# Seeking Common Ground on Climate

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This live program explores resources that are shared by everyone on Earth and why international cooperation is vital to confronting climate change. Shared resources are discussed in the context of "the Tragedy of the Commons" and a mock debate between audience members is facilitated to internalize the difficulty and complexity of international climate negotiations.

## Live Program Script:

**Note:

- Lines that begin with ">>" and bracketed text denote presenter instructions. *In this version of the script, these are also italicized.*
- "(Q?)" denotes discussion questions.

---(1) Blue Marble---

This is very close to what the Earth looks like from space. It is the only planet known to support life. Civilizations, including our own, have been able to advance and grow by tapping into Earth's natural resources.

(Q?) What common natural resources can you name?
Potential answers: Water, oil, arable land, lumber, ore, rock

---(2) Cropland Intensity---

Food is essential. This is a map of the world's cropland. The brighter colors indicate the highest density of cropland. The total area used for cropland is about the size of South America.

Dataset Notes

- Some of the most grown crops are wheat, corn, rice, soybeans, etc.
- High crop intensity in Midwestern US, Europe, India.
- No crops in deserts (Sahara, Gobi), Mountains (Himalayas), Arctic

---(3) Pastureland Intensity---

As the world's population increases, the demand for meat is also increasing. This shows the usage of land for pastures-- land used for grazing cattle and other livestock. The total area used for pastureland is 30 million square kilometers-- an area about the size of Africa. As you can see, a lot more land is used for pastureland than for cropland.

(Q?) What happens to land if it is overused?

In the 1920s, farmers used the land without paying attention to the health of the soil and this is one of the reasons for the Dust Bowl of the 1930s. When people use a shared resource without regulating its usage, the resource can quickly become depleted. This is called "The Tragedy of the Commons." This term, coined by the American ecologist Garrett Hardin, refers to the conflict between individual interests and the best interests of the community.

What other resources could be subject to the Tragedy of the Commons? Let's look at a couple more examples.

---(4) Fisheries Catch Model - 2005 vs 2050---

Here we can see the oceans, one of our greatest resources. This dataset is a computer model developed by the National Marine Fisheries Service. It shows the predicted distribution of fish in 2050 compared to 2005. Overfishing is a big global issue. If fishing is not regulated, and all countries increase their fishing to keep up with the growing number of people on the planet, fish populations can be depleted. This is a big problem because about 1 in 5 people depend on fish as their primary source of protein *[Optional: show and discuss "Overfishing Infographic" layer].*

In addition to overfishing, climate change is impacting the oceans. The oceans are getting warmer and more acidic and this is hurting species, especially in the tropics. Some species that are unable to deal with the changes may go extinct and others will migrate to different areas. Notice how this model predicts catches to increase in the high latitudes but decrease around the equator.

So far, we've looked at examples of the overuse and exploitation of shared resources on land and sea. But what about the atmosphere? Although we take it for granted, the air we breathe is limited and can become overly polluted by smog and more subtle greenhouse gases.

---(5) Beijing Air Pollution---

This is the same location in Beijing on two different days in June 2009. Smog is formed when air particles chemically react in sunlight. It reduces visibility and makes breathing difficult. Only three days passed between the picture on the left and the one on the right.

(Q?) What do you think happened in the days between when the two pictures were taken?

The picture on the right was taken before rain, and the picture on the left was taken after. Unlike smog, carbon dioxide gas is invisible and can stay in the air for hundreds of years.

---(6) Carbon Tracker 2000-2010 (fixed scale) (paused)---

This is a model showing the concentration of carbon dioxide in the atmosphere. The white dots represent measurements being taken around the world.

Carbon dioxide ($CO_2$) is an ingredient in photosynthesis and a product of breathing. Notice how $CO_2$ emitted in one part of the world can travel anywhere.

Fossil fuels are burned all over the world, and this emits $CO_2$ into the atmosphere. $CO_2$ is a greenhouse gas, which means it makes the Earth warmer by redirecting heat that is travelling out to space back down to the Earth's surface. In this way, $CO_2$ "traps heat". $CO_2$ is being emitted by all nations around the world, but in 2010 more than 40% of total $CO_2$ emissions were from China and the United States (25% from China, 15% from the US).

How are $CO_2$ emissions an example of the Tragedy of the Commons? What are "the commons" in this example? What is the "tragedy"?

$CO_2$ emissions are changing the composition of the atmosphere, which is a shared resource like "the commons". If $CO_2$ emissions are not reduced, we face a destabilized climate with

severe consequences. Note that the average concentration of $CO_2$ in the atmosphere increases a lot in only ten years.

---(7) Top 10 $CO_2$ Emitting Nations (2010)---

This dataset shows the ten nations that emitted the most $CO_2$ in 2010.
(Q?) Which country emits the most $CO_2$?

*>>Gradually reveal all 10 nations on the map.*

Some countries emit more $CO_2$ than others. China, the United States, and India are the three highest emitters and China and India's emissions continue to grow each year. If we are going to prevent the worst effects of climate change, we need an international agreement that limits $CO_2$ emissions and holds every country accountable.

(Q?) What are some ways countries can reduce their $CO_2$ emissions?

In the 1990s an international agreement called the Kyoto Protocol was drafted to address global $CO_2$ emissions. It set targets for countries to lower their emissions and was supposed to incentivize countries to reach their targets and punish countries that did not. However, China and India were exempted from the original agreement and the United States refused to sign it so the Kyoto Protocol has not achieved its goals.

**----Audience Participation Activity: Mock Debate----**

*>>Refer to the Debate Script for this activity.*

---(8) Ozone's Slow Recovery---

Although efforts to make a climate agreement have been unsuccessful, there have been successful international agreements in recent history. This is a visualization of ozone high up in the stratosphere, about 20 to 60 kilometers above us.

Notice that in September and October a region of low ozone concentration appears over the South Pole. This region is called the ozone hole. Decades ago, chemicals called chlorofluorocarbons (CFCs) were used in refrigerators and aerosol cans.

In the 1970s, CFC use was linked to ozone depletion and the formation of the ozone hole. Countries at the United Nations worked together to restrict the usage of CFCs and by 1987, they had reached a binding agreement: the Montreal Protocol. The Montreal Protocol restricted

the use of CFCs, allowing the ozone layer to recover. Computer models predict that the ozone hole will be slowly reduced over the coming decades, becoming fully sealed by 2070.

---(9) Nighttime Lights---

This is what our planet looks like at night (and with the clouds removed). You can see the outlines of countries and continents just from their electricity.
(Q?) Which countries can you see?
(Q?) Which countries can you not see?

For perspective, the biggest emitters of CO2 tend to be the countries with the brightest lights--developed nations.

At the end of every year since 1995, an international conference has taken place to discuss and debate policy for dealing with climate change. World leaders, policy makers, and scientists meet with the goal of designing a new international agreement to limit CO2 emissions. Although no agreement has been reached yet, a policy shift is becoming increasingly likely, as governments can no longer ignore the threat of climate change.

A lasting international agreement is the best way that we can reduce global carbon emissions and avert the Tragedy of the Commons with respect to climate change. This is only possible if citizens tell their governments to make an agreement happen. This doesn't just mean calling up legislators and holding climate rallies. It includes subtler ways as well, like working to reduce your own carbon footprint. However you do it, make your voice heard! With hard work and advocacy, we can reach an agreement that will mitigate the worst effects of climate change.

**Give your location's customary farewell.*