

Property Rights & the Tragedy of the Commons

Fishing Game

INTRODUCTION

Property rights—the formal and informal rules regarding the use, ownership, and transfer of property—provide important incentives. Ownership generally provides an incentive for people to consider the value of property in the future. Therefore, people tend to take better care of things they own and value. This lesson helps students experience and understand the influence of property rights on scarce resources.

CONCEPTS

- Choice
- Incentives
- Property Rights
- Voluntary Exchange

LEARNING OBJECTIVES

Students will:

1. Understand that incentives influence how people choose to use resources.
2. Explain how private ownership provides incentives to manage resources wisely and creates better likelihood of prosperity.

MATERIALS

- A piece of flipchart paper (or an overhead transparency)
- Overhead projector (optional)
- A marker
- A handful of “goldfish” crackers or beans
- A roll of dimes or quarters, or a bag of candies

PROCEDURE

Part I:

1. Ask students to hypothesize the reasons for continued over-fishing even as fishers run out of fish. Record the hypotheses on the board or an overhead transparency and explain that you will come back to consider this later.
2. Explain to your students that, changes in incentives change the choices people make. In order to understand this better, ask students to take part in a simulation and have them explain the behaviour they saw.

Part II: the simulation

1. Recruit 6 volunteers to come to the front of the room and gather around the flipchart paper (or overhead projector). Instruct the rest of the class to watch what is happening and be ready later to comment on what they see.
2. To begin, throw several goldfish crackers or beans randomly on the piece of paper (or on a blank transparency). Make sure all students in the class can observe what is going on.
3. Explain to the volunteers that they are fishers and you are a fish buyer. You will give them two 20-second fishing rounds and will purchase any fish they bring to you in good condition. The paper (or transparency) represents the ocean and the fish crackers (or paper clips) represent the fish in the sea. (Explain that you will *not* purchase the fish that are crushed or broken.)

You will buy any fish caught in the first 20-second round for 10 cents (or one candy) each and any fish caught in the second 20-second round for 25 cents (or two candies).

(note: consider ahead of time how many fish to put on the screen and how much you're willing to pay for them. Generally the fewer fish and the older the students, the higher the pay must be to provide an effective incentive to participate. With younger students use individually wrapped pieces of candy and candy bars instead of coins.)

4. Immediately after clearly giving the instructions say, "Go!" and watch the time carefully. Do not give students time to consider the possibilities or talk over the problem before you say, "Go."
(Students tend to grab the fish crackers immediately, although there may be an initial, brief hesitation until one student reaches in. Some fish will be destroyed and only a couple of students will earn money. Usually no fish are left for the second round. If using flipchart paper the paper is usually crunched and mangled, some of the fish crackers are usually damaged.)

5. Pay the students for their catch. Announce that there can be no second round because the fish are all captured or crunched. Ask the six students if they understood that the fish would have been worth more in the second round.
(Usually, this misunderstanding does not occur. But, if it does, consider running the experiment again, particularly if no student has tried to organize the others to wait. If you decide to run it again, do so quickly. The result—grabbing, damaged fish, and nothing left for the second round—will be the same.)
6. Ask the fishers why they didn't wait for the second round.
(Anticipate that they may 'blame' whoever jumped in first, but all will comment that they couldn't afford to wait for the second fishing round because they were afraid everyone else would take them all.)
7. What caused the over-fishing that destroyed the fish population?
(Help students articulate that the fish depletion was not the result of 'bad' people doing 'bad' things. No one set out to destroy the fish; people were pursuing their own best interests given the incentives they faced.)
8. Announce that you are going to run the experiment again and explain that the time rounds and pay rate will be the same—10 cents (or one candy) each for the first 20-second fishing round and 25 cents (or two candies) on the second round.
9. On the flipchart paper, or on the overhead, draw 6 “territories” . Now explain to your volunteers that there is one new rule.
10. Assign one rectangle (territory) to each student and explain that he or she owns the fish in that rectangle. Have them initial their territory. Also explain that the fine for taking someone else's fish is \$1 and the loss of future fishing rights. Put one or two fish in each person's territory. Have some ambiguously placed fish in between two territories or in the periphery.
11. Make sure that students understand the new rule. Remind them that there will be two 20-second rounds, say “Go,” and start timing. *(Usually students will not harvest the fish. Some who are confused by the rules may try to harvest others' fish; be sure to stop this and take away that student's fishing privileges.)*
12. After 20 seconds, call “Stop.” Pay for any harvested fish. Remind the students the price for the second round. *(If anyone asks about a third round, ignore the question and shrug and go on with the activity.)*
13. Quickly start the second fishing round. When the round ends, call “Stop.” Pay for the harvested fish, pick up any remaining fish, thank the volunteers and send them back to their seats.
14. Ask students to identify the similarities and differences in the first and second experiments, both in terms of set-up and in terms of results.

