The idea of long-hanging fruit is ubiquitous in environmental policy — sometimes in the form of a simple metaphor, other times expressed in more sophisticated terms as an assumption of rising marginal costs of pollution reduction. It's an arresting metaphor, and one that can often be illuminating. But like many powerful metaphors, it can also mislead us badly.

The idea behind the metaphor can be expressed in various ways, which can be equally arresting for those attuned to them. The same idea can be incorporated into graphs showing the cost of increasing additional pollution rapidly rising as the level of removal increases. If you google something like "marginal costs pollution reduction," graphs like that will pop up immediately along with verbal statements of the same concept. Combined with the assumption that the harm done by a unit of pollution is constant, it leads to the conclusion that regulators should not attempt to eliminate pollution. Rather, they should try to find the *optimal* amount of pollution where the cost of cutting a unit of pollution just balances the cost. Or in terms of the simpler rendition, you should stop picking fruit at the point where the effort of picking the harder-to-reach fruit is getting higher than the benefit.

Long-handing fruit provides an effective image even for those who have never picked a piece of fruit from a tree. It's easy to imagine how easy it is to simply stretch out your arm to take a piece of fruit on the lowest branch, while needing to get a ladder and perhaps stretch precariously to reach fruit at the top of the tree or the end of a high branch. And in economic terms, a great many activities do have increasing marginal costs, so it is plausible to assume that pollution control is similar. And on top of this forms of intuitive plausibility, it is almost certainly true that many regulatory decisions do involve increasing marginal costs. For instance, there may be a variety of ways of removing pollutants from a smokestack or waste pipe, and the cost is likely to increase for the more effective ones.

But it's easy to make a fundamental mistake in applying these concepts, which is to confuse a static analysis with a dynamic one. In the fruit-picking story, the person first picks the low-hanging fruit and then moves higher up the tree. Or when a professor shows a graph of increasing marginal costs, it's easy to say something like "as we move to the right and increase the level of pollutant removal, the marginal costs increases." Both ways of expressing this situation sound like something is happening over time. For that reason, they invite the assumption that when a regulator issues a series of regulations over time, the initial regulations will start with the cheaper reductions and that later reductions will inevitably become harder and hence less worthwhile Thus, over time, the tightening process should slow down. At some point, EPA staff should lay down their pens and say, "our work is done here." Indeed, it's only a bit of an exaggeration to say that there's an entire political party that thinks this time has already come.

Even in the fruit-picking situation, what is true at a single moment may not be true over time. Yes, today it may not be worth trying to pick every single piece of fruit from the tree because some are too high. But that could change. The farmer might change over to dwarf trees or buy equipment which makes it easy to pick even the highest fruit on the tree. Or the price of fruit could go up to the point where it's even worth climbing the tree if you have to in order to get that very last piece .

The same thing can be true of pollution reduction. For instance, the marginal cost of removing the remaining pollution from power plants could well be as low or lower than the costs of the early pollution reductions required in the 1970s. The reason is that, instead of needing to install expensive scrubbers to remove pollutants from the smokestack, we may be able to replace the power plant with a natural gas or renewable source that has much lower (or zero) emissions and is even cheaper. Moreover, we now know that the particulates produced by coal-fired power plants are more dangerous than we understood in the 1970s, especially the very fine particulates called PM2.5. And in ten or fifteen years, the economically optimum amount of emissions from all coal-fired plants may well be zero (equalling the optimum number of coal-fired plants).

There are lots of ways of telling the same story: with the homely metaphor of the fruit picker, with graphs of marginal costs and benefits, or even with formal economic models. In many situations, they can all be extremely illuminating. But they can also lead us to make unconscious assumptions that may not hold true in some important situations. In a complex world in which scientific knowledge of risks and technology are rapidly changing, some of the ways we're used to looking at discrete regulatory decisions may not work well when we try to think about longer time horizons.