

Quick Quiz What is the *free-rider problem*? • Why does the free-rider problem induce the government to provide public goods? • How should the government decide whether to provide a public good?

COMMON RESOURCES

Common resources, like public goods, are not excludable: They are available free of charge to anyone who wants to use them. Common resources are, however, rival in consumption: One person's use of the common resource reduces other people's ability to use it. Thus, common resources give rise to a new problem. Once the good is provided, policymakers need to be concerned about how much it is used. This problem is best understood from the classic parable called the **Tragedy of the Commons**.

The Tragedy of the Commons

Consider life in a small medieval town. Of the many economic activities that take place in the town, one of the most important is raising sheep. Many of the town's families own flocks of sheep and support themselves by selling the sheep's wool, which is used to make clothing.

As our story begins, the sheep spend much of their time grazing on the land surrounding the town, called the Town Common. No family owns the land. Instead, the town residents own the land collectively, and all the residents are allowed to graze their sheep on it. Collective ownership works well because land is plentiful. As long as everyone can get all the good grazing land they want, the Town Common is not rival in consumption, and allowing residents' sheep to graze for free causes no problems. Everyone in town is happy.

As the years pass, the population of the town grows, and so does the number of sheep grazing on the Town Common. With a growing number of sheep and a fixed amount of land, the land starts to lose its ability to replenish itself. Eventually, the land is grazed so heavily that it becomes barren. With no grass left on the Town Common, raising sheep is impossible, and the town's once prosperous wool industry disappears. Many families lose their source of livelihood.

What causes the tragedy? Why do the shepherds allow the sheep population to grow so large that it destroys the Town Common? The reason is that social and private incentives differ. Avoiding the destruction of the grazing land depends on the collective action of the shepherds. If the shepherds acted together, they could reduce the sheep population to a size that the Town Common can support. Yet no single family has an incentive to reduce the size of its own flock because each flock represents only a small part of the problem.

In essence, the Tragedy of the Commons arises because of an externality. When one family's flock grazes on the common land, it reduces the quality of the land available for other families. Because people neglect this negative externality when deciding how many sheep to own, the result is an excessive number of sheep.

If the tragedy had been foreseen, the town could have solved the problem in various ways. It could have regulated the number of sheep in each family's

Tragedy of the Commons
a parable that illustrates why common resources get used more than is desirable from the standpoint of society as a whole

flock, internalized the externality by taxing sheep, or auctioned off a limited number of sheep-grazing permits. That is, the medieval town could have dealt with the problem of overgrazing in the way that modern society deals with the problem of pollution.

In the case of land, however, there is a simpler solution. The town can divide up the land among town families. Each family can enclose its parcel of land with a fence and then protect it from excessive grazing. In this way, the land becomes a private good rather than a common resource. This outcome in fact occurred during the enclosure movement in England in the 17th century.

The Tragedy of the Commons is a story with a general lesson: When one person uses a common resource, he or she diminishes other people's enjoyment of it. Because of this negative externality, common resources tend to be used excessively. The government can solve the problem by reducing use of the common resource through regulation or taxes. Alternatively, the government can sometimes turn the common resource into a private good.

This lesson has been known for thousands of years. The ancient Greek philosopher Aristotle pointed out the problem with common resources: "What is common to many is taken least care of, for all men have greater regard for what is their own than for what they possess in common with others."

Some Important Common Resources

There are many examples of common resources. In almost all cases, the same problem arises as in the Tragedy of the Commons: Private decision makers use the common resource too much. Governments often regulate behavior or impose fees to mitigate the problem of overuse.

Clean Air and Water As we discussed in Chapter 10, markets do not adequately protect the environment. Pollution is a negative externality that can be remedied with regulations or with corrective taxes on polluting activities. One can view this market failure as an example of a common-resource problem. Clean air and clean water are common resources like open grazing land, and excessive pollution is like excessive grazing. Environmental degradation is a modern Tragedy of the Commons.

Congested Roads Roads can be either public goods or common resources. If a road is not congested, then one person's use does not affect anyone else. In this case, use is not rival in consumption, and the road is a public good. Yet if a road is congested, then use of that road yields a negative externality. When one person drives on the road, it becomes more crowded, and other people must drive more slowly. In this case, the road is a common resource.

One way for the government to address the problem of road congestion is to charge drivers a toll. A toll is, in essence, a corrective tax on the externality of congestion. Sometimes, as in the case of local roads, tolls are not a practical solution because the cost of collecting them is too high. But as the accompanying In The News box discusses, the city of London has found that increasing tolls is a very effective way to reduce congestion.

Sometimes congestion is a problem only at certain times of day. If a bridge is heavily traveled only during rush hour, for instance, the congestion externality



In The News

A Solution to City Congestion

Many economists believe that road pricing should be used more widely to control traffic. London has recently adopted such a plan, and San Francisco is considering it.

