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INTRODUCTION

Converging Crises, Cascading Solutions

Change, emergencies, even crises, are normal occurrences in our lives. We build and engage with systems to help us prepare for, and cope with, disruption. As individuals we insure our homes and cars, learn first aid, and maybe even volunteer for the local fire department. We practice conflict mediation and pay taxes to help support emergency responsiveness. We save money for a rainy day and donate to the local food pantry to help others who have fallen on hard times.

Shouldn't that be enough?

With regard to future crises, shouldn't it be enough to do what previous generations have done? Shouldn't it be enough to take some personal precautions and create institutions to do the rest? Well, if you've reached for this book, then the odds are you suspect that the answer to both questions is no. Are you seeing signs of increasing disruption? Are you witnessing problems cascade, converge, and amplify one another? Are you feeling as though maybe something more is needed in response?

Climate change is powering stronger storms and more intense wildfires.¹ Biodiversity is falling, and the frequency of economic disruptions is quickening.²

In many places democracy is weakening, and in others the elite are consolidating wealth.³ In the face of these mutually reinforcing crises, we need different strategies for coping. The old ones seem to be proving not up to the job.

There is no one-size-fits-all experience of destabilization. For wealthy North Americans or Europeans, the shocks may feel muffled. For a poor family in the Global South, they may be cataclysmic. But if it feels to you that instability is rising and that the periods of calm between storms are shortening, you are not alone. On a planet with growing ecological crises, the trend is toward more destabilization rather than less.

When I wrote the following words, in notes for what eventually became this book, in mid-2020 in the United States, this is what destabilization looked like from my vantage point:

COVID-19 is spreading unchecked in some states, and hospitals are being overwhelmed. The coronavirus is infecting and killing people of color at a higher rate than white people.⁴ This is at least partly due to inequities in environmental health, access to care, and access to remote jobs. For over a month, protestors have been in the streets of most cities in the US in response to police violence directed at Black men. The protestors are calling for the abolition of police and prisons. Schools closed in the spring, and many summer activities have been canceled or moved online. Parents are stretched thin. Meanwhile, most of my country is in the midst of a heat wave that is already two weeks old and is expected to last at least two more weeks. The pattern, called a “heat dome” is made more likely and more intense by climate change.⁵

By the time this book is in your hands the specific symptoms of global and local instability will be different. But if trends continue, one or perhaps both of us may still be navigating some flavor of it.

Not only are we experiencing increased instability, sometimes it seems to be feeding on itself. Notes to myself from early in the pandemic captured how destabilization in one place can ripple out to cause destabilization elsewhere:

This month roughly one-third of households in the United States missed paying their rent or mortgage.⁶ Some analysts are predicting a wave of evictions and utility shutoffs in the midst of the heat wave.⁷ Where will evicted people go during a heat wave, people ask? Traditional solutions—cooling centers, libraries—are closed due to the pandemic. Evictions combine with heat waves to collide with a pandemic to create a situation that exceeds the system’s ability to cope.

Many of those who still have jobs are working from home, in the midst of the heat wave. Without air-conditioned office buildings to work from, many will purchase air conditioners. Energy use will increase, and so will climate-changing

greenhouse gas emissions. The solution to a heat wave, which was made worse by climate change, could make future climate change even worse.

And so it goes. Problems escalate, converge, and cascade. They shape-shift and spread. Here are some of the patterns I'm noticing. You may recognize them, and others, in your own life.

Sometimes, crises arrive faster than we can cope with them. Given enough time, we could manage many of the types of crises we are currently facing. But when they arrive too fast or in dangerous combinations, they overwhelm our ability to cope. In 2020 for instance, the city of Lake Charles, Louisiana, had yet to recover from Hurricane Laura when Hurricane Delta struck.⁸ Houses whose roofs were still covered with blue tarps from Laura's impact were even more vulnerable when Delta arrived. The radar system, damaged by Laura, was not working optimally to give people information about Delta's approach.⁹ That's what happens when crises arise faster than the speed of recovery.

In addition to the same types of crises following one after the next with increasing frequency, communities or businesses may also experience several *different* types of crises at close to the same time. When crises are slow and sporadic, responding to several types of crises using the same coping capacity can work. It is efficient, in fact. But what happens when the same emergency response department has multiple overlapping crises to deal with?

As the 2020 hurricane season began in North America, I was on a conference call with officials worried about the hurricane readiness of a major US city. The city had depleted its emergency response budget trying to manage COVID-19. As a result, the whole city stood vulnerable at the beginning of hurricane season. One crisis had depleted its capacity to cope with other potential crises.

Some crises feed on themselves; others erode our ability to cope. Viral pandemics—including COVID-19, of course—are classic examples of crises that feed on themselves. All else being equal, the more people who are infected in a community, the more people are exposed, leading to a rising tide of infections, sometimes with devastating results for health systems and for human well-being.

Even if a crisis doesn't feed on itself, it can cause enough damage that it becomes harder to respond to the next crisis. When a house is burned out

by wildfire and not rebuilt, that's one fewer property tax payer in a community. It's also a smaller budget with which to respond to future fires. If a business lays off workers when supply chain issues disrupt the production schedule, it will take longer to fix mechanical problems that crop up on the production line because the most knowledgeable workers won't be on the floor. Countries that have spent heavily to cope with the pandemic have fewer resources to invest in climate change adaptation. Each of these is an example of one crisis depleting the ability to respond to others.

