

Mancur Olson and the Tragedy of the Unbalanced Commons

by Richard Zeckhauser

Economists constitute a rich menagerie. The vast majority of economists are patient toilers. In their everyday investigations, conducting regressions, tallying benefits and costs, and taking derivatives, they till the local fields. Yet, the most famous economists are often the equivalent of fierce warlords, capturing intellectual territory and fighting off those who seek, with alternative models and rival empirical analyses, to occupy it. Those who follow these warlords work in concert, like armies. Warlords and their lieutenants together can dominate vast domains.

By contrast, Mancur Olson was an unconstrained explorer. A powerful thinker, he ventured into new intellectual lands. His work was so distinctive and original that vying with others to protect that territory simply was not part of the way he led his life. Mancur loved the life of the mind. He would move comfortably through the conceptual environment, always looking for intellectual sustenance and worrying not at all about what other economists thought of his work. While they submitted articles to journals, Mancur published his most influential writings in books. Many of his ideas were simply too original and too widely applicable to be contained in the pages of articles. Though proud to be an economist, he could survive for long periods without coming back to his academic forte. He was admired as much in political science and sociology as he was in his home discipline.

Mancur and I both had Thomas Schelling as a thesis advisor. With Schelling as a role model and his own strong inclination toward intellectual adventure, it was natural for Mancur to carve his own distinctive intellectual path. Mancur was a few years ahead of me, and we did not meet until we spent a summer together at the RAND Corporation. He had in had a draft of his first masterpiece, *The Logic of Collective Action*, but it had not yet been published; I knew of it only from his verbal accounts. I quickly recognized that Mancur was a thinker, a man with the passion and the power to understand problems at a fundamental level.

Alliance Theory. Mancur and I were given a joint assignment. The background was as follows. In the mid-1960s, the United States was contributing vastly disproportionately to the support of NATO. Nonetheless, the US was less threatened than its NATO allies by the enemy, the Soviet Union, and had no colonies to control and no nearby threats. The United States spent 9.0% of its GNP on defense in 1960. The United Kingdom, France, and Germany only spent 7.0%, 6.7%, and 5.5% of their GNP, respectively. Other NATO members spent much less, with tiny Luxembourg only spending 1.7%. Mancur and I had the straightforward task of developing an argument that would explain to US allies why they should be spending more for the common defense.

Our analysis started with the assumption that, though bound in an alliance, each nation's predominant concern was its own self-interest. A central lesson of *The Logic of Collective Action* was readily applicable: in any organization, the incentive to catch a free ride is powerful. In his impressive volume, Mancur then showed how a variety of organizations had created measures to counter that incentive.

The central finding of our analysis of the NATO alliance emerged from the observation that, in any group benefitting from a public good, a bigger player secures more benefit at the margin from a unit of that good

than does a smaller player. Indeed, if other aspects, such as threat level (if a protection arrangement) or per capita income, are equal, a player twice as big benefits twice as much. The clear implication was that, as the participant with the most compelling incentives, the biggest player *would* make a disproportionate contribution. The observed pattern, with the United States contributing a far greater fraction of its GNP to the common defense, was the natural order for the NATO alliance. That basic conclusion was extremely disappointing to our superiors and presumably to their client, all of whom were hoping to find an argument that would get the United States' reduced-fare allies to contribute more.

To be sure, there were some countervailing forces. First, income effects might reduce the disparities in spending. Second, participating nations that secured unusual private benefits from their public-goods expenditures would spend more. Therefore, Portugal, still controlling its colonies, spent 7.7%. Third, the biggest player could pressure its smaller alliance partners to boost spending. This last effort, obviously, would be more successful if the monies involved were small and the "let's all pitch in" plea for fairness could carry greater relative weight. However, our central finding was that the help the US was receiving was what it should expect to get. That, in essence, is what we wrote in our co-authored piece, "An Economic Theory of Alliances."

