Lesson outline for April 30

**Learning objectives:**

Students will be able to understand and provide examples of:

* Tragedy of the commons
* Costs and benefits analysis
	+ They will remember to always ask 'Who benefits? Who pays?’
* Externality (positive vs negative)
* Economic efficiency

**Lecture:**

**Tragedy of the Commons activity** (15 minutes)

So, what we just experienced was a demonstration of one of the fundamental principles of Environmental Economics: the Tragedy of the Commons.

A ‘Commons’ in economics is some resource that is common property – that is, that is owned by either all of us together or none of us in particular. Something where it’s not clear who is responsible for management.

In the absence of management or communication, there’s little incentive to plan for the long term.

What are some examples of a commons? (2 minute think-pair-share)

* Common grazing area
* Unmanaged lake (like our idea)
* The air we breathe
* Roads! (Traffic jams) – go to slide

So how do you solve the Tragedy of the Commons? In order to get there, I want to walk you through some of how economists and policy-makers think about this kind of stuff. So let’s go back to our example that we started class with and talk about some Costs and Benefits.

Costs:

* Fishing gear
* Effort
* Resource depletion

Benefits:

* Value of sold fish

The next question to ask is who gets what?

* Benefits are easy: whoever sells the fish gets the benefit
* So who pays the costs?
	+ Each fisher pays individually for their gear and effort…
	+ but the resource depletion is paid by everyone together.
		- What do I mean by that? Imagine somewhere down the line we’re going to pay for an intervention. Maybe we’ll stock the lake with more fish. Who should pay for that? Everyone’s going to end up chipping in for it, absent some government intervention.

There’s an additional issue here, as well – not only are you sharing the costs with everyone else, but you know everyone else have every incentive to do the same. What’s to stop someone else from taking that one extra fish? And if everyone takes one extra fish, there’s none left.

That’s the tragedy of the commons – without management, the resource will be completely depleted because no one has any incentive to conserve it!

How could we do it differently? One way to look at this is by the comparison with a situation where the resource is entirely owned by one person. If you own the lake entirely, you would ‘internalize’ the cost of depleting the lake yourself. In theory, that should incentivize you to prioritize the long run, because you know you’ll be the one to benefit. What does this look like in practice?

Take the lake example. How could we allocate the resource, if we were in charge?

* Give the lake to one person, who is responsible for its maintenance and can charge for access.
* Allocate some number of fish to each person that they are entitled to take each year

Both of these solutions directly attack the “Tragedy of the Commons” by giving people an assured stake in the long-term viability of the resource.

In the real world, that’s not always a good solution, though. Allocating a formerly shared resource to one or many people has issues of equity – who gets a piece of the pie! But even more fundamentally, this solution breaks down entirely when we talk about some really big environmental problems. When we talk about the air we breathe, instead of some lake.

Think about a coal-fired power plant, a really dirty one, just upwind of a town. Now we’ve made the case a lot more complicated, but we can still use the same framework for analysis.

***(write on board)***

So, this power plant burns coal to generate power. What are the benefits of doing so, and who reaps them?

* The power plant owners get to sell the power and make money
* Society benefits from having power in many ways!
	+ Our whole world runs on this power
	+ But we pay for it! That’ll be important in a moment.

What are the costs for the operator of the coal-fired power plant? Who pays them?

* Cost of coal – power plant
* Cost of building, maintaining their facilities – power plant
* Cost of polluting the air – nobody, or alternatively, everybody!

If we draw a line representing the system getting covered by the exchange of money, you can see we a lot of this is covered! That’s good! But there’s some stuff here that isn’t – specifically the cost of pollution.

This is a ‘market failure’. Specifically, the term for this type of market failure is an ‘externality’. It’s called that because it’s a cost that’s ‘external’ to the system we have for exchanging value – i.e., it has a cost but not one that can easily be charged to company imposing it.

To be even more specific, this is a negative externality. That means, that there’s a cost here that is external to the system and is born by the public. Can any of you think of an example of the reverse – a positive externality?

* Herd immunity from vaccination.
* Bees! (The total value of the pollination provided may far exceed the value of the honey produced)

So what are the implications of these externalities? To understand this, we need to think about economic efficiency.

**Economic Efficiency – Definition:**

The simplest formulation of economic efficiency: the costs of an activity to society are precisely equal to the benefits of that activity.

Think about the production of energy. The benefits of energy are obvious, and generally easy to quantify - our productivity as a species increased enormously in the era of cheap energy – it’s why most of us aren’t working on farms today! The costs of this energy are less obvious, but this whole class has been about some of them! In an efficient world, enough energy would be produced that these costs and benefits would precisely balance.

Imagine we were at that point right now. Increasing energy production would help us, of course, but the increased cost of the pollution incurred would outweigh that cost! Therefore, if our system were ‘efficient’, we wouldn’t do that! That’s what efficiency means to an economist.

* An aside, that will turn out to be really important on Thursday – ‘Efficient’ doesn’t mean equal. Nowhere in our definition of efficiency did we discuss the distribution of wealth or outcomes. It’s a major weakness of this frame of reference.

Let’s think, then, about what an externality means for efficiency. Remember that under our definition of efficiency, the costs and benefits balance precisely. When a negative externality exists, as in the coal mining case, what does that mean about the stable outcome?

(Remember that the coal power plant is offloading some of its costs on to the general public.)

Because of this, the level at which the coal plants costs and benefits are equal means that power is being overproduced relative to its efficient level!

Rule of thumb:

* Negative externalities lead to overproduction, relative to the ‘efficient’ level of production.

*(make them figure this one out, if there is time!)*

* Positive externalities lead to underproduction, for the inverse reason!

Why does all of this matter? Why learn these terms? Tune in on Thursday to learn why!