Solutions to one problem can make others worse. In 2018 sparks from electric transmission lines in California led to climate change—exacerbated fires that burned thousands of acres of land and destroyed homes and businesses.¹⁰ In response, for the following fire season, one electric utility, Pacific Gas and Electric Company (PG&E), instituted power shutoffs. The shutoffs may have prevented some fires, but they also caused small businesses to lose revenue. And people who lost the contents of their refrigerators and freezers were put at risk of food insecurity. The way the utility addressed the fire problem contributed to new problems.

Vernice Miller-Travis, an environmental justice leader in the United States, wrote in 2020 about the “synergistic epidemic” of COVID-19 and environmental injustice, another example of complex, interacting, mutually exacerbating problems:

While most Americans are confronting the coronavirus pandemic, communities of color are confronting something worse, the Syndemic of Coronavirus and Environmental Injustice. A syndemic is a synergistic epidemic. It is a set of linked health problems contributing to excess disease. To prevent a syndemic, one must control not only each affliction in a population but also the forces that tie those burdens together.

Constant exposure to high levels of air toxics in communities of color has already resulted in explosive levels of respiratory disease, including asthma, chronic obstructive pulmonary disease, and emphysema, as well as heart disease. These pre-existing conditions have compounded the devastating impact of this pandemic; communities of color are now experiencing the highest rates of infection and death from COVID-19 in the United States. Lax attention to poor air quality has provided the perfect conditions for coronavirus to ravage minority neighborhoods.¹¹

Failure to address one crisis diminishes gains made on others. In an interconnected world with long, interacting chains of cause and effect, sometimes the efforts to solve a problem in one sector are successful, only for some other neglected problem to feed back around and erode the initial progress.

For instance, let's say that new housing is designed to be energy efficient. Terrific! This will allow the residents to save more of their paycheck for other expenses, like food, education, and medicine. But if the city where the new housing sits hasn't mustered a strong climate change adaptation program, the combination of urban heat island effect and longer and more frequent periods of extreme heat might create a stronger need for air-conditioning in the summer. Energy bills go back up, and residents' savings go down.

And so on. When problems interconnect, focusing on them one at a time can result in unanticipated and sometimes devastating backlashes.

Crises grow in size and scale because vested interests resist change. Some problems, whose consequences are extremely dangerous, have well-documented solutions that are waiting to be implemented. Biodiversity loss and climate change come to mind. For crises like these, the scientific consensus is strong. However, a few powerful interests stand to lose a lot if action to solve the problem is taken, and so they deny the problem and prevent the strong response that is needed. There is a mismatch in power between those working for change and those who resist it, and that delays the response to the crisis.



When you look at these patterns of crises and responses, though they occur at various scales, in a range of geographies, and concern different issues, what do you see?

I see problems that are not yielding to the standard ways we have been approaching them.

I see problems that are interconnected and solutions that are too often siloed.

I see short- and long-term components being addressed with solutions that focus on only one timescale.

I see problems that span silos and people working within silos trying to solve them.

And when I talk to the people who are trying to address these problems, I hear frustration, exhaustion, fear, and demoralization.

I see, more than anything, problems that cry out for different approaches.

The good news is people are experimenting with different approaches around the world, designing weblike solutions for weblike problems. The *very* good news is that we can all learn from these experiments and add to them. It's not too late to start. But there's also not a moment to lose.

The term I use for these weblike solutions is *multisolving* and, of course, I will have much more to say about multisolving in the chapters that follow. But I haven't always seen the potential of these silo-crossing approaches; I haven't always understood just how much difference multisolving could make in our world. In fact, for much of my career, I was far from being a multisolver.

My work focused quite narrowly on a single concern: global climate change and the greenhouse gas emissions that contribute to it. That was good, important work, and I'm glad I had the opportunity to do it. I taught about the carbon cycle and how the extraction and burning of fossil fuels push it out of balance. I attended United Nations climate conferences. I watched with pride as our think tank's analysis was shared on the front pages of newspapers. I celebrated each time our tools informed the thinking of top government officials and grassroots climate activists. All this work had a single purpose: squeezing greenhouse gases from the global economy. All of it was satisfying and all of it was needed. It still is. But . . . none of it was sufficient. Every year of my career, the greenhouse gas emission levels we and so many others were working to drive downward continued instead to climb.

Amid one particularly disappointing round of UN climate negotiations, I pulled a negotiator from Latin America aside. What could we add to our analysis, I asked her, that could help to unlock larger climate commitments from the UN parties? Should we show deaths from future heat waves? Decreases in the global wheat harvest? Something else? What do negotiators pay attention to?

She didn't pause to think for long. "We pay attention to how far we can go before our president or our prime minister loses the next election. That's pretty much it."

That exchange was a turn in the road for me, though I didn't know it at the time. It planted the seeds of two questions: Could we really solve climate change the way it was being framed if political leaders saw it mostly as a cost or sacrifice that their constituents would only stand for so much of? And if not, could we make more progress by widening the lens with which we looked at climate change, to include costs *and* benefits?

My search for answers led me forward to new research, new projects, and new partners. It also led me back to some of my own training and intellectual roots. And it led me outward, to other communities of practitioners, thinkers, and change-makers. Each of those threads—forward, back, and outward—has shaped the thinking in this book.

Let's start with forward. Not long after that climate negotiator set me thinking, I asked my colleague, researcher Diana Wright, this question: What else would be different in a world that had successfully addressed climate change? Diana brought me back a report that stunned me. After surveying studies in health, agriculture, water, and jobs, she estimated that the savings from being free of fossil fuels would balance out the costs required to reach that low carbon goal. That understanding is more commonplace today (though by no means universal). But at that time it shocked me so much that I asked Diana if she made a math mistake! Her report flipped my view of the climate change problem. I began to see that those leaders, afraid climate action would cost them politically, could truthfully promise their constituents cleaner air, better jobs, improved health, more energy security, and more resilience to natural disasters.