As devoted students of Tom Schelling, Mancur and I were also well prepared for the finding that the big entity does not always have the advantage and may well suffer because of its large size. Schelling had often examined situations and identified the intuitions underlying counterintuitive findings. One such finding was that, as in jujitsu, bigness can be a disadvantage.

This central fact underlying alliance theory has been borne out across a wide range of circumstances. When OPEC over the years had to cut production to preserve for its members the public good of a high oil price, Saudi Arabia, the biggest producer, had to take disproportionately deep cuts from the level it would have chosen if it had been without influence on that price. (Note, also, that when Saudi Arabia recently decided to pump hard, probably to bring pain to its enemies Russia and Iran, the oil price plummeted and OPEC effectively fell apart.) In another display of alliance theory, the United States is currently leading a broad international coalition battling ISIS in Iraq and Syria. Its major European partners, surely more than equal beneficiaries on a per capita basis of the US efforts, given their greater vulnerability to ISIS-related terrorism, have contributed very modestly in comparison to the United States.

The Olson Approach to Research. Since this volume celebrates Mancur, I will remark at this point on the physical aspects of our collaboration, and then on Mancur's more general approach to research. Not blessed with a modern word-processing program, much less the Internet and Dropbox, we produced typed drafts and used the elegant method of cut-and-paste. More than a dozen, perhaps two dozen, drafts were mailed back and forth between Princeton, where Mancur then resided, and Harvard, my base. The Scotch Tape makers profited handsomely. Only modest progress was made on the basic model, theory, and empirics in these exchanges. What did evolve was style. Mancur and I greatly differed in our views on the subject; he tilted toward longer and more complex sentences. Both of us were stubborn, but Mancur succeeded at inculcating in me his penchant for perfection. This was my first introduction to Mancur's general approach to research: work and work on a project, present it to others, then repeat. He had three guiding principles that served him well throughout his career: address a big question, get the answer right, and make it clear.

Over the years, Mancur would come to visit me at Harvard, about once annually. He would alert me each time as to what he wanted to discuss. Surprisingly, what he wanted to discuss was often the same project that we had discussed the previous year. But there would be differences; the project would have progressed. That approach enabled him to turn excellent ideas into major books, such as *The Logic of Collective Action*, *The Rise and Decline of Nations*, and *Power and Prosperity: Outgrowing Communist and Capitalist Dictatorships*.

In the context of major ideas, let me also mention his work on social indicators, produced in the late 1960s, long before most economists thought about the ways our profession failed to measure critical elements of human well-being, such as the health or educational level of the populace. Many in the economics profession, including the current author, would do well to imitate Mancur's willingness to work patiently, to get it right, and to make it clear. Equally importantly, we should also seek to follow his strategy of focusing on ideas sufficiently big to be appropriate to an unconstrained explorer. Mancur was well suited to following this strategy. He was happy to tramp his own path, worrying little whether others were ahead of or following him.

The Tragedy of the Unbalanced Commons. Were Mancur Olson alive today, I am confident that he would have something profound to say about the problem of climate change and about the failure to date of nations to do much about it. Drawing on his past work, he would observe that the world's nations are engaged in a collective-action problem and that virtually all are pursuing their incentives to ride free or cheaply. He would also observe that climate change presents an alliance problem, with some nations having much more at stake than others. He would be delighted to work on climate change, recognizing it as a problem of major policy import, one linked to his work on social indicators. He would probably relate it to his work on the institutional sclerosis that afflicts societies and thus makes their policies so hard to change.

The most famous article in the broad realm of environmental collective action is probably Garrett Hardin's "The Tragedy of the Commons." I argue, in the Olson tradition of not shrinking from irreverence, that this much-celebrated article may be fundamentally misleading, at least as it relates to the problem of the balanced commons. A balanced commons is one where the herdsmen are symmetrically situated. Each starts with the same number of the same animal. (Hardin implies that, with a zero-price commons, herdsmen would just keep adding livestock. But that ignores the issue of the efficient scale for a firm.)

