

# Lab: Tragedy of the Commons

(modified from Life on an Ocean Planet)

**Background:** Since the early 1600s, countries have been indiscriminately harvesting ocean resources without thinking ahead to the health of the resource. This led to a Tragedy of the Commons, which is defined as the depletion or degradation of a potentially renewable resource to which people have free and unmanaged access. The establishment of resource jurisdictions in the early 1980s changed the face of ocean management forever. Countries now had a vested interest as to what was happening under the waves. They could no longer fish and fish until the resource was wiped out because there would be no other place to go. Countries now had to manage their resources more wisely. This new management of biological resources comes with a price – the importance of investing in research. To be good stewards of a biological resource, one needs data. Like any business, the need to understand your product is essential to being successful. Marine resource management programs are set up in coastal areas to guide industry into its new role of ownership. At first, the research community and the fisheries industry did not get along with one another. Industries believed it was the researchers versus business. This attitude makes it difficult to obtain accurate data from the fishing fleets. Good management recommendations came slowly. During the early 1990s this “research versus industry” attitude began to change. The fisheries industry realized that to maintain a productive harvest, they needed the advice of the fisheries scientists. At the same time the scientists realized that they would need to be sensitive to the fishing industries concerns and interests to obtain the data that was needed to make valid recommendations. Scientists began to interpret data to yield practical applications. Although never perfect, current recommendations are designed to keep a marine resource strong and healthy for generations to come.

## DATA:

<b>Year</b>	<b>Total Aquaculture in metric tons</b>	<b>Total Commercial Catch in metric tons</b>	<b>Grand Total in metric tons</b>
1994	20,840,000	92,080,000	112,920,000
1995	24,390,000	92,380,000	116,770,000
1996	26,700,000	93,850,000	120,550,000
1997	28,690,000	94,300,000	122,990,000
1998	30,560,000	87,670,000	118,230,000
1999	33,450,000	93,770,000	127,220,000
2000	35,500,000	95,500,000	131,000,000
2001	37,790,000	92,860,000	130,650,000
2002	39,790,000	93,200,000	132,990,000
2003	42,700,000	90,500,000	133,200,000
2004	45,900,000	94,600,000	140,500,000
2005	48,500,000	94,200,000	142,700,000
2006	47,300,000	92,000,000	139,300,000
2007	49,900,000	90,300,000	140,200,000
2008	52,900,000	89,700,000	142,600,000
2009	55,700,000	89,600,000	145,300,000
2010	59,000,000	88,600,000	147,600,000
2011	61,800,000	90,400,000	152,200,000
2012	66,500,000	91,300,000	157,800,000
2013	70,300,000	92,700,000	163,000,000
2014	73,800,000	93,400,000	167,200,000

Species	Commercial Catch
Peruvian Anchovy	5,670,000
Alaska Pollock	3,200,000
Skipjack Tuna	3,000,000
Sardines	2,300,000
Chub Mackerel	1,800,000
Atlantic Herring	1,600,000
Japanese Anchovy	1,400,000
Atlantic Cod	1,400,000
European Pilchard	1,200,000
Jumbo Flying Squid	1,200,000

Country	Commercial Catch
China	14,800,000
Indonesia	6,000,000
United States	5,000,000
Russia	4,000,000
Japan	3,600,000
Peru	3,550,000
India	3,400,000
Vietnam	2,700,000
Myanmar	2,700,000
Norway	2,300,000

**ANALYSIS:** From Table 1, construct a double bar graph of Total World Aquaculture vs. Total Commercial Catches from 1994-2014 and answer the following questions:

**TABLE 1:**

1. Based on the results of your graph, describe the trends in commercial and aquaculture fish harvests from 1994 to 2014.
2. Propose an explanation of the changes in commercial catch that happen from year to year.
3. The size of the global fishing fleet was increasing during this time frame, yet the commercial catch stayed roughly the same. Why do you think this is?

**TABLE 2:**

4. What do you notice about the fish that account for the majority of commercial catch?
5. Why are so many Peruvian Anchovy caught? Give three examples of their use.

**TABLE 3:**

6. Name the top three commercial fishing nations in 2014.
7. Describe any patterns of geographical area that might suggest a high interest in fishing and aquaculture.

**CONCLUSIONS:**

8. What is the difference between sustainable yield and degradation of a resource?
9. Describe the impact that overfishing has on the marine environment.
10. Of all the fish species in Table 2, which type do you think should be managed more carefully and why?
11. Explain how aquaculture can take the pressure off wild fish stocks.
12. What are some of the technical advances in the fisheries industry that have placed increased pressure on wild fish stocks since the 1880's?
13. Why do you think that fishermen are sometimes known as the "Last Hunters"?
14. Terrestrial domestication of animals for food has taken thousands of years of human civilization. Do you observe any evidence that we are going towards the same situation with marine sources of food? Explain.
15. Compare the similarities between how we have utilized resources on common land to how we have traditionally used resources in the ocean.