While Diana was conducting her research, I was also learning from my friend Angela Park, an expert in equity and justice in mission-driven organizations and movements. Her report, *Everybody's Movement*, was published the same year as the UN climate summit where I began to wonder about the possibility of widening the lens with which we looked at climate change.¹² Based on in-depth interviews with environmental justice leaders, the report made the case that the climate movement over-relied on science and policy goals instead of organizing, movement building, and connecting climate change to other struggles. As a result, society saw climate as an ecological issue, lacking immediate relevance to daily concerns, like family, health, community, or economic well-being. *Everybody's Movement* painted a picture of what might be possible if the climate movement was broadened, with openness to leadership from different segments of society than the "usual suspects." Angela wrote, "We must create new partnerships and a new framework, connecting seemingly disparate issues and addressing the systemic inequities and chronic dilemmas facing communities, people, and ecosystems across the planet."¹³ Angela joined our project as a consultant and interviewed environmental justice leaders about how they saw climate change intersecting with other issues. In our conversations Angela was a strong advocate for rethinking climate change in ways that

tied health, safety, economic opportunity, and equity together in a more integrated package.

While my thinking had been sparked at the level of UN climate talks, Angela was articulating similar conclusions from a very different starting point: for people in marginalized communities, climate change, inequities, health, and well-being were interconnected, not separate. Many fruitful conversations with Angela, dating back to that time and continuing over the years, have sharpened my thinking about multisolving, particularly when it comes to equity and environmental justice.

Spurred by these conversations, I started up a new stream of work at Climate Interactive, the organization that had brought me into the UN climate conferences in the first place. We began to document the multiple benefits of climate action and to profile “bright spots” of multisolving where people acted together to address climate change and solve other problems at the same time. Those bright spots showed that the potential gains in health, equity, or jobs weren’t guaranteed. They had to be designed for. They took collaboration. There was an art to it. Wanting to better understand that art led to projects on green infrastructure, health, climate, and equity in Milwaukee.

During the work in Milwaukee, we didn’t have a word for multisolving. We were using the term *co-benefits*, but it didn’t fit well. If all the benefits mattered, which one was “main” and which was “co-”?

Angela Park was seeing something similar in her interviews with leaders who were addressing climate change in ways that helped meet other needs too. She described that way of working as akin to multitasking but without the negative connotations of being spread too thin or being distracted. Rather than attempting multiple tasks simultaneously, Angela pointed out in one conversation, we need approaches that solve lots of problems at once. Angela’s observations reminded me of one of my favorite Wendell Berry essays, “Solving for Pattern,” and we began using the term *multisolving* for what we were observing in Milwaukee and beyond.

After Milwaukee, our focus shifted to a collaboration in Atlanta, where I met another key partner who also influenced how I think about multisolving: Nathaniel Smith, founder and Chief Equity Officer at the Partnership for Southern Equity. Nathaniel’s deep knowledge of equity, especially racial equity in the United States, influenced my thinking a lot, and I’ve done my best to acknowledge his influence in relevant places throughout the book. Tina Anderson Smith, who led the evaluation of our work in Atlanta, first

exposed me to ideas like coherence and self-similarity, and you'll read about those ideas in the second half of the book.

My early training is the source of the systems framing of this book. Much of that framing I attribute to my friend, mentor, and boss Donella Meadows. She's known both for her contribution to the *Limits to Growth* project and for her book *Thinking in Systems*. From Donella I learned how to apply a systems lens to complex problems. She convinced me of the power of vision and the importance of questioning our mental maps and giving up our quest for control, all themes of this book.

In her essay "Dancing with Systems," Donella wrote:

Systems thinking leads to another conclusion—however, waiting, shining, obvious as soon as we stop being blinded by the illusion of control. It says that there is plenty to do, of a different sort of "doing." The future can't be predicted, but it can be envisioned and brought lovingly into being. Systems can't be controlled, but they can be designed and redesigned. We can't surge forward with certainty into a world of no surprises, but we can expect surprises and learn from them and even profit from them. We can't impose our will upon a system. We can listen to what the system tells us, and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone.¹⁴

To the extent you find the spirit of working with systems—rather than trying to control them—throughout this book, you have the influence of Donella Meadows to thank.

While there are other books about systems, my approach is a little bit different. For this you have the many people to whom I've taught systems thinking to thank, especially the Donella Meadows Leadership Fellows. From these global sustainability leaders, I learned that you don't always need a diagram or a graph to impart important systems ideas. In that spirit, in the chapters that follow we'll approach systems through stories, metaphors, and even poems, more than through diagrams and charts.

Another thread I pulled into multisolving came from another mentor, Joanna Macy. Joanna is the developer of what she calls the Work That Reconnects, tools and practices for working with the strong emotions that the converging crises of our times can provoke.¹⁵ One of Joanna's teachings

is that there are many types of actions needed at this time. She says we need creative experiments (like eco-villages and resilient urban design), new worldviews, and holding actions that prevent harm. That's a way of describing multisolving: stopping the harm and creating the new all at once. Joanna's background as a scholar of both Buddhism and systems theory also shaped some of my thinking about the partnership worldview that is core to multisolving.