With a little bit of organizational skill, the over-grazed balanced commons has good potential to be turned into "The Resurrected Balanced Commons." Hardin had animals--I will use sheep though he used cattle--belonging to different owners and grazing on the commons in the center of a community. Left to their own devices, the owners simply let their animals multiply and, in aggregate, graze excessively. What was needed was either property rights, a mechanism that appealed to Mancur as a promising approach to a great range of problems, or a community council. With property rights, there would be a group of landlords who would rent out their shares of the commons for grazing. They would have every incentive to prevent overgrazing.

For many commons problems, possibly the one of grazing, but certainly the one involving fish in the sea or the use of the atmosphere as a dumping ground for greenhouse gases, property rights are not a feasible solution. Fish move around, as do gases in the atmosphere. So let us focus on the community-council approach, once again invoking an animal metaphor. Figure 1 shows a community with four farmers. Each of them has four sheep, their personally efficient scale, assuming free grass. Each sheep eats 10 units of grass a day. Alas, the commons only produces 120 units of grass per day, hence can only carry twelve sheep total.

INSERT FIGURE 1 ABOUT HERE

The symmetric solution stands out, where each farmer gets to graze three sheep. Figure 2 shows the solution. Schelling would observe that this resolution represents a focal point.¹ It would be hard for any farmer to argue that “I should get four sheep and you should get only two.” If anyone tried to break away from the balanced three-sheep arrangement, disorder would ensue. Thus, as long as the numbers of sheep per farmer could be easily monitored, the community council could implement a policy that would resurrect the commons, with just the right amount of grazing and little need for bureaucratic infrastructure. Human beings intuitively understand and often embrace the principle of symmetric treatment for those symmetrically situated. Thus, when two lanes of cars merge into one, drivers know to alternate.

INSERT FIGURE 2 ABOUT HERE

Let us continue with the animals-on-commons metaphor, but this time with four participants who start in a highly asymmetric situation, which we shall refer to as unbalanced. Figure 3 tells the story. Farmer A has been around a long time, but he is old and can only care for three sheep. B is energetic and able to tend six sheep. C went to an agricultural college and deals with a hard-to-raise new breed of larger sheep. D has unusual skills as an elephant handler and makes a living giving elephant rides. There is no easy symmetric solution to be found. Elephants are not readily measured in sheep equivalents, and the new-breed sheep of farmer C are not the same as those of farmers A and B. Obviously, the animals consume very different amounts of grass and provide very different values per grazing day.

INSERT FIGURE 3 ABOUT HERE

The community council assembles. Heated discussions follow. The arguments go roughly as follows. Farmer A says: “I should reduce not at all. My animals eat the least grass, and I just use up the 30-unit per capita limit that would preserve the commons.” Farmer B objects, arguing: “Farmer A has been grazing for 10 years, not 3; he should be the first to reduce.” Farmer C then argues: “My sheep are more efficient producers of value than the traditional sheep of A and B. I should hardly be punished for my superior skill, which enables me to handle the new breed.” Then the three sheep farmers turn as a group to raise accusations against Farmer D and his elephant, which consumes well over half the available grass. But D counters that: “My elephant really produces enormous value from the grass he consumes, much more than any of your sheep. My participation is vital; it lifts the whole economy, as we saw this past year.”

¹ See Schelling, *The Strategy of Conflict*, particularly chapter 4, pp. 83-118.

What finally happens? All of the four persist with their own arguments. No voluntary agreement on limiting the number or types of animals proves achievable. The commons collapses. End of story.

Climate change, unfortunately, presents just such an unbalanced situation. The nations of the world are in drastically different situations. Some are big; some are little, whether measured in area or in GNP. Some would be devastated by significant temperature increases; some might benefit. Some are rich; many are poor. Some have been dumping major quantities of greenhouse gases for centuries; others have only become big emitters lately. And some nations' citizens are much more concerned about the environment than those of other nations, which helps explain why a few nations have already taken strong measures to curb greenhouse gases. Indeed, the disparities among nations are much greater than those among the earlier four farmers tending to their significantly different holdings of animals.

