PART II: MAKING CHANGE

Thinking in Systems

In the previous nine videos we explored the interrelated crises of the twenty-first century. As we saw, these are not simple problems, and they can't be solved with simple technical adjustments. They are ***systemic*** issues. Understanding and responding to them intelligently requires us to think systemically.

Well, ***systems thinking*** emerged in science during the latter part of the twentieth century. Previously, it was often assumed that we could understand systems simply by analyzing their parts. However, it gradually became apparent—in practical fields from medicine to wildlife management to business management—that this often led to unintended consequences.

In medicine, it's understood that treating diseases by managing symptoms is not as desirable as treating and, if possible, curing the disease itself. That's partly because symptomatic treatment with pharmaceuticals can produce side effects that can be as distressing as the disease symptoms. Take a pill and you may feel better for a while, but you may soon have to deal with a whole new set of aches, rashes, sleep problems, mood swings, or digestive ailments. Further, truly curing a disease often involves addressing exposure to environmental toxins; or lifestyle choices, including poor nutrition, smoking, lack of exercise, or job-related repetitive stress injuries—all of which are systemic issues that require treating the whole person and their environment, not just the symptoms, or sometimes even just the disease.

So in order to address systemic problems we need to understand what systems are, and how to intervene in them most effectively. That's what this video is about.

So, what makes a system a system? Well, for one thing, all systems have: Number one, ***boundaries***, which are a semi-permeable separation between the inside and outside of the system. Two, ***inputs***, like energy and materials. Three, ***outputs***, like work of various kinds, as well as waste heat and waste materials. ***Information flows*** from and to the environment, and ***feedbacks***, of which there are two kinds: balancing or negative, like a thermostat; and self-reinforcing or positive, which are like the proverbial vicious circle. Systems need balancing feedback loops to remain stable, but they can be destroyed by positive feedback loops.

The human body is a system that is itself composed of systems, and the body exists within larger systems; the same could be said of a city or a nation or a company. A brick wall, by contrast, doesn't have the characteristics of a system. It may have a boundary, but there are no meaningful ongoing inputs and outputs, information flows, or feedbacks.

Now, failure to think systemically is still common. For example, the global climate is a system, and climate change is therefore a systemic problem. But some non-systems thinkers have proposed solving climate change simply by putting chemicals in the Earth's atmosphere to manage solar radiation. But because this supposed solution addresses only part of the systemic problem--it only addresses, really, the symptoms--it's likely to have many unintended consequences.

Systems thinking would suggest very different approaches—such as reducing fossil fuel consumption while capturing and storing atmospheric carbon in regenerated topsoils. These approaches recognize the role of inputs (such as fossil fuels), outputs (like carbon dioxide), and feedbacks, including the balancing feedback provided by soil regeneration). In some cases, a systemic approach to addressing climate change could have dramatic side benefits. Reducing fossil fuel consumption would result in cleaner air and a dramatic reduction in lung diseases, while regenerative agriculture would not just

sequester carbon in the soil, it would also make our food system more sustainable while increasing biodiversity. Interventions based in systems thinking often tend to solve many problems at once.

Donella Meadows, who was one of the great systems thinkers of the past few decades, left us a brilliant essay titled "Leverage Points: Places to Intervene in a System." There are places within every complex system where "a small shift in one thing can produce big changes in everything." Meadows suggested that these leverage points have a hierarchy of effectiveness. She said that the most powerful interventions in systems address its goals, rules, and mindsets, rather than the details of parameters and numbers—which in human systems often translate into things like subsidies and taxes. This has powerful implications for addressing climate change, because it suggests that subsidizing renewable energy or taxing carbon, these are actually fairly weak ways of inducing systemic change. If we really want to address a deeply rooted, systemic problem like climate change, we may need to look at our society's most fundamental paradigms—like, for example, the assumption that we must always have continual economic growth.

Systems thinkers have come up with two other helpful frameworks for thinking about the most effective ways of intervening in human systems.

Here's one, in her book ***The Shock Doctrine***, social activist Naomi Klein quoted economist Milton Friedman, who said that "Only a crisis—actual or perceived—produces real change." Klein then showed how economists and corporations in wealthy countries have undertaken efforts to implement predatory policies in poorer countries that were undergoing major economic or political shocks. Her point was that the key to taking advantage of crises is having effective system-changing plans waiting in the wings for the ripe moment. And that's actually a strategy that resilience practitioners should consider.

Everett Rogers, a professor of communications, contributed another insight that is important for understanding how the system of human society changes over time. His theory of the ***Diffusion of Innovations*** describes how, why, and at what rate new ideas, social innovations, and technology spread throughout the culture. The key to the theory is his identification of different types of individuals in the population, in terms of how they relate to the development and adoption of something new. There are innovators, then early adopters, then an early majority, a late majority, followed by the laggards.

Innovators are important, but the success of their efforts depends on diffusion of the innovation among early adopters, who tend to be few in number but exceptionally influential in the general population.

On the basis of we've learned so far, we might conclude that the greatest opportunities for significant change may be where diffusion and crises meet, and where intervention is at a highly leveraged point within the social system.

Systems thinking takes practice, and there is a lot more to it than can be covered in a short video. It's important to understand that this is a natural way of seeing the world. We intuitively know that systems are more than the sum of their parts. But digging deeper into the insights of systems theory—going beyond the basics—can pay great dividends both in our understanding of the world, and in our strategic effectiveness at making positive change happen.