

Unit D: Applying Basic Economic Principles in Agribusiness

Lesson 3: Utilizing Economic Principles to Determine What to Produce

Student Learning Objectives: Instruction in this lesson should result in students achieving the following objectives:

1. Understand the Principle Equimarginal Returns.
2. Understand the Rule of Opportunity Cost.
3. Understand the relationship between enterprises.

Recommended Teaching Time: 2 hours.

Recommended Resources: The following resources may be useful in teaching this lesson:

<http://www.investopedia.com/terms/o/opportunitycost.asp>

List of Equipment, Tools, Supplies, and Facilities:

Writing surface
PowerPoint Projector
PowerPoint Slides
Copies of WS 3-1

Terms:

Broker
Competitive Enterprises
Complementary Enterprises
Marginal Returns
Principle of Equimarginal Returns
Opportunity Cost
Supplementary Enterprises

Interest Approach: *Begin this lesson by discussing how students make decisions. A question that may be asked is "How did you decide to attend this school?" Ask students to name items or information that helped them to make the decision. Just like those pieces of information helped them decide, the principles in this lesson help business owners and planners decide what type of enterprise to start and what commodity or product to produce.*

Summary of Content and Teaching Strategies

Objective 1: Understand the Principle of Equimarginal Returns.

Anticipated Problem: What is the Principle of Equimarginal Returns?

*****To help students master this objective, begin by asking students if they have ever borrowed anything from another person. Then ask students if they have ever lent anything to another person. Examples might include a writing utensil, some money, or clothing. Ask students what they expect when the other person is finished using the item that was borrowed. (They expect to receive the item back.) Use this as an analogy to the Principle of Equimarginal Returns. Just like each person expects to receive the item back, money is expected back after the business owner “lends” it to the business. The business owner should expect an equal or greater return on the money that was “lent” to the business.**

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I. The **Principle of Equimarginal Returns** states that investments or resources should be allocated among several alternative uses in such a way that the **marginal returns** are equal or greater in all uses. Marginal returns are the profit that is earned from the enterprise. Marginal returns are calculated by taking revenue minus expenses.

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- A. Never invest capital in an alternative that does not provide returns equal to or greater than the amount invested.
- B. Always invest capital in the option that provides the greatest marginal returns, so long as the returns are greater than the amount invested.

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1. For example, if a business planner wants to begin a poultry enterprise, he knows that he can purchase 5 chickens for \$2 each for a total of \$10. He should speculate his input costs and revenue accurately. To meet the principle of equimarginal returns, the profit from this enterprise should be at least \$10 (the amount of money he paid for the chickens.) If it is less than \$10 the business planner has two options: modify the enterprise to earn more profit (if possible) or choose a different enterprise.

Objective 2: Understand the Opportunity Cost Principle.

Anticipated Problem: What is the Opportunity Cost Principle?

*****To help students master this objective, begin by asking the question “How does a person decide what to purchase at the market?” Many answers will be given, they key answer is that individuals want to receive the most for the amount of money they paid. Another similar answer is they want to receive the best for the amount of money they paid. Example: Two vendors are selling apples. One vendor is selling 1 kg apples for \$1 and the other vendor is selling 1 kg apples for \$2. Which one will individuals buy? The 1 kg apples for \$1 because they will spend less money and get the same amount of apples as compared to the other vendor. This concept is similar to the Opportunity Cost Principle. The business owner wants to put in less work (or money) and receive the most profit as possible.**

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- II. **Opportunity cost** is the cost of an alternative that must be given up in order to take a certain action. The Opportunity Cost Principle states that one action will have a greater benefit than that of an alternative action.

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- A. Opportunity cost is calculated by taking the profit from the action taken (or plan to be taken) minus the profit from the alternative option.
1. In order to calculate opportunity cost before actions are taken, some speculation must be made. Then, a decision must be made about which action to take. The action with the greatest potential benefit, or profit, should be chosen.
 2. Because speculation is involved, there is a risk that the action taken may not actually be the most profitable.