This global commons problem is further vastly complicated because there is not any community council that could simply tax grass consumption or that could work through the politics and determine the sheep-equivalent of one elephant. All these "farmers" of the global commons, living in their own nations, reflect on their own situations and put forth justifications in the council of nations for solutions that are favorable to them.

Table 1 below shows the total greenhouse gas emissions of the world's five leading emissions producers in 2011, as well as their emissions per 100 million population and per trillion dollars of gross national income (GNI). Note the differences between China and the United States.² The United States produces vastly more emissions per capita, but much less per dollar of GNI. Reasonable arguments could be advanced as to why either a per capita or a GNI ratio would provide an appropriate basis for an international agreement. However, the reductions agreements to be signed for the Paris Accord, scheduled for fall 2015, are based on emissions relative to those in various target years.

INSERT TABLE 1 ABOUT HERE

Here, once again, there are dramatic asymmetries as to which target year nations would prefer. Since China's emissions have been growing and continue to grow much more rapidly, it would like to peg any reductions to later years, while the U.S. would favor earlier years. The pledged intentions as of June 2015 for the Paris Accord scheduled for fall 2015, as shown in Table 2, are instructive. The United States has pledged to reduce emissions by 26 to 28% from its 2005 level, a year where emissions were notably above both its 1990 and 2011 levels. China, also pursuing its self-interest, has pegged its emissions to a much later year, intending to have its emissions peak before 2030.³ Russia, by contrast, whose stumbling economy has caused its emissions to fall by nearly 30% since 1990, has agreed to be at 70-75% of its 1990 level, implying no cuts from its current level.

INSERT TABLE 2 ABOUT HERE

² Disagreement would be stronger still if there were choices on limits, possibly using per capita emissions or emissions per dollar of GNP. China would have argued strongly for the former, the U.S. for the latter.

³ Private communication, Robert Stavins, June 11, 2015.

The European Union (EU) also has 1990 as its top year for emissions, though its reduction percentage since then has been far below that of Russia. Reflecting its strong environmental consciousness, the EU has committed to a 40% reduction from the 1990 level by 2030.⁴ As of June 2015, India, whose government has announced strong plans for economic growth, has not yet committed. Posit that these five gargantuan emitters could reach an agreement to cut emissions significantly from what they would otherwise be. What kind of cooperation could they expect from the dozens of lesser emitters, who would have bargaining strength as potential free riders?

The global commons cannot be owned. Otherwise, property rights would solve the problem. Recognizing the ownership problem, some smart economists proposed a cap-and-trade system. But that proposal failed because the parties could not agree on how to hand out the initial property rights.

The sad implication is foreshadowed by the work of Mancur Olson. An effective international climate change agreement would be exceedingly difficult to implement. Unbalanced situations impede the effective resolution of collective-action problems.

But if that is true, how has NATO managed to provide the public good of deterrence sufficiently effectively for so many decades? The NATO collective-action problem was easier than the climate change challenge for two reasons. First, there was one party, the United States, that was so important that it was able to be the disproportionate provider of the public good. An unbalanced situation may be bad for efficient provision, but once it gets sufficiently unbalanced, matters may improve. Second, NATO was a contribution situation; in theory, one country could, if necessary, do it all. An equivalent situation prevailed in the 19th century, when the British Navy could ensure unfettered sea navigation for all.

Climate change is a denial phenomenon. Even if the United States and/or China were to cut their emissions to zero, if the other nations simply maintained their current practices, concentrations of greenhouse gases would continue to rise steadily. Were Mancur Olson to return to the scene today, he might write a volume entitled *Shortfalls and Catastrophes in Collective Action*. NATO would fall into the first category. Climate change would fall into the second, unless some effective new instrument were found, or geo-engineering proved safe and effective, or the world just got lucky. Olson's volume would pay considerable attention to the degree of imbalance within the alliance and to whether it was a situation of contribution or denial.

