AAE 320 Problem Set #8 **Due December 9, 2019** **Name KEY**

Below are several questions that will ask you to demonstrate your understanding of how crop insurance works. You will likely have to use the class overheads and/or the materials posted on the class web page to answer some of them.

A. Yield Insurance

Suppose a farm has 240 acres of corn in one insured basic unit with an actual production history (APH) average yield of 165 bu/ac.

1. If the farmer buys 80% Yield Protection (YP) crop insurance, what would be the per acre yield guarantee? What would be the yield guarantee for the whole 240 acre unit?

   Per Acre Yield Guarantee: 80% x 165 bu/ac = 132 bu/ac
   Unit Yield Guarantee: 132 bu/ac x 240 ac = 31,680 bu

2. If the farmer actually harvested 30,000 bushels from the unit (an average of 125 bu/ac), what would be the YP indemnity, assuming a 100% price election of $4.00/bu?

   30,000 bu < 31,680 unit yield guarantee, triggers indemnity
   Yield Loss = 31,680 – 30,000 = 1,680 bu
   Indemnity = 1,680 bu x $4.00 = $6,720

3. How would the indemnity for question 2 change if the farmer actually sold the corn for $3.90/bu?

Not at all, indemnity is calculated using the price election, not the actual price the farmer sells the grain for. The farmer may never sell the grain, but feed it to livestock.

4. If instead the farmer actually harvested 32,400 bushels from the unit (an average of 135 bu/ac), what would be the YP indemnity, assuming a 100% price election of $4.00/bu?

   32,400 bu > 31,680 unit yield guarantee, so no indemnity is triggered, and Indemnity = $0

Suppose the farmer instead bought a corn Area Yield Protection (AYP) policy in a county with an average yield of 160 bu/ac. The farmer buys a AYP policy with a 90% coverage level, so the county yield guarantee is 90% x 160 bu/ac = 144 bu/ac. The farmer enrolls all 240 corn acres.

5. If the county average yield is 140 bu/ac and the farmer chose a $4.00/bu price election, what would be the AYP indemnity?

   140 bu < 144 yield guarantee, so triggers an indemnity
   Yield Loss = 144 – 140 = 4 bu/ac
   Indemnity = 4 bu/ac x $4.00 x 240 ac = $3,840

6. How would the AYP indemnity change if the farmer's actual yield was 170 bu/ac? How would the AYP indemnity change if the farmer actually sold the corn for $3.90/bu?

   Not at all. Indemnities are calculated using county yield, not a farm's actual yield, and the $3.96 price election, not the farm's actual price received.

B. Revenue Insurance

Suppose a farm has 160 acres of soybeans in one insured basic unit with an actual production history (APH) average yield of 50 bu/ac and the Revenue Protection (RP) base price is $9.54/bu.

1. If the farm buys 70% Revenue Protection crop insurance, what would be the initial per acre revenue guarantee? What would be the initial revenue guarantee for the 200 acre unit?

   Per Acre Revenue Guarantee: 70% x 50 bu/ac x $9.54/ bu = $333.90/ac
   Unit Revenue Guarantee: $333.90/ac x 160 ac = $53,424

2. What is the final per acre revenue guarantee and unit guarantee if the officially announced harvest price is $9.62/bu? What if the officially announced harvest price is $9.44/bu?

   The final guarantee is calculated using the maximum of the initial Base Price and the Harvest Price. Maximum of Base Price ($9.54) and Harvest Price ($9.62) is $9.62, so revenue guarantee is updated: 70% x 50 bu/ac x $9.62/bu= $336.70/ac x 160 ac = $53,872 for the unit.

   If the Harvest Price is $9.44, the final guarantee is the same as the initial guarantee, or $53,424 for the unit (or $333.90/ac).

Suppose the farm actually harvests 4,800 bushels from the unit (an average of 30 bu/ac).

3. If the officially announced harvest price is $9.62/bu, what would be the RP indemnity?

   Maximum of Base Price ($9.54) and Harvest Price ($9.62) is $9.62, so guarantee is $53,872. Actual Revenue = 4,800 bu x $9.62/bu = $46,176 < $53,872 guarantee, so triggers indemnity = $53,872 – $46,176 = $7,696 (or $48.10/ac)

4. Suppose the farm has a futures contract and actually sells the soybeans for $9.82/bu in March, how does the RP indemnity change?

   Not at all, actual revenue for calculating the indemnity uses the officially announced harvest price, not the actual price the farmer sells the grain for.

Suppose the farm instead bought a soybean Area Revenue Protection (ARP) policy in a county with an approved average yield of 45 bu/ac and the farmer chose a 90% coverage level. If the base price is $9.54/bu, then the initial county revenue guarantee is 90% x 45 bu/ac x $9.54/bu = $386.37/ac. The farmer enrolls all 160 soybean acres.

5. If the county average yield is 40 bu/ac and the officially announced ARP harvest price is $9.44/bu, what would be the ARP indemnity?

   Maximum of Base Price ($9.54) and Harvest Price ($9.44) is $9.54, so no guarantee change. Actual County Revenue = 40 bu/ac x $9.44/bu = $377.60/ac < $386.37 guarantee, so triggers indemnity = $386.37 – $377.60 = $8.77/ac x 160 acres = $1,403.20.

6. How would the ARP indemnity change if the farm's actual yield was 35 bu/ac and it sold its grain for $9.62/bu? How would the ARP indemnity change if the farm's actual yield was 55 bu/ac and it sold its grain for $9.4/bu?

   Not at all. Actual revenue for calculating indemnities uses the officially announced harvest price and county yields, not the farm's yield or actual price received.