

THE BREAKTHROUGH

Alex Trembath: Welcome to another episode of Breakthrough Dialogues, the podcast for pragmatists and problem solvers, brought to you by the Breakthrough Institute. I'm Alex Trembath, your host and deputy director at Breakthrough. I was just really excited for this episode, in which we talk to Miriam Horn. Miriam was at the Environmental Defense Fund for a number of years and is the author of this fantastic book on food and agriculture called *Rancher, Farmer, Fisherman*. She has thought about producing food at scale while respecting ecology and environment, more than almost anybody I've ever come across. I think you'll really enjoy this conversation. Miriam Horn, thank you so much for joining us.

Miriam Horn: Well, thank you for having me.

Alex Trembath: You're welcome. At Breakthrough, we talk a lot about sparing wild nature with high-density farming, cities, energy. Much of your work has focused on managing and protecting nature and natural systems, so I wanted to start by asking what you think of the land sharing, land sparing debate, and how do you think it relates to the active management of natural systems?

Miriam Horn: I actually find it a really useful framework, not because we should choose one or the other, but because I think we need to do both. The footprint of agriculture is already so vast, it's half of the ice free planet, 70% of the freshwater systems. It's really already bigger than we can afford it to be, so land sparing is really key. Keeping the footprint from expanding and even shrinking it to the degree that we can, and therefore maximizing production on the lands that have already been altered, the grasslands that have already been plowed up, and the forests already deforested. It's also really critical to concentrate that intensified agriculture, the kinds of things you work on in areas where you get the greatest productivity, at the lowest cost, meaning where you sacrifice the least biodiversity and you sacrifice the least sequestered carbon, whether it's sequestered in soils or forest.

Miriam Horn: I'm sure you know that the yield gap analysis that's been done that really looks at places that are currently being farmed, but are really underproducing relative to their capacity. Kansas is a great example of a place where you can go and produce massive wheat yields, with no irrigation on a lot of the dry land farms there and with actually relatively low cost in terms of the biodiversity that you sacrifice, and really negative cost on soil carbon. You can farm in ways there that actually build soil carbon.

Miriam Horn: In other parts of the country, other parts of the world, there are far worse trade-offs. If you go to try to farm in the tropics, you get actually mostly very paltry yields, and what you sacrifice to get those yields is extremely valuable. You go into the richest stores of biodiversity and carbon on earth and trade them away for really paltry yields. So sparing those kinds of lands that have those high values is really key, and that's really kind of a challenge to this romantic idea that the solution to sustainable farming is small holders scattered all over the world, and food sovereignty is far better for the planet as a whole often to do this big intensified commodity crop growing in places like Kansas and then export those crops to places where you do a lot more damage by farming.

Alex Trembath: Yeah. How do you do that? I can certainly think of, and share your vision of a very efficient global food system where we're growing high yields, as much food as possible in the parts of the planet that have the lowest impacts on biodiversity and landscapes. But that seems like such a massive global coordination problem when you're dealing with 200 countries at different stages of development with different types of food systems. How do you, in your time at EDF and now, think about approaching that big coordination and planning problem?

Miriam Horn: That's a really interesting question, you know, Stephen Pacala at Princeton and the climate solution center does say, he thinks that we have reached the point where we have to make deliberate decisions about essentially every acre on the planet and really use each acre for its highest value. How you make that happen, I guess the market can play some role in it. We've been working, EDF has been working with Walmart and other huge players in the food system to try to send out a market signal for low carbon resources. Walmart, which is the biggest grocer in America has told its suppliers like Kellogg's and Campbell Soup that they want them to go out and give preferential treatment to farmers that are doing low carbon farming.

Miriam Horn: If you start to have metrics that you can use, where you understand what is the carbon impact of farming in Kansas versus say Brazil and you have a market that is rewarding that lower carbon farming, that's one way to start to concentrate it in the places where it's actually least harmful. In a place like Kansas, the bulk of the biodiversity is actually underground. They talk about, people talking about the prairies as being like upside down rainforest, where the real critical biodiversity that you're trying to protect is this microbial ecology in the soil, and so you get the kind of double benefit if you're farming for low carbon, you're also farming for maximum biodiversity in Kansas.

Miriam Horn: I guess I also think that some of it is where the kind of, again, the market where the kind of consumer energy goes. I do get frustrated with what often seems to me a kind of naïve view of that if it's kind of aesthetically pleasing, if it's smaller local, or it's indigenous, that somehow that is a signal that it's sustainable, and I think that ends up driving a lot of demand in the wrong direction.

Alex Trembath: I want to ask you, you mentioned EDF's work with Walmart. I am a little bit more from the energy side of Breakthrough's work and have really admired EDF's work with oil and gas producers, working to clean up their operations. EDF has this reputation of working across sectors with government and with communities certainly, but also with industry. I wanted to ask you, in your time at EDF, where does that come from and how did it guide your work there?