In addition to threads from my past and my own learnings (with partners) along the way, the ideas in this book have been influenced by many others also searching for ways to address problems in an integrated fashion. From public health experts measuring the lives saved by clean energy to labor researchers investigating the potential for green jobs, there's a growing body of scholarly research that has shaped my thinking about multisolving.

My thinking has also been influenced by the work of environmental justice leaders and the communities to whom they are dedicated. Health, justice, equity, energy, water, jobs, and climate all intersect in communities. The environmental justice movement has shined a spotlight on these interconnections for decades, dating back at least to the formulation of the Principles of Environmental Justice formulated by the first National People of Color Environmental Leadership Summit in 1991.¹⁶ With their emphasis on solidarity, bottom-up leadership, and just relationships among collaborators, these principles of environmental justice offer a transformative approach to addressing environmental and social challenges. There's also the work of scholars like Dr. Robert Bullard, who is often called the father of environmental justice. His books focus on environmental health and racial justice and the impacts of events like Hurricane Katrina.¹⁷

My understanding of multisolving hasn't emerged solely from teachers and text, or from partnerships and practical experiments either. I also saw the power of multisolving firsthand (though I didn't have a word for it yet) in 2011, the year Tropical Storm Irene battered New England, including the region around my home in Vermont.

There I was, a climate researcher watching (and trying to assist in) the recovery from a disaster likely made more severe by climate change. What I noticed in the early days of the disaster was that it was food pantries, farmers markets, locally owned businesses, and churches that most helped my flooded-out neighbors. Those entities organized volunteers, collected and distributed supplies, fed people, charged phones, and provided drinkable water. Watching and participating in that recovery helped me see how the

same dollar I donated to our local food pantry might contribute to both community well-being in normal times and resilience in dangerous times. That's the essence of multisolving, and it was made visible across my state during the Irene recovery.

A lot of threads wove together to shape the ideas of this book, and maybe that's appropriate. Maybe a book about solving problems by bundling them together can only be informed by a bundling a lot of different perspectives and schools of thought. Maybe a weblike approach to solving problems requires a weblike collection of teachers, mentors, and colleagues.

My hope is that such a book will be of interest to a web of readers as well. I came to multisolving via a focus on climate change, but you could just as easily pick up this book because you want to see more progress in health, equity, biodiversity, or economic vitality. In that sense, this book is for people who are alarmed about at least one problem and want to do something about it. If something in your world is keeping you awake at night, that's your entry point. I hope what you find here will give you some new ideas to try, either on your own or with others.

As we will see in later chapters, multisolving can be employed at a scale as small as a single neighborhood or hospital. It can also be employed regionally, nationally, and at every scale in between. And no matter what scale interests you most, you can learn about the principles of multisolving from studying how it works at other scales too. The same goes for what sector you focus on. Multisolving can involve the collaboration of governments, nonprofits, businesses, and individuals. There's room for everyone, and I've aimed in my choice of examples throughout the book to showcase that diversity.

Is this book for everyone, then? Regardless of what problem or crisis motivates you, what scale that problem manifests at, and what sector you come from? Well, no, probably not. There's one more ingredient that will make this book worth your time: frustration with other approaches. If your efforts to address one or more of our converging crises (at whatever scale, from whatever sector) seem to fall short of what's possible, I hope you will find new ideas here. If you can see possible solutions but don't have enough allies (or dollars or shovels) to make them happen, I hope this book might help you see other routes to success. And if you just feel stuck or alarmed by the complexities and interactions of multiple converging problems, I hope that some of the tools in the book will help you make more sense of it all.

Many of you will read this book alone, but I hope that many of you will read it together with others. You'll find questions for reflection at the end of each chapter that could be fodder for your journal or your morning walk but also for a discussion group in your classroom, your community, or your organization. I hope some of you will read this book at the outset of collaborations, to have a common language and a library of solutions that others have used to overcome some of the obstacles you might find yourself facing along the way. Especially if you meet together with others to read this book, I hope the process itself will help you develop the friendships and connections that make multisolving possible.

Whether reading alone or in a group, you can also find more resources to support your journey through the book at <https://www.multisolving.org/multisolving-the-book/>.



A funder once asked my colleagues and me to conduct a global scan for multisolving. They were interested in examples from outside the United States that could be replicated here. We found many examples but also drew a conclusion I think they found surprising. We recommended that they *not* try to replicate the specific projects we had found. Each project fit perfectly to the specific geography and culture and needs of its place. We didn't see how those projects could be replicated elsewhere. Instead, we said the foundation should try to foster the *attitudes and approaches* of those projects. That's part of the beauty of multisolving. Every example has something to teach, even if the specifics of your situation are very different from mine.

Multisolving isn't a specific set of procedures one must follow. You won't find ten simple steps or cookie-cutter protocols in this book. What you will find are the best descriptions I could capture of those attitudes and approaches, the true replicable units of multisolving. As you read the following chapters, I hope you will listen for that vital underlying spirit.

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Web World

*Spiders worked all night
so that when I walked
 through the pasture
it was web filled,
like the world.
It was only the clinging dew drops
that made the webs
strung between meadow rushes
 and milkweed stems
visible at all.
This is how webs are: to see,
 look for sparkle.
There is a web strung by a
 butterfly between this
 milkweed and Mexico.*

*There is a water web that connects a
 dew drop to an upwelling ocean.
And
of course,
there is a web that connects
 you to me.
Moving through a web
 world could be a joy.
Or, it could hurt; it could desecrate.
Or—
you know this,
you can trust this—
it could heal.
It's not the web that tilts the balance.
It's how you move within it.*

CHAPTER ONE

Multisolving: Promises and Obstacles

Some years ago, my colleagues and I began studying interventions that solve multiple problems at the same time. We found them everywhere, at both neighborhood and national scales and in every country we looked. We found them across sectors: in urban planning, health, agriculture, forestry, energy, transportation, and disaster management.