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- B. In business planning, decisions must be made regarding what to produce or grow.
1. For example, Bob, an agribusinessman wants to make a profit from a new enterprise. He has very little money to purchase capital and he would like to receive profit as soon as possible. Bob decides that purchasing land and growing crops is too difficult. Bob thinks his options are buying chickens to produce eggs, buying a goat to produce milk, or buying a cow to produce milk. Finally, Bob decides to buy chickens to produce eggs because they don't cost as much as a goat or cow. Bob decides to sell his eggs at \$1.00 for 12 eggs.

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- a. To calculate Bob's opportunity cost, some predictions must be made about how much profit he will make. Bob's chickens produce 12 eggs in one day. If Bob had purchased a goat, his goat would produce 2 liters of milk in one day.
 - i. Let's predict the profit from 12 eggs is \$.50 and the profit from 2 liters of goat's milk is \$1.00.
 - ii. We can calculate Bob's opportunity cost by taking $\$.50 - \$1.00 = -\$1.00$. Therefore, Bob's opportunity cost is $-\$.50$ because he earned \$.50 less per day by producing eggs instead of goat's milk.
 - iii. Although Bob could have earned more profit by producing goat's milk, he chose to produce eggs because buying chickens required less capital than buying a goat.

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- b. If Bob had purchased a cow, his cow would produce 3 liters of milk in one day.
 - i. Let's predict the profit from 12 eggs is \$.50 and the profit from 3 liters of cow's milk is \$1.50.
 - ii. We can calculate Bob's opportunity cost by taking $\$.50 - \$1.50 = -\$1.00$. Therefore, Bob's opportunity cost is $-\$.50$ because he earned \$1.00 less per day by producing eggs instead of goat's milk.
 - iii. Although Bob could have earned more profit by producing cow's milk, he chose to produce eggs because buying chickens required less capital than buying a cow.

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2. Like Bob, in some situations, business planners choose to accept an enterprise that earns a lower profit due to other reasons.
 - a. The enterprise requires less capital.
 - b. The enterprise requires less labor and time.
 - c. The enterprise will earn profit more quickly than others.

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- C. Opportunity cost also needs to be considered while operating a business. When to harvest or sell a commodity is a business decision that needs to be made carefully.
1. An agribusiness can benefit by selling at the time when prices are the highest.

- a. For example, Jim, a wheat grower sells his commodity to a **broker**, someone who takes the product to another location to be sold. Let's pretend that on May 10, just before wheat harvest, supply is low and the broker is offering \$1 per kilogram, an unusually high price for wheat.

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- i. Jim's wheat is mature and can be harvested on May 10, but Jim has the opportunity to work for a neighbor for 10 days in May. His neighbor will pay \$3 per day of work. If Jim waits to harvest his wheat, he knows the price will decrease, but he doesn't know exactly how much it will decrease. Jim does know that in June last year, the broker was paying \$.40 per kilogram of wheat.

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- ii. Jim can calculate about how much he will earn if he harvests in May or in June. Jim predicts that he will have 40 kilograms of wheat when he harvests.
1. If Jim harvests in May, he will receive about \$40 for his wheat.
(40 kg x \$1 per kg = \$40)
 2. Using last year's price, Jim can predict that he will receive about \$16 if he harvests in June. (40 kg x \$.40 = \$16)

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- iii. Jim must decide if he will harvest his wheat now (May) or work for his neighbor then harvest his wheat in June.
1. If Jim harvests now, he will receive about \$40.
 2. If Jim works then harvests in June, Jim will receive \$16 for his wheat and will receive \$30 for working for his neighbor
(10 days of work x \$3 each day = \$30) In total, he will receive \$46.

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- iv. Jim decides that he will work for his neighbor then harvest his wheat in June. Because his opportunity cost will be a positive number. Jim calculated this by taking $\$46 - \$40 = \$6$.