Miriam Horn: Well, it really goes back to earlier days in EDF. EDF was founded in the late 60s, we had four scientists that we were working with. Rachel Carson, the first big move EDF made was suing to stop the spraying of DDT having recognized that it was doing severe damage to particularly to raptors, to birds of prey. The original motto EDF likes to say that 50 years ago when it was founded, its original motto was sue the bastards, and that was actually the kind of branding motto of the environmental movement that we had just passed all these critical, or we were in the process of passing all these critical environmental laws, the National Environmental Protection Act, and the Clean Air Act, and the Clean Water Act, and the Marine Protection Acts, and all of these laws that have been the bedrock of the environmental movement ever since.

Miriam Horn: That was kind of what guided EDF for the first decade or so, but in the 80s, Fred Krupp, who remains the CEO at EDF, he hired a couple of PhD economists who were starting to look at a different way of getting at these environmental goals. They, for instance, looked at, California was about to develop 10 new coal fired power plants because they had determined that they needed x number of gigawatts of new supply, and so one of our economists went and did this analysis and discovered that you actually could provide that supply at half the cost if you did it with megawatts, if you did it with energy efficiency and managed to get those 10 coal fire power plants canceled. Then looked at the other big sort of founding move the EDF made was in the Clean Air Act, getting the sulfur dioxide cap and trade program in place to try to deal with acid rain, and succeeding at dealing with acid rain at much lower costs than anyone anticipated.

Miriam Horn: Then it really stuck and Fred Krupp went out in the Wall Street Journal with this kind of manifesto about the third wave of environmentalism that was no longer about this confrontational, combative posture, but was about partnerships and leveraging markets to get to your goals. He's now actually added to that with what he calls the fourth wave, which brings the whole power of information technology into the mix. But that's been really the defining principle of EDF ever since.

Miriam Horn: In terms of my work, which has been both in clean energy and in the world of food production and fisheries, and farming and ranching, that means that EDF friends are partnering with people who are often viewed as sort of anathema by some other green groups. People like large scale commodity crop growers in the heartland who are using GMOs and judiciously using pesticides, and growing crops for export, and working with big corporate players in really across all of

these chains, working with oil and gas companies who are willing to step out and try to get methane leaks reined in, working with big companies like Land O'Lakes who are real drivers of sustainability in the food system. We had partnerships with McDonald's and FedEx in the past. It really shaped everything that EDF does.

Alex Trembath: Can you actually dig into that a little bit more? I'm curious about what are the practices and policies within these big corporations that EDF builds partnerships for. What is the leverage specifically in farming and in food systems that like Kellogg's or Land O'Lakes, or Walmart has that EDF is really interested in leveraging?

Miriam Horn: Well, so Walmart, EDF actually has an office in Bentonville because Walmart has been kind of the biggest lever on the planet, has been, you know, we've always tried to go for those companies that have the biggest leverage, so FedEx, the project was developing a hybrid delivery truck so that that would start to drive that technology through the trucking sector. McDonald's, the earliest partnership was with McDonald's that was about packaging, but then later we worked with some of the meat companies on antibiotics, and putting out a demand signal, telling their suppliers that they needed animals that were raised without the constant use of antibiotics. They are big enough that if they ask for such a signal, it immediately ramifies through the entire marketplace.

Miriam Horn: The earlier projects that we did with Walmart, we're in fact energy focused, so we were working, we have big presence in China, so we were working in the supply chain, their supply chain in China to try to get to things like more efficient motors in some of these factories. We did a big project with them on renewable energy and efficiency in their operations, trying to help them really ratchet down their energy surge and ratchet up the generation of renewable energy, but also their voice in these grids that they function in and are often the biggest customers in, where they could become a voice for something like valuing demand response, valuing the reduction of electricity demand more in a more robust fashion than it had been. And then you really start to get that moving through the PUC policies, the public utility commission policies that get set around the grid.

Miriam Horn: On the food supply, Walmart, and some of these other companies, Walmart decided, they made a commitment to reduce a huge number of gigatons of carbon out of their supply chain. With EDF's help, they actually looked across all of their operations of where were they going to be able to do that most quickly and at lowest cost, and they discovered that it was actually in their grocery division, but it was in their food division that they were going to get those gigatons most readily, and that the way to do that was to go to their suppliers, the people whose products are on their shelves and say, we want you to go out and ask your suppliers to be looking for things like low carbon wheat.