On the surface, these projects were all quite different, and the people undertaking them certainly didn't think of themselves as using any special methodology. Still, we found that the projects had much in common with each other.

It would be helpful, we thought, to find a word that would categorize these diverse projects. It seemed to us that they had much to learn from each other and much to teach the world. We couldn't find any word in use that quite captured these approaches and their potential impacts. So, we began to use the word *multisolving*.¹

We defined multisolving as using one investment of time, money, or energy to address multiple problems. Once you start looking, examples of multisolving are easy to find.

For example, when a city greens by increasing its number of parks, gardens, and trees, it addresses multiple problems.² It improves the sense of well-being of residents. It reduces energy use for cooling and reduces the urban heat island effect, a burden of warming climates that disproportionately falls on marginalized communities. It can help reduce urban flooding by absorbing and slowing the flow of stormwater. That's multisolving: the single solution of greening the city solves multiple problems.

Multisolving can also address problems that play out on different time scales. For instance, reducing burning of fossil fuels addresses the health impacts of air pollution in the near term and protects the climate for the long term.³

Importantly, multisolving can address symptoms and root causes at the same time. That's because so many of our current crises are the result of a worldview of disconnection and separation. Multisolving happens best when people adopt a worldview of interconnection. So, a community that comes together to address flooding, energy bills, and the impact of climate change on its most marginalized community members is addressing symptoms: flooding, economic hardship from energy costs, and high heat days. But by working together to benefit many issues at once, the community is also forging new relationships and working together in new, more connected ways. They are solving problems from a different frame of reference than the frame that created those problems.

Multisolvers around the world are showing us what might be possible if more of our efforts to address one problem could address several all at the same time. They're demonstrating another way to steer systems in new directions, toward justice, health, equity, and sustainability.

In tumultuous times, we know we need to navigate short-term crises while also steering systems in a different direction for the long term. Multisolving is one powerful approach for that. And it's available to us all.



Although our team began using the word *multisolving* in 2015, the idea of solving several problems with one effort is, of course, nothing new. I grew up hearing the adage “kill two birds with one stone.” While a little bit gruesome, the saying does convey the essence of multisolving. My grandmother, who raised her family through the Great Depression and the Second World War, was a great multisolver, out of necessity. Quilts kept the beds warm, but she could also use them to create a makeshift room around the wood stove to create a steamy spot and help her croupy baby breathe easier. The church suppers she helped organized fed people, raised money for the church, and helped maintain a sense of community.

The small farmers I know are master multisolvers. Scraps from the table become food for the pigs, solving a waste disposal problem and a cost-of-feeding-pigs problem. In his essay “Solving for Pattern,” Wendell Berry described the work of managing a successful farm as optimizing for many things rather than prioritizing just one: “The farmer has put plants and animals into a relationship of mutual dependence, and must perforce be concerned for balance or symmetry, a reciprocating connection in the pattern of the farm that is biological, not industrial, and that involves solutions

to problems of fertility, soil husbandry, economics, sanitation—the whole complex of problems whose proper solutions add up to health: the health of the soil, of plants and animals, of farm and farmer, of farm family and farm community, all involved in the same interested, interlocking pattern—or pattern of patterns.”⁴

Permaculture practitioners refer to the principle of “stacking functions,” getting multiple types of use out of each element of a permaculture design, such as a plant that produces both food and fiber, or shade and food, or even all three. Permaculturist and author Toby Hemenway described this idea in a 2014 interview: “Nature is marvelous at what we call ‘stacking functions,’ where if you have a conventional landscape designer, they may choose a tree for shade or fruit or, you know, a single function. And, if you look at what a tree is doing in any natural system, it is producing fruit, it is producing shade, the leaf litter is building soil, the roots are breaking up heavy soil, it is harvesting rain and channeling it somewhere. It is habitat for a zillion different kinds of creatures. And, that is the kind of thinking that permaculture recommends.”⁵

Though not so named, the concept of multisolving is also a part of many Indigenous knowledge systems around the globe. In his book *Native Science*, Tewa author and professor Gregory Cajete describes the traditional planting techniques of some Indigenous peoples in North America: “When soil was planted with the traditional ‘three sisters’ of corn, beans, and squash, with other native plants such as marigolds nearby, corn provided shade for the delicate beans and a stalk on which the vines of squash and beans could grow. The squash provide extensive ground cover, reducing weed habitat and weeding, and simultaneously shielding the soil from rain erosion while capturing a maximum of available rainfall. Beans fix nitrogen in the soil through their roots, and so improve fertility.”⁶ This way of thinking may be common and ancient, but before our team began using the word, I couldn’t find a simple term that seemed to capture its essence.

At the time (and still today) one way to talk about projects that meet many goals is to refer to “co-benefits.” But co-benefits imply a “main” benefit. Often that main benefit is something global or something off in the distant future, like climate protection. Is climate protection the main benefit of closing a coal-fired power plant? Maybe, but if you are a parent to a child with asthma, the benefit of cleaner air might feel central, not “co-.”

