

Tragedy in the Making

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THERE is a growing feeling that resources vital to sustain human life, such as fresh water, land and fossil fuels, are being used too fast to ensure our long-term presence on the planet. It seems obvious that nations should cooperate on this problem, and yet successful cross-border solutions and agreements are hard to find. Why don't we act for the common good more often?

Look around the world and you can see instances of water-related inter-state tension and conflicts in many regions, including the Middle East ([Jordan river](#) basin, [Tigris-Euphrates](#) basin), Asia ([Indus river](#)), and Africa ([the Nile](#)).

"Fish wars" have erupted sporadically, such as [Europe's cod wars](#), and while these have been more contained, they could resurge amid decreasing stocks. In the same way, the shared resource of global climate continues to be threatened by the relentless burning of fossil fuels.

Our degradation of the environment is ominous and much [evidence](#) points to a clear link between the scarcity of vital resources and conflict. One wonders, then, why world leaders failed to reach a substantive agreement on climate change at the Copenhagen summit in 2009; or why fishing and hunting quotas for endangered species are so hard to implement; or why the use and pollution of river basins is not better regulated.

Explanations such as poor forecasting of resources, the short-term mindset of politicians, or simply the refusal to recognise the problem are usually given.

However, what if these are not the real reasons and something more fundamental is at work? Game theory, an established way of modelling decisions involving conflict and cooperation, offers a way to seek answers. Traditionally, cross-border armed conflict over shared resources is sidelined in game theory simulations on the grounds that it is deemed more costly to a nation state than cooperation.

For example, imagine a depletable natural resource – such as a

water basin – jointly owned by two countries. Both drain it for drinking, sanitation, irrigation and so on. Draining too quickly will result in it drying out. Most game theory work says that working for the common good is the optimum choice for both nations. But this does not square with conflicts we see, or the widely held view that more are inevitable.

To address this, I designed a simulation that allowed the use of violence to control resources ([The Rand Journal of Economics, vol 45, p 521](#)). In a world where force is a very real option and history suggests it is used or threatened more often than we might hope, this seemed reasonable.

The outcome offers an explanation for the gap between theory and reality. Having constructed a game-theoretical model, I found that when conflict is allowed it *always* occurred, but only when resources become heavily depleted.

And, crucially, the very expectation of impending conflict led to non-cooperation in the short term and sped up depletion of the common resource. I would argue that this resource-grabbing tallies with what we see in much of the world, be it disputes over fossil fuels, fresh water, land or marine resources.

Are there any historical examples that illustrate this effect of "conflict expectation" and more rapid resource use? Possibly. The demise of the first society on Easter Island, as documented by [Jared Diamond](#) in his book *Collapse*, is salient. It is thought Polynesians were first to colonise this isolated, 160-square-kilometre Pacific island around AD 900. At its peak, 30,000 people may have lived there.

Their society was organised in hierarchical clans, peacefully competing for supremacy by displaying vast stone statues. To move them, the tallest trees needed to be felled and used as rollers. Deforestation resulted, says Diamond. Instead of reaching agreements, the islanders rapidly devastated their lands, and by the time the first Europeans arrived in 1722, no tree taller than 3 metres stood there.

An ecological disaster and dramatic deprivation must have occurred. According to Diamond, a sort of military coup took place, sparking prolonged conflict. It is reasonable to imagine that the clans realised that trees – also vital for things like fishing boats –

were in short supply, and so grabbed what they could before the inevitable violence.

The conclusions I've drawn on the impact of over-use of resources today on future conflict are purely theoretical. So with economists Giacomo De Luca and Dominic Spengler of the University of York, UK, I am designing a lab experiment to see whether humans in a controlled environment do deplete resources faster when given the possibility to use violent control. Our early findings point that way. Such evidence would shed new light on the failure of international cooperation over the preservation of the environment.

What's next? I have not yet considered human ingenuity in adapting to a changing environment. Whether that will be sufficient to achieve a sustainable path depends on the rate of depletion versus adaptation.

Inevitable conflict and accelerated use of depleted resources may be more likely to become a reality within weak states and in the international arena, where weak institutions are more likely. For example, signing a carbon emissions treaty today does not commit a country beyond mild sanctions that the global community may or may not impose. In addition, a change in government in a powerful country is sufficient for a treaty to be revised, curbing the incentives of others to join.

All this reinforces the need for stronger institutions and international bodies if we are to avert a tragedy of the commons in a violent world. Sadly, this will require overcoming the very problem we are trying to solve: a lack of international cooperation.