



Risk and Reward

Lesson 2 - Sustainable Agriculture: Economics

Voluntary National Content Standards in Economicsⁱ

- **Content Standard 2: Decision Making:** Students will understand that effective decision making requires comparing the additional costs of alternatives with the additional benefits. Many choices involve doing a little more or a little less of something: few choices are “all or nothing” decisions.
- **Content Standard 7: Markets and Prices:** Students will understand that a market exists when buyers and sellers interact. This interaction determines market prices and thereby allocates scarce goods and services.
- **Content Standard 8: Role of Prices:** Students will understand that prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives.
- **Content Standard 13: Income:** Students will understand that income for most people is determined by the market value of the productive resources they sell. What workers earn primarily depends on the market value of what they produce.

Grade Level: 9-12

Lesson Length: 60 minutes

Learning Objectives:

Participants will:

- Explain farm business profitability and viability and its relation to economic sustainability.
- Understand how agriculture reflects other economic decisions.
- Understand how agriculture contributes to local, national, and global economies.

Materials and Equipment Needed:

- Economic Sustainability PowerPoint
- Paper and writing utensils for students
- Paper cups (2 per student)
- Risk and Reward Activity Sheet (1 per student)
- Risk and Reward Activity Sheet: Die Answer Key (for teacher only)
- 1 Die
- Tokens or beans (to represent money), OR play money in \$20 increments (enough that each student has the equivalent of \$400)
- Access to the internet



Cross-Curricular Connections:

Use these suggested adaptations to make learning across the curriculum easy!

Science	Technology	Engineering	Mathematics
Conduct a weather assessment for the local area over a 3-month span (future). Consider historical data and future casts. Choose an area of production agriculture to layer over this weather assessment. Analyze the effects of the weather on the production.	How can technology in agriculture alleviate risks? Have students work in teams to design an app that would help alleviate risk (internal or external) for someone in production agriculture.	Many crops can be stored to preserve the quality of the crop for feed or to wait for a more favorable market. Design and build a prototype for corn storage facilities. Research best practices and needs for corn storage.	Want to ramp up the stakes? Use the game in the lesson but add multiple acres and additional starting money to the game. Add additional factors such as interest rates for farm loans, etc., to add complexity.

Teacher Preparation:

- Write this question in a prominent place in the classroom: What are some internal and external risks associated with agriculture production?
- Divide the whiteboard into two columns with the labels "Internal Risks" and "External Risks."
- Familiarize yourself with the game and set game resources out for each student or pair of students.
- Print out "checks" for game reward (print one of each check per student to make sure there are enough checks).
- Reserve access to computer lab/cart, if necessary.



Lesson

Introduction (Anticipatory Set) • 10 minutes

STEP 1: In this step, students will gain valuable background information on the role that economics plays in sustainable agriculture.

- Write this question in a prominent place in the classroom:
What are some internal and external risks associated with agriculture production?
- Below or next to the question have two columns, one labeled “Internal Risks” and the other labeled “External Risks.”
- *The process that food and fiber take from producer to consumer is affected by economics in many ways. Economic sustainability across the production journey is essential. Those in production agriculture must often juggle known and unknown internal and external risks. External factors can include the viability of trade markets (local and global), workforce availability, and the influence of Mother Nature. Internal risk factors that affect economic sustainability can include on-farm decisions to plant certain crops, types of seed to use or livestock to raise, and available financial inputs.*

Think-Pair-Share

- Ask students to write down their responses to the question posted on the board. When they finish, have them share their responses with a partner, creating a more comprehensive response. Have students send one partner to the board to write their answers in the corresponding columns (internal risks / external risks). To reduce time, have students place tally marks by duplicate answers.
- *Production agriculture involves a variety of risks – both internal and external – and these directly affect the economics of sustainable agriculture.*
- Explain that the game they are about to play demonstrates the risk and return on an agricultural enterprise.
- Each agricultural enterprise has its own risk and return potential with a number of variables. These variables can include weather, equipment, labor, and market forces. Variables can be farm specific, regional, or even nationwide. Each variable on its own can turn an otherwise good year into a disaster.



Input and Modeling • 20 minutes

STEP 2: Give each student a copy of the activity card and two cups. Have them label one cup “bank” and the other cup “costs.” Give each student the equivalent of \$400 for their “bank” cup from the tokens or play money (Ex: Give each student 20 tokens, each token represents \$20, for a total of \$400).

- o Give students the following background information: *You have the opportunity to rent ONE acre of land in Anywhere County from May through October. This acre has highly productive soil and no rock. In the best conditions, it can produce 200 bushels of corn on the acre.*
- o To start the game, students must first make a choice, to rent the land or keep their \$400 in the bank. Ask the question: Do you want to rent the land?
 - Students who do not want to rent land will partner with another student renting land to experience the game. For those that want to rent the land and put in a crop, go through the mandatory costs and have students transfer the appropriate amount of money from their “bank” cup to their “cost” cup. (*Items ABOVE the thick gray line on the student activity sheet.)
- o Next, go through the optional costs for the land (*items BELOW the gray line on the student activity sheet), allowing students to choose their costs. Money for the optional costs also comes out of their “bank” cup and into their “costs” cup.