Co-benefit language, perhaps unintentionally, implies a hierarchy of benefits, with the long-term and global often seeming more important than

the short-term and local. The point of multisolving is that it doesn't matter which benefit is core for you and which is core for me. If we can collaborate to accomplish both benefits, then that's a win for both of us. One reason I like the word *multisolving* is that it frames all the benefits of a project as important. The word is a reminder that all the constituencies being served are important and puts all goals on equal footing. The word reminds us that we are all in this together.

Another advantage of the word *multisolving* is that it can be a verb. Multisolving is something you *do*, an action you take, as opposed to a result (like a co-benefit). The word itself is a good reminder that multisolving is a way of working one can cultivate and improve at over a lifetime.

Systems

Multisolving is an approach that is designed for complex systems. A system is an interconnected set of elements that function together. Your body is a system, of course. Within your body, your liver is also a system, and so is a liver cell. Book clubs are systems, as are neighborhoods, political parties, grassy meadows, and tide pools. Systems are complex. Often, they are highly interconnected. Their behaviors change as the connections within and between them change.

Your family is a system that influences both political and ecological systems. And of course, those political and ecological systems turn right around and influence your family.

Each of us is a system nested within multiple systems, subject to a vast array of interconnections. In fact, the cascading and converging of problems described in the Introduction stems from these interconnections.

Interconnections are why one problem can make another worse. A single crisis, via cascades and ripples of cause and effect, triggers others. Reinforcing feedback can amplify problems, which can then grow so large that they push systems across unexpected thresholds, giving rise to entirely new problems. The complexity of systems gives us plenty of good reasons to be concerned about problems interacting and amplifying each other.

But the highly interconnected nature of systems isn't always bad news. It also means that, sometimes, a single intervention can set off ripples of connected solutions. Some problems become easier to solve when you tackle them together. One well-crafted intervention can solve many problems at the same time.

Interconnections between systems are neither good nor bad. They just *are*, a feature of the world. Multisolving acknowledges and works with these interconnections when more common approaches often ignore them. When money, resources, time, and attention are in short supply, this is great news. We can use a system's interconnection in positive ways. We can focus on interventions that ripple outward, solving many problems at the same time.

Here's an example. A community organizing to shut down a coal-fired power plant will, if successful, solve several problems. For one, they will improve the air quality of the neighborhood. Less air pollution—which contributes to many illnesses, including respiratory disease, heart disease, and premature birth—means the health of people in the neighborhood will improve. Less coal being burned also means less of the greenhouse gas CO₂ will be generated, so the project will protect the climate. One action will have improved air quality and people's health in the near term and helped protect the global climate in the long term.

One of the beauties of multisolving is that anyone can do it.

Individuals can and do multisolve, in both their personal and professional lives. When a young father fills his shopping cart with sustainable and fair-trade products even though they cost a bit more, he is multisolving, his family budget helping to protect health, livelihoods, and ecosystems near and far from home. When a retiree offers landscaping classes through her church that teach people how to install rain barrels, raised garden beds, and plants to support native pollinators, she helps build community connections, conserve water, feed people, and protect biodiversity.

The small farmer who produces healthy food while restoring the land that she tends and protecting habitat is multisolving. The teacher who leads his class to install a solar panel on the school roof and batteries in the basement is multisolving. His project reduces greenhouse gas pollution, prepares students for roles in the clean energy economy, and provides the neighborhood around the school with a source of resilience in the face of outages in the electricity grid. The energy minister of an island nation can multisolve when she directs investment into clean electricity and closes down a fossil fuel-burning power plant.

The possibilities for multisolving become even more far reaching when the process is approached together with others.

Policymakers can work across the typical silos of government to multisolve. Housing budgets can be deployed to house people, reduce energy use, lessen the need for cars and highways, *and* foster economic equity.

A country's energy policy can conserve energy *and* improve national security. Global climate policy can serve international development goals *and* help to reduce poverty.

Collections of businesspeople, citizens, nonprofits, and government entities can collaborate so that new infrastructure provides economic opportunity for communities who have been historically marginalized. They can make sure the infrastructure helps meet environmental and health goals while also supporting local small businesses.

Reasons to Multisolve

We're more used to breaking problems down into their smallest components rather than looking for ways to bundle multiple problems together. Because multisolving approaches are countercultural in this way, they can feel unnatural to attempt. And as we'll see in the following section, there are obstacles to multisolving that take effort and planning to overcome. Before looking at the obstacles though, let's explore some reasons why multisolving is worth the added effort.

Make efficient use of investments of time and money. We need investments in new infrastructures and technologies. We need investments to repair past harms. We need investments to adapt to change already in the pipeline that we can't stop. The deeper we move into overshoot of sustainable limits, the more these needs are likely to grow.

But the time, money, and attention we have available to address these needs are limited. One of the biggest challenges of our time is to solve as many problems as we can with the resources we have.

Faced with this reality, multisolving is basic common sense. In our daily lives we are always looking for such synergies. Can we paint the community building and strengthen the community fabric at the same time? Can we serve local vegetables in the school cafeteria, supporting both our kids' health and our neighbors' farms? Multisolving is the original "two for the price of one" bargain.

The wisdom of multisolving was demonstrated by some city, state, and national leaders around the globe in response to the COVID-19 pandemic, when stimulus packages that emerged to address the pandemic's economic slowdown were invested in ways that accomplished multiple goals.

In Nigeria, some economic recovery spending was directed toward building solar electricity microgrids to replace polluting and health-harming

fuels like kerosene and diesel.⁷ Communities that couldn't access the central grid previously now have clean local electricity for lighting, refrigeration, and businesses.