Miriam Horn: It is tricky because these commodity crops, you know, the farmer that I have worked with most closely and written about, Justin Knopf, who is just an amazing farmer in Kansas and everything he does on his land has led him to really not only stop soil carbon loss but begin to rebuild it back to native prairie levels. But his wheat goes into a grain elevator with everybody else's wheat. Trying to be Kellogg's and actually go and get that low carbon wheat is not that easy, and so that's a problem EDF's been working to solve by things like trying to work on a kind of regional level so that if you hit a certain percentage of farmers in a region that are supplying a particular elevator who are using some of these climate smart practices, that that elevator then gets preferential purchasing from a place like Kellogg's. It's not an easy problem to solve because these are commodity crops.

Alex Trembath: Yeah, certainly. I'm really compelled by this, and it gets back to something that you mentioned earlier, the sort of romantic vision of production, you were talking about food. You can imagine it in a number of industries, the sort of small scale producer that you look at it and you use the word romantic or idyllic, this vision of the small scale producer, it doesn't have a large impact compared to these huge monoculture mega farms in the middle of the country, or the massive sort of environmental footprint of a big corporate like Walmart. You sort of understand why the popular environmental conception is in favor of the small scale producer, even though as you're pointing out, the sort of both the efficiencies of production that you get with scale and the leverage that you have on environmental impacts, with like big corporates or big customers can be just overwhelmingly compelling from an environmental perspective.

Miriam Horn: I think that's really true. One big misunderstanding I think of these big farms is calling them corporate farms when in agriculture, the corporations are suppliers to farmers, they're suppliers of seed and fertilizer and they're buyers from farmers, but most of these farms are actually owned by, even if they're five or 10,000 acres, they're actually, you know, they're owned by families who are incorporated. I think there's a big misconception that Monsanto is somebody owns a bunch of farmland. Farming is far too risky a business for most corporations to actually be in the ground planting the crops. They want to be on the surer parts of the supply change.

Miriam Horn: There's just the simple math that if you're a farmer who's farming 5,000 acres, the impact that you can have is vastly greater than if you're a farmer working five acres. You know, you really are shaping the landscape in a critical way. I mean, we're down to 1% of the American population that ranches or farms or fish, but managing the recorders of the landscape. We really are in the hands of these food producers in terms of all of the things that we care about.

Alex Trembath: That gets us to your most recent book, Rancher, Farmer, Fisherman, which talks about farmers and ranchers and fishermen that have large impacts, whose production systems have large environmental impact, but you talked about these people, and these industries in terms of how they can actually manage

and protect animals, landscapes, ecosystems. Can you tell us a little bit more about your book?

Miriam Horn: Yeah, so it's a book and a film, the discovery film really a big incentive for me, a big inspiration for me was to push back against the kind of myth that we're talking about right now, that the only sustainable farm is small and local and organic. I intentionally structured the book as a trip down the Mississippi river watershed, it starts in Montana and it ends in the Gulf of Mexico. I did that book to push back really against two myths, one this myth that conservation is somehow a liberal coastal value, and so I intentionally went through really the heart of red state America. The other was this idea that you have to be small and local and organic to be contributing to the solution here.

Miriam Horn: I start up in Montana with a cowboy named Dusty, of course, who is a fourth generation rancher, he was a rodeo cowboy and was flying around the west, and through that experience came to see what had happened to the whole, what they call the rocky mountain front, which is that scene where the rocky mountains meet the great plains. He saw how it had turned into basically one giant suburban sprawl, and all of these grass lands that had been critical habitat for the wildlife that he really loves, the big herds of elk and wild sheep, but also of grizzly bears who historically moved between the mountains and the prairie, but it had all been converted.

Miriam Horn: He went home with a real commitment to protect this landscape in Montana that he'd grown up in, and so he ended up pulling together this really motley crew from across the political spectrum, I mean from the most True Blue Republican, True Red Republican, I guess you've ever met, to what Dusty calls the Beatnik of the mountains of former Peace Corps volunteer in deeply liberal guy. They came together and to protect this landscape, both the public lands around the Bob Marshall Wilderness area, but also these epic private ranches that are really critical habitat for wildlife because they're down in the sheltered bottom lands where the animals have their babies and where they have to come down and feed in the winter.

Miriam Horn: He really came to recognize the value of these unbroken grasslands, and that it was because they were being ranched that (a) they were economically viable, so if you could keep people on the land in a way where they could have income, then the whole economic pressure wasn't going to be to subdivide this land, but also that these grasslands evolved with grazing animals, and so grazing done well is a strategy you can use to really keep those lands healthy.

Miriam Horn: I then moved down into Kansas with this farmer Justin Knopf, who is a no till farmer. He has completely forgone plowing for several decades and as a consequence, he's actually in the historic dust bowl region and by foregoing plowing has protected those really vulnerable soils. He leaves them undisturbed, they retain all of the pores that penetrate them so that he can capture water, which, he's a dry land farmer, he has no irrigation, so it's really

critical that he capture every drop of water. He leaves a residue is on top of the soil so that it's completely sheltered from wind and rain erosion. It's also protected from the extremes of heat and cold that he's dealing with more acutely every year.

