SRRR
Sustainable & Resilient Resources Roundtable

https://sustainableroundtable.org

Link to Video of Workshop: https://youtu.be/N9oW8dKoVX4

Proceedings

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Introduction to Sustainable & Resilient Resources Roundtable

David Berry SRRR Director:

David welcomed the presenters and participants and summarized the history of the Roundtable which began in the White House Council on Environmental Quality before becoming part of a Federal Advisory Committee on Water Information. When it became clear that the previous Administration was planning to close many advisory committees, the Roundtable formally withdrew and formed the 501 (c)(3) charitable organization it is today. When the pandemic began, the Roundtable stopped holding live workshops around the country and moved to online short workshops like this one, each of which focuses on a topic or theme related to resources.

David said that regenerative approaches to resources including agriculture seek to renew or restore the resources drawn upon to meet human needs. Regenerative thinking looks at interactions nested within whole systems to reveal practices that are equitable and resilient rather than depletive or fail to enhance capacities. The wellbeing of human communities, and the natural world of which we are an integral part, are considered and deeply respected in these approaches.

The presenters represent organizations with varied approaches to and applications of regeneration. They will share what they have learned from implementing them.

"Regenerative" and "Sustainable": Definitions and Debates

Julie Suhr Pierce, Ph.D., National Economist, Ecological Sciences Division
Science and Technology, USDA Natural Resources Conservation Service

Julie spoke about her farm background and her life-long interest in sustainable food and regenerative agriculture, and highlighted topics related to regenerative agriculture that are being discussed in the Ecological Sciences Division at the NRCS.

"Sustainable" and "regenerative" agriculture are terms used to describe methods of food production that include environmental conservation. Some people use those terms interchangeably Others define them as being distinct from each other. Sustainable practices seek to maintain a system into the future in an equilibrium state, whereas regenerative practices typically seek to restore a system to an improving state at or above a static level of sustainability. In that view, a sustainable system can be an equilibrium state with production that minimizes negative impacts to the environment and uses resources without damaging them. A regenerative system would improve the quality of the environment and resources and be represented by an upward sloping curve on a graph.

Herman Daly, an economist heavily focused on the environment, sustainability, sustainability systems, and systems design, taught three basic rules of sustainability. His first rule is that renewable resources have to be used at or below the rate at which the resource regenerates. This one is interesting. It brings into focus the issue of growth

rates competing with interest rates in financial markets. Some people have pointed this out. For example, when a university for example, has a stand of trees that they've been bequeathed, as a heritage for their students. If financial markets go into an up, upswing, and interest rates climb to a rate higher than the growth rate of the trees, there's a temptation to cut the trees to sell the timber and put that money into financial markets to get a better rate of return for the university. And that's something that has actually happened and it has been distressing to families who thought that they were protecting natural resources. From that definition, that would not be a sustainable use of that resource. I think it's also tragic to treat a living forest, a system and a community, as a single resource such as the timber of value to humans. instead of acknowledging the value to the entire system of intact and healthy trees.

The second rule Herman Daly taught is that non-renewable resources have to be used at or below a rate at which renewable substitutes can be developed, and considering the use rates of renewable resources that are already or will soon be utilized.

The third rule, is that pollution and waste streams have to be emitted at or below a rate at which the natural systems can absorb, recycle or render them harmless. I have taught this in undergraduate economics courses over 20 or so years. What we're proposing is not zero emissions, which isn't possible, but that we only emit what can be accepted into the natural system and processed without doing harm.

Now let's focus on regenerative agriculture. Regenerative can be an adjective, a noun or a verb. And it's a combination of the prefix re and the word generate. Merriam Webster and Cambridge both define generate as actively making something exist and Re is a preposition meaning again or a new. So regenerate means to actively make something exist again or anew.

Bill Buckner of the Nobel Research Institute said that sustainable and regenerative agriculture overlap in the practices that are implemented in them. Regenerative agriculture uses a systems approach to address soil biological function, and to restore farming or ranching systems to improve their productivity, soil and water quality, and biodiversity, and to reduce fertilizer and other chemical usage.

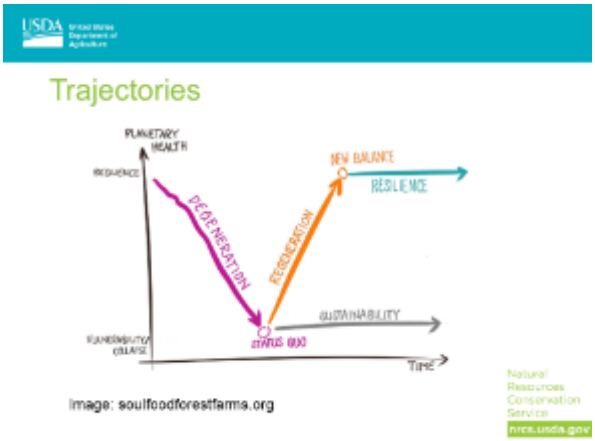
Now let's think about systems. A lot of scholars have identified sustainability from the perspectives of agriculture development and economics, often applying a systems approach to the definitions expressed by Donella Meadows, one of my favorite heroes. Donella defined a system as an interconnected set of elements that is coherently organized in a way that achieves a specific outcome. When I studied systems thinking, I

was inspired by her definitions and her approach to looking at the connections between elements and systems.

