8 - 80) / 87.8

Protection level x percent shortfall

Group Risk Income Plan (GRIP)

Crop:	Corn
County:	Jefferson
Expected county yield:	97.6 bu.
Expected price:	$2.45
Coverage level:	90%
Revenue guarantee:	$215

($215 = 97.6 bu. x 2.45 x .9)

GRIP Payment

Protection level:	$376
Revenue guarantee	$215
County yield:	80
Harvest price:	$2.05
Gross revenue:	$164
Indemnity payment:	$89

$376 x (215 – 164)/215

protection level x revenue shortfall

Group Risk Plan (GRP)

Crop:	Corn
County:	Macon
Expected county yield:	165.4 bu.
Maximum protection level:	$433
Yield election:	90%
Protection level:	$433
Yield guarantee:	148.9 (165.4 x .90)

GRP Indemnities

Protection level:	$433
Yield guarantee:	148.9
Actual county yield:	120 bu.

Indemnity payment:	$84

$433 x (148.9 - 120) / 148.9

Protection level x percent shortfall

Group Risk Income Plan (GRIP)

Crop:	Corn
County:	Macon
Expected county yield:	165.4 bu.
Expected price:	$2.45
Coverage level:	90%
Revenue guarantee:	$365

($365 = 165.4 bu. x 2.45 x .9)

GRIP Payment

Protection level:	$622
Revenue guarantee	$365
County yield:	140
Harvest price:	$2.05
Gross revenue:	$287
Indemnity payment:	$133

$622 x (365 – 287)/365

protection level x revenue shortfall

Group Risk Plan (GRP)

Crop:	Corn
County:	Ogle
Expected county yield:	146.6 bu.
Maximum protection level:	$384
Yield election:	90%
Protection level:	$384
Yield guarantee:	131.9 (146.6 x .90)

GRP Indemnities

Protection level:	$384
Yield guarantee:	131.9
Actual county yield:	120 bu.

Indemnity payment: $35

$384 x (131.9 - 120) / 131.9

Protection level x percent shortfall

Group Risk Income Plan (GRIP)

Crop:	Corn
County:	Ogle
Expected county yield:	146.6 bu.
Expected price:	$2.45
Coverage level:	90%
Revenue guarantee:	$323

($323 = 146.6 bu. x 2.45 x .9)

GRIP Payment

Protection level:	$551
Revenue guarantee	$323
County yield:	130
Harvest price:	$2.05
Gross revenue:	$267
Indemnity payment:	$96

$551 x (323 – 267)/323

protection level x revenue shortfall

Individual Workshop packets distributed at each Meeting Location….

(a few examples from Ogle County included in proceedings)

Farm-level Analysis (simulation)