London's Traffic Tactic Piques Interest in San Francisco

By Rachel Gordon

A program to combat traffic congestion in central London, in which drivers pay for the right to drive down the busiest streets during peak hours, has caught the fancy of city officials in San Francisco who are looking for ways to ease downtown gridlock and raise revenue to pay for public transit.

"It's certainly an idea worth looking at," said Supervisor Jake McGoldrick. "Traffic is getting worse, and we could use more money for better transit." . . .

London Mayor Ken Livingstone, in San Francisco this week for the United Nations' World Environment Day conference, said congestion charging zones, as they're known in his city, have a proven track record since he introduced them two years ago.

Congestion has been reduced, independent analyses show. Plus, Livingstone said, carbon monoxide pollution is down, and more people are taking the bus. The city also has more and newer buses funded by the increased revenue from the special fee. Congestion has decreased in central London by 30 percent, with 50,000 fewer cars entering the area each day.

San Francisco, Livingstone said in an interview Friday, has the right ingredients for such a scheme to work.

"Clearly," he said, "both the geography of the city and the basic political sophistication of the electorate would make it possible. If it can't happen here, it can't happen anywhere in the United States."

Livingstone, a socialist who was given the nickname "Red Ken," said he was inspired by an unlikely source: free-market economist Milton Friedman, who wrote an essay in the 1950s advocating road charges to discourage traffic.

"It wasn't a radical socialist who came up with a congestion charge," he said.

The London plan crafted by Livingstone encompasses eight square miles in central London—the heart of the city's financial, legal and entertainment areas. Cars driving into these sectors on weekdays between 7 A.M. and 6:30 P.M. must pay the tax, which is now about \$9.50 a trip and will be going up to about \$14. Plans are in the works to expand the boundaries to double the current size.

Drivers are tracked via cameras, which capture the license plate numbers, which are then entered into a database. Hefty fines are imposed on motorists caught trying to evade the tolls.

San Francisco Mayor Gavin Newsom described Livingstone's initiative as bold but said he isn't ready to endorse it for here. He said it deserves further exploration.

Source: *The San Francisco Chronicle*, June 4, 2005.

is larger during this time than during other times of day. The efficient way to deal with these externalities is to charge higher tolls during rush hour. This toll would provide an incentive for drivers to alter their schedules and would reduce traffic when congestion is greatest.

Another policy that responds to the problem of road congestion, discussed in a case study in the previous chapter, is the tax on gasoline. Gasoline is a complementary good to driving: An increase in the price of gasoline tends to reduce the

quantity of driving demanded. Therefore, a gasoline tax reduces road congestion. A gasoline tax, however, is an imperfect solution to road congestion. The problem is that the gasoline tax affects other decisions besides the amount of driving on congested roads. For example, the gasoline tax discourages driving on uncongested roads, even though there is no congestion externality for these roads.

Fish, Whales, and Other Wildlife Many species of animals are common resources. Fish and whales, for instance, have commercial value, and anyone can go to the ocean and catch whatever is available. Each person has little incentive to maintain the species for the next year. Just as excessive grazing can destroy the Town Common, excessive fishing and whaling can destroy commercially valuable marine populations.

The ocean remains one of the least regulated common resources. Two problems prevent an easy solution. First, many countries have access to the oceans, so any solution would require international cooperation among countries that hold different values. Second, because the oceans are so vast, enforcing any agreement is difficult. As a result, fishing rights have been a frequent source of international tension among normally friendly countries.

Within the United States, various laws aim to protect fish and other wildlife. For example, the government charges for fishing and hunting licenses, and it restricts the lengths of the fishing and hunting seasons. Fishermen are often required to throw back small fish, and hunters can kill only a limited number of animals. All these laws reduce the use of a common resource and help maintain animal populations.

CASE STUDY | WHY THE COW IS NOT EXTINCT

Throughout history, many species of animals have been threatened with extinction. When Europeans first arrived in North America, more than 60 million buffalo roamed the continent. Yet hunting the buffalo was so popular during the 19th century that by 1900 the animal's population had fallen to about 400 before the government stepped in to protect the species. In some African countries today, the elephant faces a similar challenge, as poachers kill the animals for the ivory in their tusks.

Yet not all animals with commercial value face this threat. The cow, for example, is a valuable source of food, but no one worries that the cow will soon be extinct. Indeed, the great demand for beef seems to ensure that the species will continue to thrive.

Why is the commercial value of ivory a threat to the elephant, while the commercial value of beef is a guardian of the cow? The reason is that elephants are a common resource, whereas cows are a private good. Elephants roam freely without any owners. Each poacher has a strong incentive to kill as many elephants as he can find. Because poachers are numerous, each poacher has only a slight incentive to preserve the elephant population. By contrast, cattle live on ranches that are privately owned. Each rancher makes great effort to maintain the cattle population on his ranch because he reaps the benefit of these efforts.