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- b. It is important to realize that other factors may have an effect on the total amount of money that Jim will earn.
- i. The price for wheat may decrease to an amount lower than predicted.
 - ii. A pest infestation or other uncontrollable factor may cause the total amount of kilograms of wheat to decrease.
- c. Let's pretend that Jim works for his neighbor and harvests his wheat in June. The broker is only offering \$.20 per kilogram of wheat. How much money will Jim receive?

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- i. Jim earned \$30 by working for his neighbor and earns \$8 for his wheat. (40 kg x \$.20 per kg = \$8) In total, Jim earned \$38.
 - ii. We can calculate Jim's opportunity cost by taking \$38 that he earned by working then harvesting in June minus \$40 which he would have earned if he harvested in May. $\$38 - \$40 = -\$2$ Jim's opportunity cost is -\$2.
 - iii. Because the price decreased lower than Jim predicted, he earned less money than if he had harvested in May.
- D. The better an individual is at speculating the profit that will be earned, the more likely the Opportunity Cost Calculation will be true.

Objective 3: Understand the relationship between enterprises.

Anticipated Problem: How do existing enterprises relate?

*****To help students master this objective, discuss the information using the PowerPoint presentation. Have students name additional examples of each type of enterprise.**

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III. Many businesses combine several enterprises to maximize profits.

- A. **Supplementary enterprises** are those where one enterprise supplements the income of another.
1. A field that is used to grow wheat can also grow pulses.
 - a. Wheat can be harvested in the middle of May and pulses can be planted as late as the end of May. Pulses will be harvested in September and the next crop of wheat will be planted in October or later.
 2. A bucket used to milk cows can also be used to pick almonds.

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- B. **Complementary enterprises** are those where one enterprise produces the inputs for another.
1. Manure from livestock can be used to fertilize plants such as wheat.
 2. A seed agribusiness may also sell fertilizer to farmers.

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- C. **Competitive enterprises** are those where one enterprise interferes with another.
1. Enterprises competing for labor resources.
 - a. One example of competitive enterprises would be an apple grower that also offers to harvest apples for other apple growers. His own apples need harvested at the same time that he needs to be harvesting apples for his customers.
 2. Students who work so much that they do not have enough time to study.

Review/Summary: Students should complete WS: 3-1 to review the information in this lesson.

Evaluation: A sample written test is attached.

Answers to Test:

Part One: Matching

1 = b, 2 = e, 3 = d, 4 = c, 5 = a

Part Two: Completion

- 1 = capital
- 2 = opportunity cost
- 3 = Principle of Equimarginal Return
- 4 = Opportunity Cost Principle

Part Three: Short Answer

1. Use Objective 3 to score this question.

Utilizing Economic Principles to Determine What to Produce

Instructions. Complete the items below.

Would you enter into this business? Answer by writing “Yes” or “No”.

- _____ 1. Billy bought a goat for \$20. The goat had a kid and he has kept the kid and has sold \$25 worth of milk so far.
- _____ 2. Joe bought 10 chicks for \$10 total. Only 3 of the chickens were hens so he has sold \$4 worth of eggs. When the roosters became mature, he sold them for a total of \$15.
- _____ 3. Mike bought a young calf for \$35. Mike wanted to sell the calf two months later, but not many people wanted to buy calves at that time. He was able to sell the calf for \$30.

Calculate the Opportunity Cost for the items below. Show the math calculations for each answer.

Bob owns 0.25 hectare of land. In the past he has produced field crops on the land; however, he wants to earn a higher profit so he decides to plant an orchard. Below is a list of his options. Bob decides to plant an apple orchard.

<u>Type</u>	<u>Number of Plants</u>	<u>Production per Plant</u>	<u>Profit per kg</u>
Almond	56	11	\$12
Apple	25	37	\$5
Grape	226	9	\$8

What is the opportunity cost as compared to almonds?