Miriam Horn: He uses a ton of diversity in his cropping, both his crops and his crop rotations and also cover crops that he plants, so that he uses that diversity as a way to manage pests and to fix nitrogen for his crops. He's had this just really stunning success. He's has yields that are far more consistent than his conventional tilling neighbors. He has been able both to really stabilize his yields in the face of this just incredible climate volatility that he's been dealing with, and he's got, his soil is kind of tested in multiple ways and both the quantity of carbon that he's sequestering in those soils, but also the microbial diversity and the health of the microbial ecology and his soil is really reaching native prairie levels.

Miriam Horn: That's really where the sharing piece comes in, that even if you make the decision that you're going to concentrate food production in these places where you can do it most efficiently and with least sacrifice of the most valuable ecosystems on earth, you still can do that intensive production and share the landscape with a lot of other living things. You really can still restore biodiversity and use large scale food production, not only make it less harmful, but actually make it part of the regenerative machinery.

Alex Trembath: Yeah, that's what I found really fascinating about this whole discussion. Obviously, as I said at the top of this conversation, the sort of ecomodernist view of the world is to shrink the physical human footprint farm on as little space as possible, live in dense, efficient cities, use as few resources as possible for the sort of greatest human gain. But there are always going to be sort of edge cases, there are always going to be very large cases of sharing, and of managing natural systems. Whether that's something pretty active like on ranches or managing and protecting threatened wild populations. I think that's where a lot of these interesting conversations actually happen, so that's why I find it so fascinating to talk about it.

Miriam Horn: Well, and it is one of the places where we still meet in a country that doesn't meet very often anymore. It's a place where in every one of these landscapes, this strange bedfellows future was really inspiring to me, it really is an issue that gets past political division that allows people to connect across that, because you realize a lot of these large scale food producers are some of the deepest scientists we have out there. They're doing this work all the time, they're confronting climate impacts all the time. And so they're, they're willing to build bridges with people that might otherwise seem like the enemy camp.

Alex Trembath: Yeah. I often like to end these conversations with an example of a sign of progress that you see. I feel like we've been talking about ways that we can make progress, particularly in food and conservation this whole time. I wanted to give you one more chance to tell our listeners about a particular case of a

rancher, or farmer, or a fisherman, who out there is doing really inspiring work in the food production space to protect ecosystems and species.

Miriam Horn: I've seen it in so many places where I've been out, you know, in the heartland where I spent most of my time, the movement toward this kind of no tilling practice, and are really trying to farm in ways that are harmonious with the native ecosystem. It's now up to about 20 or 25% of heartland farmers who have shifted to no tilling and cover crops. The uptake of that is huge. Was out in California talking to the Northern California Water Association and the number of farmers there who are using their rice fields that have modified their flooding regime so that they really emulate the flux, the natural flux of wetlands, both for the salmon populations and for the waterfall populations, I mean that's incredibly inspiring.

Miriam Horn: Across the board, I think what you see is really this move away from, they like to talk about moving on a continuum from chemistry to biology, then increasingly using biology as the template, using biology as the solution to a lot of the problems like nitrogen fixing so that you aren't exacting all of the costs that you have of producing nitrogen and all of the costs that you have of losing nitrogen into waterways or the atmosphere, I see people across the country, and really the problem, when I was working on this book was an embarrassment of riches. I could have gone into any state and any ecosystem, and the key is that people are responding, they're not starting with this predetermined formula that big is better than smaller the other way around, or high tech is better than low tech or the other way around. It's that they're responding to the ecosystem that they're in and they're willing to look across all of the options and they're really honest about the trade offs.

Miriam Horn: I was really gratified traveling with this book and film. I was actually really gratified at the openness from people at again, both ends of the spectrum to people who thought they were strict supporters of organic farming to really understand in a more nuanced way that if organic farmers are tilling, that they're actually doing a tremendous amount of damage to the soil life and that they need to think in a more complicated way about what constitutes good stewardship of their land. At the other end, the getting invited to address the national meeting of the American Farm Bureau, who told me they'd never invited an environmentalist before, that they're, you know, an openness to really confront climate; the ag press is really addressing climate in a more direct way than it ever has before.

Miriam Horn: In Louisiana, this effort to restore wetlands, you know, deep, deep red state, but taking account of sea level rise in all of the master planning that they're doing, so this wetlands restoration. It's hard to boil it down to one example, because there're so many inspiring examples out there all over the place.

Alex Trembath: I actually love that, and with that, I want to thank you for joining us today, Miriam.

Alex Trembath:

Thanks again for listening to Breakthrough Dialogues. If you liked the show, rate us on iTunes and subscribe wherever you get your podcasts. I want to again, thank our guest, Miriam and our producers, Alyssa Codamon and Tali Perelman. Catch you next time.