The Passing of Mancur Olson. On February 19, 1998, I was privileged to have dinner at the house of Tom and Alice Schelling. The meal was lovely, as always, and the conversation lively. At dessert, Alice turned to Tom and me and told us that she had received a very sad phone call before our arrival, informing her that Mancur had suffered a fatal heart attack that day. The rest of the evening was spent coping with our grief and recounting tales of our encounters with Mancur, noting his great intellectual contributions and, most importantly, expressing our great affection for him. Alice had deftly divided the evening. She had effectively structured a situation of collective action. There was just enough time for

⁴ Following alliance theory, had the nations of the European Union (EU) participated individually, they would have taken on a lesser burden in total. Not surprisingly, the EU is generally considered to be more environmentally committed than the average of its member countries. Robert Stavins, private communication, June 2015.

an appropriate memorial, not too much and not too little. Mancur would have been proud of Alice, compassionate in concern, yet rational in choice.

A Final Word. I was fortunate to tag along on occasion as Mancur Olson, an unconstrained explorer blazed an intellectual path through his chosen forest. The trees in that forest were of all species of institutional performance, ranging from the smallest organizations, through the largest governments, to international entities. In an era when most institutions in and among nations seem to disappoint, the world would be well served to retrace some of Mancur's paths and thereby find the way to elusive solutions.

Bibliography

Olson, Mancur, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Cambridge, MA: Harvard University Press, 1965.

Olson, Mancur, *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*, New Haven, CT: Yale University Press, 1982.

Olson, Mancur, *Power and Prosperity: Outgrowing Communist and Capitalist Dictatorships*, New York, NY: Basic Books, 2000.

Olson, Mancur, and Richard Zeckhauser, "An Economic Theory of Alliances," *Review of Economics and Statistics* 48(3), August 1966, 266-279.

Schelling, Thomas C., *The Strategy of Conflict*, Cambridge, MA: Harvard University Press, 1960.

Table 1. Comparison of the Five Leading Emitters of Greenhouse Gases^a as of 2011

	China	United States	European Union (15)	India	Russian Federation
2011 emissions	10,304	6,024	3,364	2,756	2,181
2005 emissions	6,974	6,480	3,779	1,914	2,163
1990 emissions	3,218	5,744	3,936	1,212	2,777
2011 emissions per 100 million population	7.656	19.326	8.443	2.220	15.273
2011 emissions per trillion dollars of GNI	1,562.9	384.0	139.0	1567.7	1,409.8
2011 population (millions)	1,345.9	311.7	398.4	1,241.3	142.8
2011 GNI (\$ trillions)	6.593	15.689	24.208	1.758	1.547

^a All emissions measured in million metric tons of CO₂. Values include land-use change and forestry.

Sources:

Emissions: CAIT Climate Data Explorer. 2015. Washington, DC: World Resources Institute. Available online at: <http://cait.wri.org>.

Population: 2011 World Population Data Sheet. 2011 Population Reference Bureau.

GNI: The World Bank Group. <http://data.worldbank.org/indicator/NY.GNP.ATLS.CD>

Table 2. Commitments to Reduce Emissions for Fall 2015 Paris Accords

Country	Commitment	Date
China	By year 2030: <ul style="list-style-type: none"> • To achieve the peaking of carbon dioxide emissions around 2030 and making best efforts to peak early; • To lower carbon dioxide emissions per unit of GDP by 60% to 65% from the 2005 level; • To increase the share of non-fossil fuels in primary energy consumption to around 20%; and • To increase the forest stock volume by around 4.5 billion cubic meters on the 2005 level. 	6/30/15
United States	26%-28% below its 2005 level in 2025; best efforts to reduce by 28%	3/31/15
European Union (28)	40% domestic reduction by 2030 compared to 1990, to be fulfilled jointly	3/6/15
India	None	n/a
Russian Federation	Limiting to 70%-75% of 1990 levels by 2030, subject to the maximum possible account of absorbing capacity of forests	3/31/15; Revision 4/1/15