What is the opportunity cost as compared to grapes?

What are some reasons that Bob may have chosen apples even though he could have made more money with another enterprise?

Write the letter of the correct answer in the blank. Letters may be used more than once.

- a. Supplementary Enterprise
- b. Complementary Enterprise
- c. Competitive Enterprise

- _____ 1. Livestock enterprise that produces manure for the field crop enterprise.
- _____ 2. Milking goats and harvesting almonds with the same equipment.
- _____ 3. Bean enterprise that produces nitrogen within the soil followed by a wheat enterprise.

Utilizing Economic Principles to Determine What to Produce

Instructions. Complete the items below.

Would you enter into this business? Answer by writing “Yes” or “No”.

- Yes 1. Billy bought a goat for \$20. The goat had a kid and he has kept the kid and has sold \$25 worth of milk so far.
- Yes 2. Joe bought 10 chicks for \$10 total. Only 3 of the chickens were hens so he has sold \$4 worth of eggs. When the roosters became mature, he sold them for a total of \$15.
- No 3. Mike bought a young calf for \$35. Mike wanted to sell the calf two months later, but not many people wanted to buy calves at that time. He was able to sell the calf for \$30.

Calculate the Opportunity Cost for the items below. Show the math calculations for each answer.

Bob owns 0.25 hectare of land. In the past he has produced field crops on the land; however, he wants to earn a higher profit so he decides to plant an orchard. Below is a list of his options. Bob decides to plant an almond orchard.

Type	Number of Plants	Production per Plant	Profit per kg
Almond	56	11	\$12
Apple	25	37	\$5
Grape	226	9	\$8

Almond Profit: $56 \times 11 \times 12 = \7392

What is the opportunity cost as compared to almonds?

Apple Profit: $25 \times 37 \times 5 = \4625

Opportunity Cost: $\$4625 - \$7392 = -\$2627$

The opportunity cost is zero because Bob earned more profit by choosing the almond enterprise instead of the apple orchard.

What is the opportunity cost as compared to grapes?

Grape Profit: $226 \times 9 \times 8 = \16272

Opportunity Cost: $\$16272 - \$7392 = \$880$

The opportunity cost for growing almonds instead of grapes is \$880 because Bob could have earned this much more with a grape enterprise.

What are some reasons that Bob may have chosen apples even though he could have made more money with another enterprise?

The almond plants may have been less expensive than grape plants, a grape enterprise may have required more time to earn the profit.

Write the letter of the correct answer in the blank. Letters may be used more than once.

- a. Supplementary Enterprise b. Complementary Enterprise
c. Competitive Enterprise

- A 1. Livestock enterprise that produces manure for the field crop enterprise.
B 2. Milking goats and harvesting almonds with the same equipment.
B 3. Bean enterprise that produces nitrogen within the soil followed by a wheat enterprise.

Test Utilizing Economic Principles to Determine What to Produce

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

- | | |
|---------------------------|-----------------------------|
| a. broker | d. supplementary enterprise |
| b. marginal return | e. complementary enterprise |
| c. competitive enterprise | |

- _____ 1. Profit that is earned from the enterprise.
 _____ 2. One enterprise produces the inputs for another.
 _____ 3. One enterprise supplements the income of another.
 _____ 4. One enterprise interferes with another.
 _____ 5. Someone who takes the product to another location to be sold.

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

1. Invest _____ in the option that provides the greatest marginal returns, so long as the returns are greater than the amount invested.
2. The cost of an alternative that must be given up in order to take a certain action is called _____.
3. The _____ states that investments should be utilized so that marginal returns are equal or greater than investments.
4. The _____ states that one action will have a greater benefit than that of an alternative action.

Part Three: Short Answer

Instructions. Use complete sentences and correct spelling to provide the information below.

1. Give an example of one of the each of the following: Supplementary Enterprise, Complementary Enterprise, and Competitive Enterprise.