(Students' answers should include the idea that people chose to harvest early in the first experiment because they were afraid someone else would take the fish if they let them remain. In the second experiment, that wasn't the case.)

15. Encourage students to explain the differences and similarities using economic terms like choice, incentives, property rights and voluntary exchange. Below are some questions you may pose:

Choice:

- Were the alternatives and the choices different in the two experiments? *(Yes)*
- What was scarce? *(The fish, the time for fishing—no difference from the first experiment)*
- What alternatives were available to the fishers?
(To fish now, to fish later, to not fish at all—no difference from the first experiment)
- What choice did they make and what was the consequence of their choice?
- Did any of the fishers set out to deliberately destroy the fish population?

Incentives:

- Were the incentives the same or different?
- Was there a reward for fishing in the first round of the second experiment?
- What was the punishment for fishing in the first round of the second experiment?
- Did the incentives encourage different behaviour?

Property Rights:

- Did the changed property rights rules affect the behaviour in the fishers?
- How did the property rights rules differ?
- Did the changed rules of ownership affect the incentives? How?

DEBRIEF

Return to the original question: Why do people who care about and even depend on the health of fish populations participate in the over-fishing that is destroying many fish stock? What do you think about your list of hypotheses? Where any of them correct or helpful?

Note: Before taking part in this lesson, students have a tendency to explain the over-fishing problem by assuming people are greedy, ignorant, or stupid. The activity illustrates that those ideas do not explain the behaviour very well. The problem isn't the people; it's the rules of the game. The character, morals, knowledge, and mental capacity of the people in the two experiments were the same. However, people behaved differently when the property rights changed the incentives.

CONCLUSION

Conduct a wider discussion on the issue of the tragedy of the commons using the reading below. Can you think of other environmental issues in which the tragedy of the commons plays an important role?

(Students should be able to recognize several local and international issues. Most endangered species problems are tragedies of the commons. Trash in public parks, lakes, restrooms, and even the mess in the school cafeteria are commons problems, as is the pollution of the greatest commons of all—the air.)

This lesson plan is based on, with some modification, *Fish Tales: Classroom Lessons About the Economics and the Environment*. by Donald R. Wentworth and Kathryn Ratté, copyright 2002 by PERC (www.perc.org). A downloadable, pdf version of the “Fish Tales” lesson plans is available from the PERC web site.

Food for Thought: The Tragedy of the Commons

Written by Gabriella Megyesi

In the first experiment, ownership wasn't defined, and no fisher was willing to risk waiting to until the second round because other fishers would take all the fish. As a result there was over-fishing. Economists refer to this scenario as "the tragedy of the commons."

The original term comes from eighteenth century England, where towns reserved some land as common land available for everyone to use. Because everyone could use the common land, shepherds in England used common land rather than their own land for grazing. There was no problem at first, as long as only a few people used the commons; but when many did, they overgrazed the land. The grass died.

The key to understanding "the tragedy of the commons" is to remember that people are more likely to take better care of things they own than things that someone else—or no one else—owns. Private ownership creates incentives that reward the wise use of property and the conservation of resources for use in the future. The wise use of property increases its future value.

Publicly owned land, on the other hand, creates incentives for overuse. When everyone owns land collectively, people who actually use the land share the costs of their use with everybody else – including those who don't use it. For example, people in England placed additional animals on the common land even though the livestock were scrawny and unhealthy and the commons overgrazed.

Why is the elephant population decreasing in Kenya and Zambia, while their numbers are increasing dramatically in South Africa, India, Botswana, and Zimbabwe?

(In those African countries where elephants are owned in common, and where the ivory trade is banned, the number of elephants are dwindling rapidly. They are victims of poachers in search of ivory. But in India, South Africa, Botswana or Zimbabwe, elephants are not government owned (they are owned by villages or by individuals), and the ivory trade is legal. Despite this (really, because of it) the elephant population is growing! Why? Villagers are issued hunting permits, depending on the size and health of the herds in their area. The villagers may choose to sell the permits. The hunters benefit by gaining meat and hides; the fees paid by the hunters help to support wildlife management services as well as provide income for the villagers.

For information on fisheries management and environmental conservation, visit the Fraser Institute publications page at www.fraserinstitute.ca.