Source:
CAIT Climate Data Explorer. <http://cait.wri.org/indc/>

Figure 1. Overgrazing the Balanced Commons

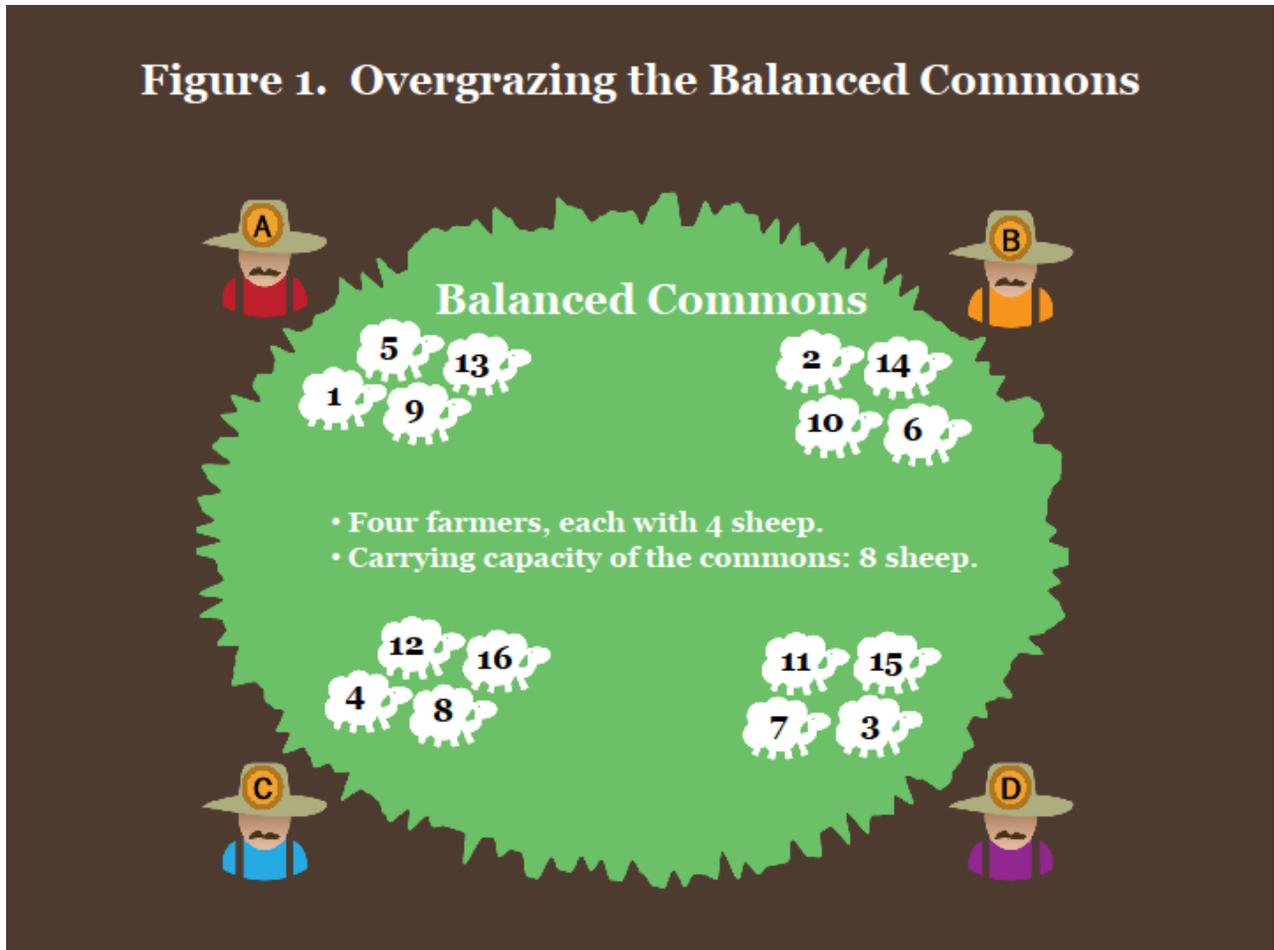
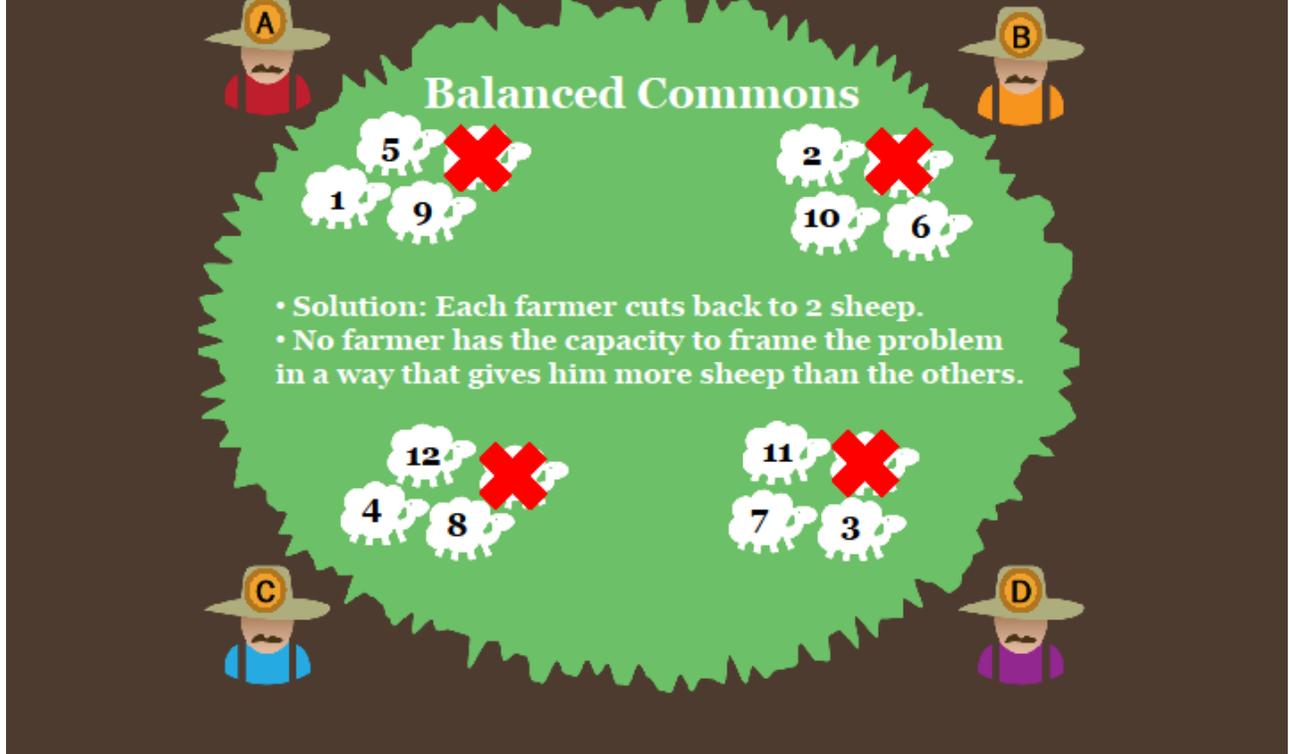


Figure 2. Resurrection of the Balanced Commons, A Symmetric Solution



Solution: Each farmer cuts back (as pictured) to 3 sheep.

No farmers have the capacity to frame the problem in a way that allows them more sheep than the others.

Figure 3. The Tragedy of the Unbalanced Commons