Play the Game

- o The teacher may either roll a die for a predetermined number of rolls and then proceed to “Harvest” #6 or use their discretion, giving students something to react to by randomly picking several items in #1-5.
 - Always end on “Harvest” #6.
 - If students go bankrupt, they are out of the game.
 - Give students their appropriate ‘check’ depending on their “Harvest” #6 answer. Have them add their check amount plus any money left over in their “bank” cup.
- o Discuss the multiple economic factors present in this simple scenario. Listen for students to identify that economic risks and rewards in agriculture are internal and external; they directly affect the economic viability of the farm or ranch and have an impact at the local and global levels.



Checking Understanding and Guided Practice • 10 minutes

STEP 3: *The game that you played is a small taste of the risks and rewards those in production agriculture face with regular occurrence. Let's look at some current events to see what other economic factors we can find that affect sustainability in agriculture.*

- Give students a set amount of time to find a current news article from a credible source that describes one of the risks related to the economics of agriculture. Ensure that each student has an appropriate article by the end of the given time.

***Optional:** Have students use the Credibility Checklist in the Resources section of Addressing Misconceptions at www.agfoundation.org/ag-lit-catalog%20/view/addressing-misconceptions-in-agriculture

Independent Practice • 10 minutes

STEP 4: Have students highlight the area of agriculture production and list out the risks relayed in the article. As a class, discuss the articles and topics researched.

Wrap-Up (Review, Assess, Challenge) • 10 minutes

STEP 5: Have students individually, or in pairs, visit https://www.agfoundation.org/files/sustainable_agriculture_rise/#/ and complete the "Sustainable Agriculture: Economics" module.

- Challenge students to review the content and reflect in their notes on two new concepts they discovered, and one question they still have.
- Have students share their reflections and note information for continued investigation.



Scenario

You are a farmer, and you have \$400 in the bank. Do you want to take a chance on planting a crop? There's a risk, but there's also a reward!

Do you want to rent land to plant a corn crop?

- o YES? Play game.
- o NO? Leave your \$400 in the bank and see how you fare!

What happened?	Cost per acre	You need to...
You choose to rent one acre of land.	\$60/acre	Put \$60 from the "bank" into the "costs" cup.
You need to buy the corn seed to plant.	\$20/acre	Put \$20 into the "costs" cup.
You need to pay equipment costs for planting, maintaining, and harvesting the crop.	\$60/acre	Put \$60 into the "costs" cup.
You need to pay labor costs for planting, maintaining, and harvesting the crop.	\$20/acre	Put \$20 into the "costs" cup.
Do you want to fertilize your crop?	\$40/acre	YES: Put \$40 into the "costs" cup. NO: Don't do anything.
Do you want to irrigate your crop?	\$20/acre	YES: Put \$20 into the "costs" cup. NO: Don't do anything.
Do you want to use pest control?	\$40/acre	YES: Put \$40 into the "costs" cup. NO: Don't do anything.



Directions

Use this page as a resource during the game

Die Number	Risk/Reward Result
1	<p>Rain, rain, go away! May – October has been full of rainy days, many more than usual! Planting was late due to the wet fields, the corn got a slow start due to the lack of sunny days, and the crop is not faring well overall because it is too wet!</p> <p>Everyone loses \$80 for damage to the crop!</p>
2	<p>Oh no! Bugs are in the corn! Did you spray for pests?</p> <p>YES: Your crop is ok. No loss. NO: Your crop is severely damaged. Lose \$80 for damage to the crop.</p>
3	<p>Your tractor keeps breaking down throughout the season. It's in and out of the shop with some major repairs!</p> <p>Everyone loses \$40 for tractor repairs.</p>
4	<p>It's a dry, dry season. The ground is hard as rocks due to lack of rain. The corn needs water! Did you irrigate?</p> <p>YES: Your crop is ok. No loss. NO: Your crop is severely damaged. Lose \$80 for damage to the crop.</p>
5	<p>You've had a hard time hiring extra help to maintain the farm and crop. You finally decide to use migrant labor through the H2A Program.</p> <p>Everyone loses \$60 for additional labor costs.</p>
6	<p>It's harvest time! Time to see how your use of fertilizer paid off! Did you fertilize?</p> <p>YES: Your corn crop got 200 bushels to the acre! Nice job! At \$3.80/bushel for corn, you get 760 dollars. Here's your check! NO: Your corn crop got 120 bushels to the acre. At \$3.80/bushel for corn, you get 456 dollars. Here's your check!</p>



5719

DATE: _____

PAY TO THE ORDER OF: **Farmer** \$ **760**
Seven Hundred Sixty DOLLARS Security Features Detailed on Back

MEMO: For John Doe

⑆000045678000 0000⑆ ⑈*0000

5719

DATE: _____

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PAY TO THE ORDER OF: **Farmer** \$ **456**

Four Hundred Fifty-Six DOLLARS Security Features Detailed on Back

MEMO: For Jane Doe

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DATE: _____

PAY TO THE ORDER OF: **Farmer** \$ **456**

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MEMO: For Jane Doe

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References:

- ⁱ Council for Economic Education. (2010). Voluntary National Content Standards in Economics Second Edition. Retrieved from www.councilforeconed.org/policy-advocacy/k-12-standards/