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"WILL THE MARKET PROTECT ME?"



In The News

Should Yellowstone Charge as Much as Disney World?

National parks, like roads, can be either public goods or common resources. If congestion is not a problem, a visit to a park is not rival in consumption. Yet once a park becomes popular, it suffers from the same problem as the Town Common. In this opinion column, an economist argues for the use of higher entrance fees to solve the problem.

Save the Parks, and Make a Profit

By Allen R. Sanderson

It is common knowledge that our national parks are overcrowded, deteriorating, and broke. Some suggest that we address these problems by requiring reservations, closing some areas, or asking Congress to increase financing to the National Park Service. But to an economist, there is a more obvious solution: Raise the entrance fees.

When the National Park Service was established in 1916, the admission price to Yellowstone for a family of five arriving by car was \$7.50; today, the price is only \$10. Had the 1916 price been adjusted for inflation, the comparable 1995 fee would be \$120 a day—about what that family would pay for a day of rides at Disney World, . . . or to see a professional football game.

No wonder our national parks are overrun and overtrampled. We are treating our natural and historical treasures as free goods when they are not. We are ignoring the costs of maintaining these places and rationing by congestion—when it gets too crowded, no more visitors are allowed—perhaps the most inefficient way to allocate scarce resources. The price of a family's day in a national park has not kept pace with most other forms of recreation. Systemwide, it barely averages a dollar a person. . . .

An increase in daily user fees to, say, \$20 per person would either reduce the overcrowding and deterioration in our parks by cutting down on the number of visitors or it would substantially raise fee revenues for the Park Service (assuming that legislation was passed that would let the park system keep this money). Greater revenue is the more likely outcome. After spending several

hundred dollars to reach Yellowstone Park, few people would be deterred by another \$20.

The added revenues would bring more possibilities for outdoor recreation, both through expansion of the National Park Service and by encouraging private entrepreneurs to carve out and operate their own parks, something they cannot do alongside a public competitor giving away his product well below cost.

It is time to put our money where our Patagonia outfits are: Either we value the Grand Canyon and Yosemite and won't complain about paying a realistic entrance fee, or we don't really value them and shouldn't wring our hands over their present sorry state and likely sorrier fate.

Source: The New York Times, September 30, 1995, page 19. Copyright © 1995 by The New York Times Co. Reprinted by permission.

Governments have tried to solve the elephant's problem in two ways. Some countries, such as Kenya, Tanzania, and Uganda, have made it illegal to kill elephants and sell their ivory. Yet these laws have been hard to enforce, and elephant populations have continued to dwindle. By contrast, other countries, such

as Botswana, Malawi, Namibia, and Zimbabwe, have made elephants a private good by allowing people to kill elephants, but only those on their own property. Landowners now have an incentive to preserve the species on their own land, and as a result, elephant populations have started to rise. With private ownership and the profit motive now on its side, the African elephant might someday be as safe from extinction as the cow. •

Quick Quiz Why do governments try to limit the use of common resources?

CONCLUSION: THE IMPORTANCE OF PROPERTY RIGHTS

In this and the previous chapter, we have seen there are some “goods” that the market does not provide adequately. Markets do not ensure that the air we breathe is clean or that our country is defended from foreign aggressors. Instead, societies rely on the government to protect the environment and to provide for the national defense.

Although the problems we considered in these chapters arise in many different markets, they share a common theme. In all cases, the market fails to allocate resources efficiently because *property rights* are not well established. That is, some item of value does not have an owner with the legal authority to control it. For example, although no one doubts that the “good” of clean air or national defense is valuable, no one has the right to attach a price to it and profit from its use. A factory pollutes too much because no one charges the factory for the pollution it emits. The market does not provide for national defense because no one can charge those who are defended for the benefit they receive.

When the absence of property rights causes a market failure, the government can potentially solve the problem. Sometimes, as in the sale of pollution permits, the solution is for the government to help define property rights and thereby unleash market forces. Other times, as in restricted hunting seasons, the solution is for the government to regulate private behavior. Still other times, as in the provision of national defense, the solution is for the government to supply a good that the market fails to supply. In all cases, if the policy is well planned and well run, it can make the allocation of resources more efficient and thus raise economic well-being.

SUMMARY

- Goods differ in whether they are excludable and whether they are rival in consumption. A good is excludable if it is possible to prevent someone from using it. A good is rival in consumption if one person’s use of the good reduces other people’s ability to use the same unit of the good. Markets work best for private goods, which are both excludable and rival in consumption. Markets do not work as well for other types of goods.