In Medellin, Colombia, stimulus spending increased the number of bike paths and public transit routes.⁸ Such projects create jobs, reduce greenhouse gas emissions from transportation, and provide access to mobility for city residents.

Weatherizing the homes of low-income residents was a provision in many stimulus packages. Weatherizing contributes to economic recovery by providing good jobs, contributes to climate change protection by improving energy efficiency, and—because low-income residents pay the largest share of their paychecks on energy—reduces economic inequity.

The pandemic created unprecedented need for assistance and support, and governments faced tough choices about how to target aid. These multi-solving stimulus packages maximized the impact of every dollar.

Build power and overcome resistance to change. While the costs of some actions in systems are upfront, their benefits may not be apparent until some unspecified time in the future; for example, we need to build a clean energy infrastructure today to avoid worse climate outcomes decades from now. This can lead to political resistance, when elected officials who are concerned about reelection delay or avoid strong action on climate because voters perceive a difficult cost in the present for a benefit they may doubt or never see.

Resistance to change can also occur when a cost is felt locally, while the benefit happens in a far-off place. Actions to build a clean energy system in my state show up as an increase to my state tax bill, even though reduced emissions in my state benefit not just my state but the whole world.

Multisolving projects, which tend to combine local benefits with global ones, can help overcome both of these sources of resistance to change. When my state enacts an energy efficiency program, we contribute to long-term global climate protection. We also harvest some local immediate benefits, including good jobs, cleaner air, financial savings, and less reliance on distant energy sources.

On a smaller scale, a company might invest in an upgrade of the physical plant to allow more natural light and better insulation and windows. Looked at narrowly, that would register as a cost to the capital budget. But studies have shown comfortable spaces infused with natural light make for happier and more productive employees.⁹ Within a company, the advocates for this

sort of project would be wise to share the full mix of benefits when they seek approval. They could explain that the costs on the capital side of the budget would be offset by the gains on the operating budget.

Design investments to meet multiple goals. Help stakeholders understand the full picture. Leaders who do both of these things can help ease resistance to change.

Use synergy to prepare for the future while tending to the present. When it comes to climate change and other crises that we cannot fully prevent, we know that our communities, economies, and societies must adapt. Investments in adaptation can be costly, from building giant infrastructure projects to hardening coastlines, moving buildings and equipment to higher ground, redesigning highways and railroads to withstand stronger storms, and preparing cities for more extreme high heat days. If these investments are required to keep people safe in times of extreme impacts, wouldn't it be wonderful if we could harvest other benefits from them as well? That's another type of multisolving.

Can a strategy to protect a coastal area from sea level rise also protect habitat and biodiversity and fishing economies? Since a stretch of road needs to be rebuilt to accommodate increased stormwater flows, can a cycling lane be installed as well? When new housing is built outside of the floodplain, can it be energy efficient, powered by the sun, and clustered in a cooperative neighborhood with dedicated green and gardening space? With planning, intention, and cooperation across silos, it is possible to brace for future risks while also improving people's quality of life right now.

Embed justice. To respond to climate change, we will need to build new infrastructures in the span of mere decades. Every community will need access to zero-carbon electricity. We will need to build millions of new structures to net-zero standards. We will need to upgrade millions more to those same standards. How we use land will need to change at much the same pace. Agriculture will need to shift its practices, as will forestry. And so on.

Entirely new infrastructure sounds like a big job, but that's only part of it, isn't it? On top of that is making sure everyone is able to meet their basic needs. When almost 10% of the world's people are currently living in extreme poverty as defined by the World Bank, and 44% on less than \$5.50 per day, that is a huge challenge.¹⁰ The changes we need to implement must take care of more people than ever *and* relieve pressure on the Earth *and* withstand the effects of climate change we are unable to prevent.

Multisolving will be essential to doing all of this well. Imagine what might be possible if all the massive changes the world is beginning to embark on practiced multisolving. If every new technology could be shaped to accomplish more than one objective, and with influence from more than one kind of expert. If every bit of new infrastructure to meet the challenges of climate change and habitat loss could be designed with input from both climate change adaptation experts and the local people who would live with its impact, as well as designed to provide economic opportunities in ways that would reduce inequity.

And imagine how wrong it could all go without a multisolving approach. Imagine trillions of dollars invested in low-carbon infrastructure only for it to succumb to future climate change impacts. Imagine new infrastructure that exacerbates rather than heals inequalities.

Both futures are possible. Our commitment or lack thereof to multisolving will make the difference.

Avoid misguided solutions that create harm. The scale of the transformation needed to address crises like biodiversity loss and climate change is staggering.

For instance, the International Energy Agency says that to mitigate climate change we will need to electrify much of the infrastructure currently powered by coal, oil, and gas. That means batteries, lots of them, which will require mining an estimated forty-two times more minerals like lithium by 2040. Lithium is currently extracted at great environmental and human cost in countries like Chile. Without a multisolving approach, a climate “solution” could worsen the well-being of communities near lithium sources. A multisolving framework broadens both the questions and the design challenges. How can we meet our energy needs without fossil fuels *and* without harming the places that produce essential components for renewable energy? Holding both of those objectives at once leads to new ideas, from careful recycling of batteries, to reducing energy demand by changing patterns of consumption and urban design, to supporting democracy and local control in the places where raw materials are extracted.

The biodiversity crisis poses similar challenges. Land conservation is an essential tool for the protection of species. A multisolving approach to land conservation would place leadership of such efforts in local hands. This includes returning land to Indigenous peoples who, while currently stewarding only 20% of Earth’s land, protect 80% of global biodiversity.¹¹ It would include livelihood and economic well-being as another design goal alongside

conservation. Without this perspective, a singularly focused conservation program risks creating displacement and poverty. And because local communities and Indigenous groups hold key knowledge about managing lands, the conservation approach itself needs their leadership and input.