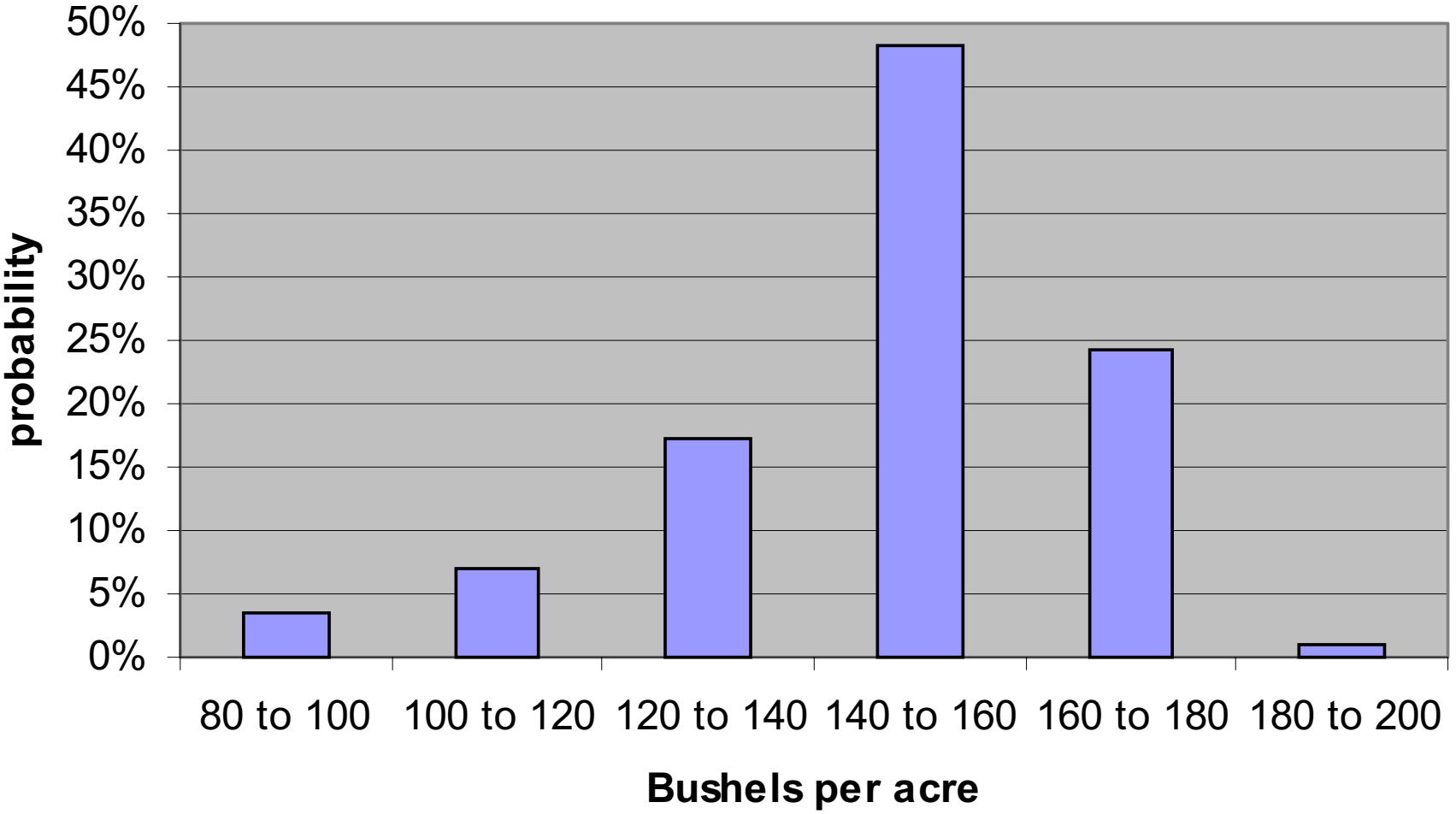
Needed items:

- Yield distribution for farm/county
- Price distribution for harvest
- Yield-Price Relationships
- Insurance elections, local conditions (e.g., basis)

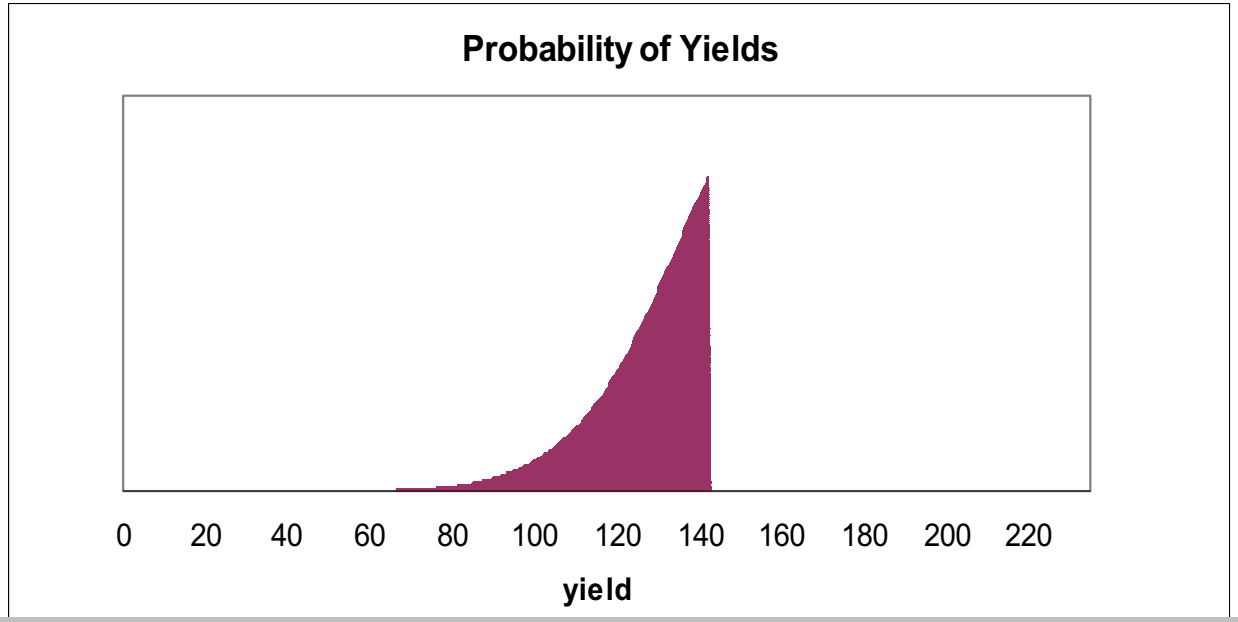
"It's tough to make predictions, especially about the future."

