

AGEC 622  
11\_scenarios Exercises  
Due by 11:00 am, Monday, April 27

- Complete the exercises in a notebook titled “11\_exercises\_LASTNAME\_FIRSTNAME.xlsx”.
- **Rename your file, replacing ”LASTNAME\_FIRSTNAME” with your actual names.**
- If there is more than one question, note that each should have its own tab in the workbook.
- **Work vertically down the sheet** within your notebook. Separate the individual parts of the question(s) (a, b, c, . . . ) using dividing rows like the blue example dividers in the file.
- Submit this homework by emailing your xlsx file to henry@tamu.edu, **with the subject “AGEC 622 exercises 11”**.

1) **Question 1**

The overall objective of this question is to build on the analysis in the 09 exercises, using that model for decision making. Specifically, you will evaluate several available options for yield protection (YP) crop insurance, and choose one that you believe is best.

You will choose a particular *coverage level* for YP crop insurance from among several available options. For some coverage level  $c$ , you would pay a fixed premium  $P_c$ , and would receive a positive indemnity  $I_c$  if your crop yield falls below a threshold that is some proportion of your *established yield* of 50 bushels per acre. Specifically, the indemnity **per acre** for coverage level  $c$  is

$$I_c = \$5.00 \times \max(0, c \times 50 - Y)$$

where  $Y$  is your realized yield, the \$5.00 is an assumed level for what is known as the *projected price* at harvest time, and  $c$  is one of the following:

0.75, 0.80, 0.85, 0.90

- a) **Build a model for the crop price.** Simply leave this as it was for the 09 exercises.
- b) **Build a model for the crop yield.** Simply leave this as it was for the 09 exercises.
- c) **Build a model the gasoline price.** Simply leave this as it was for the 09 exercises.
- d) **Build a model for variable cost (VC).** Simply leave this as it was for the 09 exercises.
- e) **Jointly generate all stochastic variables.** Simply leave this as it was for the 09 exercises, except that now you only need to simulate the year 2019 rather than five years.
- f) **Calculate financial variables for the enterprise.** Modify this portion of your 09 model. Again, you now only need to do calculations for 2019. You will add components reflecting crop insurance choices.  $NR$  for each year should now reflect a crop insurance premium (a cost) and an indemnity (income). The indemnity should be calculated based on the information above and your realized/simulated yield. The premiums for the different coverage levels are presented in the schedule below. You should additionally include the implicit coverage level of zero, which has a premium of zero (that is, you can choose not to purchase crop insurance). You need to set up a table for five values for  $c$  and the corresponding premiums, and use the SCENARIO function to incorporate these values into the calculations for the indemnity and  $NR$  (and, ultimately, these are reflected in ending cash). The premiums **per acre** are:
  - for  $c = 0.75$ , the premium is  $P_c = \$0.10$
  - for  $c = 0.80$ , the premium is  $P_c = \$0.30$
  - for  $c = 0.85$ , the premium is  $P_c = \$0.60$
  - for  $c = 0.90$ , the premium is  $P_c = \$0.80$

- g) **Simulate ending cash under five scenarios.** Simulate ending cash for the five scenarios. For ending cash for all five scenarios, generate a stoplight chart and plot the CDFs. Once you have the stoplight chart, you may want to expand the number of digits after the decimals that are visible (rows 5 through 7 on the “StopLight1” sheet).
- h) **Interpret.** Which scenario do you prefer? Note that there are some clearly wrong answers (scenarios that are clearly bad no what decision criterion you use), but there may be some better scenarios among which your choice would depend on what criterion you use (that is, depends on your personal risk preferences). How effective was the YP insurance in reducing risk for the operation? How do you think risk might be better reduced?