Act from a worldview of connection and interdependence. The primary purpose of multisolving is to help people address problems more effectively. But multisolving does something else.

So many of the tangled and converging crises that we face have their roots in a worldview of disconnection and separation, a style of interaction some have called power-over (whereby one group tries to thrive by dominating another). Instead of participating in the closed loops of ecology, the global economy as it is currently configured extracts resources and deposits wastes, giving rise to resource crises, biodiversity crises, and pollution crises. Instead of sharing burdens and benefits equitably, our economic and governance systems too often prioritize the well-being of one group over others. This pattern creates other crises, including gender inequity, racial inequity, religious and ethnic inequities, and sexual orientation inequities.

Multisolving requires people to work together across the parts of a system. They have to replace disconnection with connection and power-over with power-with. They have to heal the fractures created by dividing the world up into disciplines, departments, and jurisdictions. They have to reach across the boundaries of different communities or different cultures. They have to grapple with artificial constructions of “us” and “them.” They have to listen, connect, and find the points where multiple goals rise together.

This means that even while multisolving addresses immediate, tangible problems, it does so in a way that is distinct from the habits of thought and action that created those problems in the first place. In this way, multisolving is an antidote to the predominant, anti-systemic way of looking at the world.

Long after a particular multisolving project ends, the experience of working together as a whole system stays with people. It offers a template for future work and another way of looking at problems.

Boost adaptability. Because multisolving projects happen when people work together across the typical divisions in our world—departments, jurisdictions, disciplines, and more—multisolving projects leave behind a system that is connected in new ways. Long after the orchard is planted or the jobs program is funded, the people who pulled all of that off remain

connected to one another as friends, colleagues, and trusted partners. That is a source of resilience. When conditions change and new problems or new opportunities arise, the networks created in the process of multisolving are a source of adaptive capacity. People know who to call for help. Leaders trust each other enough to move quickly and collaborate well.

Live your values. “The well-being of everyone in this community matters to me.”

“I don’t want my long-term solutions to come at the expense of someone else’s health or prosperity.”

“Future generations have a stake in what we decide today.”

“I work in the arts (or I write cookbooks or design apps or teach preschool or . . .), and I want that work to contribute solutions to global problems and to protect future generations.”

If sentiments like these fit in in your personal code of ethics, then you have one more reason to multisolve. Your values call you to work in a way that includes concerns and interests outside of your own narrow sphere. Your values will lead you to consult others, to look for unanticipated impacts, to draw wide boundaries in your mental map of systems. That, of course, is just the stance for multisolving.

Can the new wing of the museum also be a showcase for low-carbon design? How can all children in the community benefit from the exhibits they will pass through?

Start with the problem that keeps you awake at night and ask what other problems, keeping other people awake at night, could be solved by addressing yours. In doing so, you will be living out your values. You’ll also be well on the way to multisolving.

Obstacles to Multisolving

Although my colleagues and I found multisolving projects everywhere that we looked, on every continent and at every scale from small towns to nations to regions, it remains rare. If that sounds paradoxical, just look at your own world. Do most people work in organizations that encourage them to explore widely, collaborate, and work across different domains? Do most governments have mechanisms that allow employees to work across departments? Do most universities make it easy to be interdisciplinary? In my experience, the answer to all these questions is a resounding no!

Although multisolving seems to be possible everywhere, it isn’t nearly as widespread as the need for it, or the opportunity. Why is that? In this

section we'll look at some of the reasons that help explain the relative rarity of multisolving.

Disciplines. Universities have departments and disciplines. Academics publish and converse within their separate disciplines. Each field evolves its own specialized language and a knowledge base that can be daunting to outsiders. The people who study the impacts of air pollution on the human body have degrees in medicine and public health. The people who study the impacts of greenhouse gas pollution have degrees in fields such as climatology or ecology. Then there are the engineers who design the energy systems that combust fossil fuels to produce both air pollution and greenhouse gas pollution, and the policymakers who set the incentives within which the engineers must work. It's the rare individual in any of these fields who was educated in a way that explored all these connections. And after graduation, it's the rare professional whose job description allows them to step back to view the full picture. There may be pathways to the future where all these interests rise together, but whose job is it to find them?

Restoring ecosystems can help protect biodiversity and help build resilience to climate change impacts. That work can also provide good jobs for people who need them. But when does a career in youth job training intersect with one in biodiversity? Until very recently, the odds of such a connection were slim, and even today, with growing interest in ideas like a youth climate corps, leaders are feeling their way into the intersections of very different fields.

Budget silos. Multisolving provides a net benefit for the whole system. But sometimes costs burden only one subsystem while, at least initially, benefits accumulate in another. From the vantage point of the first subsystem, the entire project may not seem worth it in the early days.

Consider a country contemplating replacing fossil fuels with clean energy. Where would the costs fall? Probably on the transportation and energy ministries. Where would the benefits accrue? Well, there'd be fewer hospitalizations from air pollution-related illnesses, representing a savings to the health ministry. The benefits to the health system might match or even outweigh the costs to the energy and transportation systems—a report from the World Health Organization found that, worldwide, the costs of meeting climate goals would be offset by the savings to the health sector.¹² But in most countries, decisions about transportation and energy are not made in consultation with the health ministry. From

(continued...)

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