-- Yogi Bera

Yield Probability - Ogle

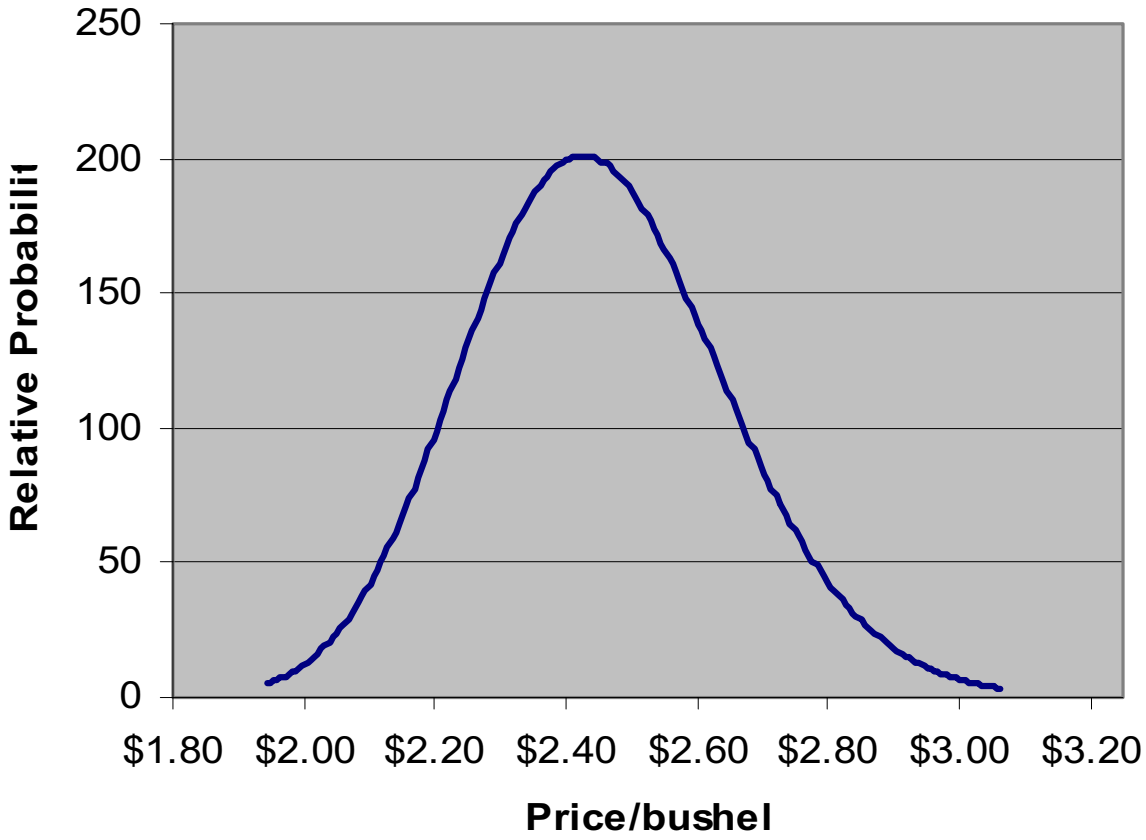


Ogle County case farm ***(see FAST tool)***

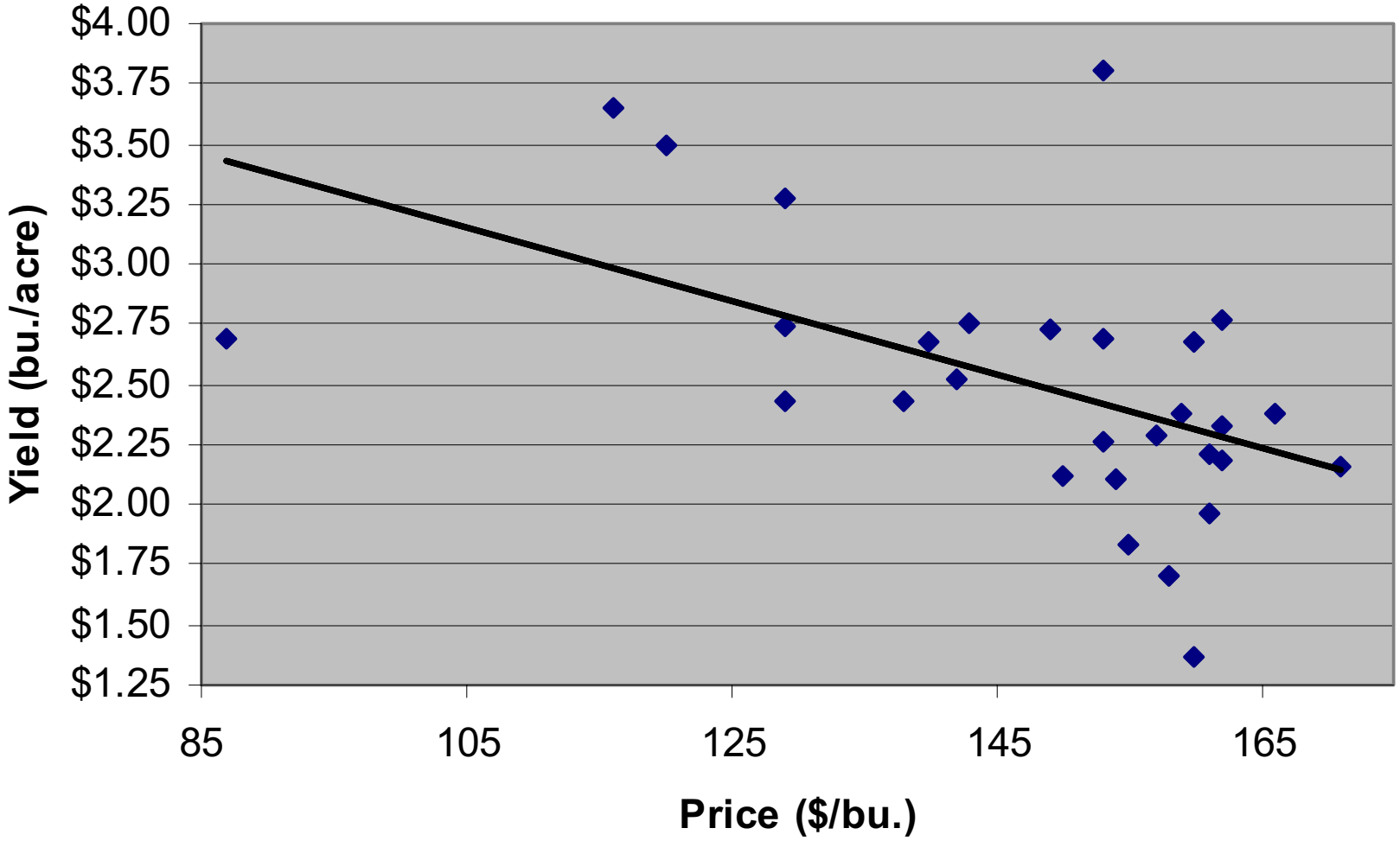


	farmer	county	Probability:			
prob	VAR	VAR	YIELDS	Below	Above	APH level
0.1	119.40	124.90	72.7181	0.0013	0.9987	50%
0.15	125.34	129.72	94.5336	0.0130	0.9870	65%
0.2	129.87	133.37	101.8054	0.0251	0.9749	70%
0.25	133.62	136.36	109.0772	0.0459	0.9541	75%
0.3	136.88	138.94	116.3490	0.0802	0.9198	80%
0.35	139.81	141.26	123.6208	0.1338	0.8662	85%
0.6	152.14	150.88	119.2577	0.0990	0.9010	***82.00%***

Prices from futures/options markets, adjusted for local basis



Historic Price vs. Yield - Ogle County



Putting it all together…

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SRI Information Systems and Technology

C-FAR

Crop Insurance

analysis/risk | multi-peril products | guidelines | risk reduction | software

Current information regarding crop insurance products available to Illinois farmers. This information is useful in judging which crop product provides a farm the most risk reduction for a given level of cost.

iFARM

Illinois Farm Analysis & Risk Model

- Premium Calculator
  - Shows per acre costs of selected insurance products in Illinois for the 2001 corn and soybean crops
- Crop Insurance Evaluator
  - Shows frequency of payments of alternative products
  - Shows net costs of alternative products
  - Shows risk reductions from alternative products

What's New

- iFARM Crop Insurance Premium Calculator
- iFARM Crop Insurance Evaluator
- Guideline for Crop Insurance Choice
- Risk Reduction Available through Crop Insurance Choice

FARM INCOME 2002
click here ►

See Handout for Location-Specific Information

Crop Insurance Evaluator, 2001

Print Preview

Case Farm Information				
County: OGLE	**Crop: Corn**		**Farm Yield**	**County Yield**
Farm Average Yield	145.44 bu./acre		bu./acre	bu./acre
Farm St. Dev. of Yield	19.48 bu./acre	30% of years yields below:	136.88	138.94
County Average Yield	145.44 bu./acre	20% of years yields below:	129.87	133.37
County St. Dev. of Yield	15.4 bu./acre	10% of years yields below:	119.4	124.9
Average Futures Price	$2.47 /bu	5% of years yields below:	110.15	117.29
St. Dev. of Price	$0.53 /bu	Farm APH	145.0 bu./acre	
Local Cash Basis	$0.33 /bu	Average Gross Crop Rev.	$323.2 /acre	

http://www.farmdoc.uiuc.edu/cropins/evaluator/evaluatorTable.cfm

Comparison of crop insurance premiums - Ogle

Estimated Premiums, per Acre, Corn

Coverage Level (%)	APH ($/acre)	RA ($/acre)	CRC ($/acre)	GRP ($/acre)
55	1.35	0.77	2.22	
60	1.64	1.46	2.75	
65	2.31	2.65	3.92	
70	3.02	3.83	5.13	1.25
75	4.5	5.77	7.6	1.66
80	7.04	8.8	11.86	2.53
85	11.23	13.43	18.88	3.16
90				4.68

Description:

This table contains estimates of the per acre premium costs of crop insurance products. The entries give a feel for the range in costs of the insurance products across coverage levels and among different products. (Actual per acre premium may vary. A qualified insurance agent should be consulted for insurance premium quotes.)

source: www.farmdoc.uiuc.edu/cropins/evaluator/

Comparison of crop insurance payments - Ogle

Average Payments from Insurance Products, per Acre, Corn

Coverage Level (%)	APH ($/acre)	RA ($/acre)	CRC ($/acre)	GRP ($/acre)
55	0.04	0.11	0.16	
60	0.1	0.31	0.41	
65	0.21	0.74	0.94	
70	0.45	1.59	2.01	0.43
75	0.92	3.1	3.92	0.84
80	1.81	5.65	7.21	1.65
85	3.3	9.51	12.21	3.21
90				5.9

Description:

This table shows the average per acre indemnity payment of the products. The insurance payments will vary from year to year depending on yields and prices. These averages show the average yearly payment for the products over a number of years.

source: www.farmdoc.uiuc.edu/cropins/evaluator/

Comparison of crop insurance payment likelihoods – Ogle county

Frequency of Payments , Corn

Coverage Level (%)	APH (% of time)	RA (% of time)	CRC (% of time)	GRP (% of time)
55	0.3%	0.7%	0.9%	
60	0.5%	1.6%	1.9%	
65	1.1%	3.5%	4.0%	
70	2.2%	6.3%	7.6%	1.2%
75	4.3%	11.0%	13.3%	2.5%
80	7.6%	17.8%	21.7%	5.0%
85	12.7%	25.6%	31.4%	9.8%
90				17.7%

Description:

This table indicates the frequency, or percentage of years the crop insurance products make payments. An entry of 20, for example, means that the crop insurance products will make a payment in 20 percent of the years. A higher percentage means that a product will pay in more years than a product with a lower percentage.

source: www.farmdoc.uiuc.edu/cropins/evaluator/

Comparison of crop insurance net cost - Ogle

Net Cost of Insurance Products, per Acre, Corn

Coverage Level (%)	APH ($/acre)	RA ($/acre)	CRC ($/acre)	GRP ($/acre)
55	-1.31	-0.66	-2.06	
60	-1.54	-1.15	-2.34	
65	-2.1	-1.91	-2.98	
70	-2.57	-2.24	-3.12	-0.82
75	-3.58	-2.67	-3.68	-0.82
80	-5.23	-3.15	-4.65	-0.88
85	-7.93	-3.92	-6.67	0.05
90				1.22

Description:

Over many years, payments from the insurance products will offset part of their costs. This table shows estimates of the net costs of the insurance products. They equal the average payments from insurance (2nd table above) minus estimated premiums (1 st table). Negative values imply that insurance costs more than it pays back on average and positive values mean that payments exceed the premiums on average.

Note that in this case, higher elections result in higher net costs of insurance, except for GRP

Comparison of crop revenue with insurance

Average Gross Revenue, per Acre, Corn

Coverage Level (%)	APH ($/acre)	RA ($/acre)	CRC ($/acre)	GRP ($/acre)
55	322	323	321	
60	322	322	321	
65	321	321	320	
70	321	321	320	322
75	320	321	320	322
80	318	320	319	322
85	315	319	317	323
90				324

Description:

Average gross revenues are estimated assuming all crop is sold at harvest. Average gross revenue equals crop sales plus LDP payments plus insurance payments less insurance premiums.

source: www.farmdoc.uiuc.edu/cropins/evaluator/

Impacts on risk of low revenue …

10 Percent Value-At-Risk, per Acre, Corn

Coverage Level (%)	APH ($/acre)	RA ($/acre)	CRC ($/acre)	GRP ($/acre)
55	252	253	250	
60	252	252	251	
65	251	252	252	
70	251	253	253	252
75	251	254	254	252
80	250	255	255	252
85	248	258	256	253
90				253

10% Value-At-Risk Without Insurance =$252

Description:

This is a measure of risk. A 10 percent value-at-risk means that 10 percent of the time, gross revenue will be less than those values. In other words, gross revenue will be less than the values in the table about one in ten years.

25 Percent Value-At-Risk, per Acre, Corn

Coverage Level (%)	APH ($/acre)	RA ($/acre)	CRC ($/acre)	GRP ($/acre)
55	281	281	282	
60	280	281	279	
65	280	280	278	
70	279	279	279	281
75	278	279	278	281
80	276	279	278	280
85	274	279	277	281
90				281

25% Value-At-Risk Without Insurance =$281

Description:

This is a measure of risk. A 25 percent value-at-risk means that 25 percent of the time gross revenues will be less than these values. In other words, gross revenues will be less than the values in the table about one in four years.

Insurance Choices

	Individual	County
Yield	**APH**	**GRP**
Revenue Insurance w/out increase	**IP, RA-BP**	**GRIP**
Revenue Insurance with increase	**CRC, RA-HP**	

Yield (APH)

- **Only protect yield loses, need to protect price declines with hedging contracts**

- **Maybe a good choice for livestock producers**
- **Good for hedgers**
- **May wish to think about other insurance products**

Revenue Assurance without increase (IP, RA-BP)

- Provides both price and yield protection
- Concern: Aggressive use of forward contracts or futures markets eliminates revenue guarantee
- Good, relatively inexpensive product that protects gross revenue

Revenue Assurance with increase (CRC, RA-HP)

- **Provides both price and yield protection**

- **Good product for aggressive pre-harvest hedgers (above 50 percent of expected production before harvest using forward, futures, or HTA contracts**

GRP and GRIP

- **Farmers in relatively strong financial position (e.g., one bad year will not terminate business)**

- **Farm yields correlated with county yields**
  - **Does not often replant crop**
  - **Has not had farm yield significantly below county yield (20 bu. for corn, 8 bu. for beans)**
  - **No high risk ground (e.g., flood plain)**

GRP and GRIP

- **GRP – Individuals who hedge**
- **GRIP – Individuals who do not hedge**

Crop Insurance and Marketing

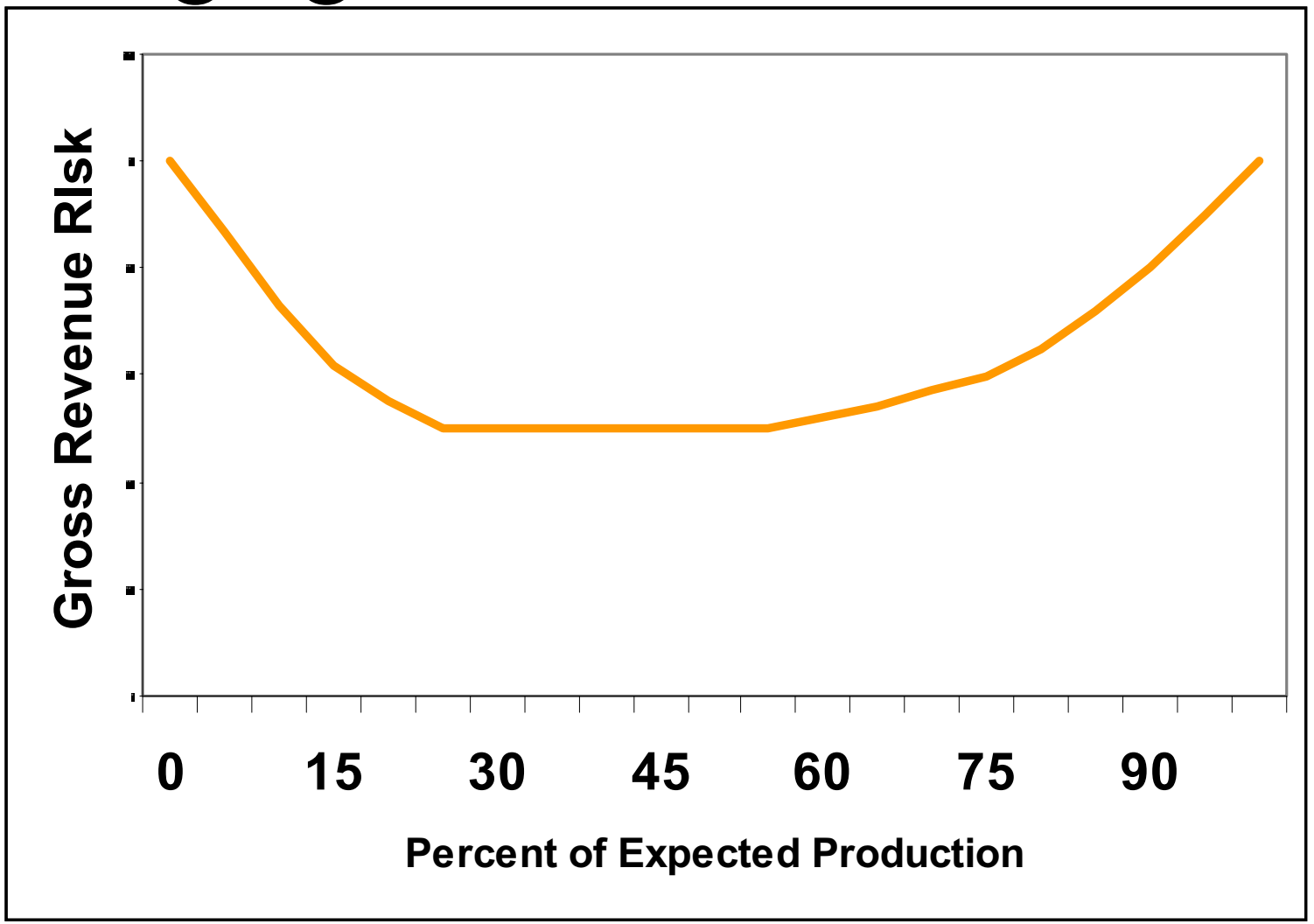
- **Discuss risk impacts of crop insurance and marketing combinations**

- **Only concerned here with risk impacts**
- **Discuss pre-harvest strategies**

- **Some crop insurance and marketing combinations increase risk.**

- **Crop insurance used alone does not increases risk, except in extremely rare circumstances.**

Hedging can increase risks



Marketing and Risk

Potential to Increase Risk

- **Sell/buy futures**
- **Forward contract**
- **Sell options contracts**
- **HTA**

Any contact with downside price potential

Will not increase risk

- **Buy put options**
- **Buy call options**
- **Minimum price contracts**

Any contract without a price downside

Revenue Insurance, Increase (CRC, RA-HP) and Hedging

Amount of hedge	Impact on risk
0 to 25% of APH	Decrease risk
25 to 50% of APH	Decrease risk slightly
50 to coverage level	Stable
Above coverage level	Increase risk

Revenue Insure., No Increase (IP, RA-BP) and Hedging

Amount of hedge	Impact on risk
0 to 25 % of APH	**Stable**
Above 25%	**Increase risk**