I hope that as we leave this meeting, we all think more in that way, rather than looking at natural resources as isolated parts that don't connect to other things. I want to talk a bit about Permaculture, an agriculture or cultural system that brings together elements of sustainability and regeneration. David Holmgren and Bill Mollison invented the word permaculture to refer to agricultural systems that are permanently sustainable. Within the permaculture community, however, there is still debate over what does and doesn't constitute genuine permaculture.

I belong to a permaculture group online, on Facebook, and recently someone posted that they were selling their permaculture home and half-acre yard. They said they did not want to sell all their hard work to someone who would just destroy what they had built. They were only interested in selling to someone who knew permaculture or is willing to learn. I was surprised to see negative comments about how the yard looked like a weed patch and posted a picture of their own front yard to show what permaculture really looks like followed by the harsh comment, “I see people putting a few plants in the ground and calling it permaculture. Now New Agers have a cutesy name called permaculture. It's not a hobby, it's a lifestyle.”

I was taken aback, and I could tell that the person who had posted the information about the property was heart hurt over this response. So I want to propose a different way of looking at things. I borrowed this from Soul Food Forest farms.org, and I like their approach. They have a graph that shows degeneration of planetary health. And they have a continuum of vulnerability and collapse up through resilience as we go through time. As we focus on regeneration, we can reach a new balance, and then be resilient and sustainable at that higher level. Whereas if we start from the status quo and don't try to be regenerative, we end up with just sustainability at a low level of health and resilience, and lack support for resilient human and ecological systems.



Marianna Grossman, Respondent: Thank you for a great and inspiring presentation. I had the opportunity to meet a wheat farmer this summer, who is a leader in the wheat industry, as well as producing his own dryland farm in central Oregon. And he felt offended by city people telling him to be more sustainable. He's a fourth generation farmer - that's a miracle of sustainability. He works to reduce the fossil fuel he uses and chemical inputs, but he is not a regenerative farmer and kind of resistant. So how do

you help people who are actually earning a living running farms or landscaping in urban areas to understand these concepts and then figure out how to implement them?

Julie Suhr Pierce: A great question. My favorite thing to do is to visit farmers on site and go out with them on their land. I don't get the opportunity to do that very much in this national position I'm in, but I used to do field work as an economist and visit farmers and ranchers on their properties. When you walk out and talk about specific things that you observe on the ground, different ways they might farm or ranch, and the benefits that would come to them, their children, and the ecosphere that they live and work in. It's often the case that you can connect better with people than you otherwise would from a distance.

I find that talking about specifics is incredibly important as opposed to speaking in general abstract terms. And there's almost no farmer or rancher who wants to harm the soil that they're working in. But if they don't know how to do it differently, and don't know what options are available to them, to help them do that, it's hard for them to make that change. So I think is the very first thing is connecting with them on a personal level and having them understand that you're not there to criticize, that you're there to provide a different perspective, to find out their needs and interests, and to genuinely share those interests and provide information beneficial and valuable to them.

Marianna Grossman: Thank you. I understand that USDA has $35 billion in new funding. To help institutionalize this and bring it to scale, how do you scale up and out into the market,

Julie Suhr Pierce: We're going to hire around 4,000 new people, right away, to be on the ground to go out and meet those folks where they are. We have field offices all over the country. And we have a system of sharing information with those people at the ground level, and a training system that helps them get up to speed and understand how to deliver our messages and how to support those producers. Because if they're not economically sustainable, they can't be environmentally sustainable.

Marianna Grossman: I assume you work with partners like Farm Bureaus.

Julie Suhr Pierce: Yes, and local conservation districts and many other organizations.

Marianna Grossman: I see a question in the chat about international efforts and lessons learned internationally.

Julie Suhr Pierce: Yes. I've participated in a group that works with the EU on some of these issues. I was invited to participate in a listen only mode so I didn't have anything to contribute to that. But in other venues, the USDA and NRCS are engaged in international work. We have an international office that shares conservation information and expertise around the world. There is also an effort underway within USDA to bring more indigenous knowledge into what we do, and to incorporate the values and the wisdom of people who live sustainably in relatively small groups, as compared to what we do now. So we're learning from them as well.

Marianna Grossman: That's great. Ron McCormick, an ecologist from the Bureau of Land Management, will be talking about recognizing the ecological and cultural values in lands. I think that's an important connection to make between the indigenous view and relationship to the natural communities that we all live in. Thank you Julie.

Regenerative Thinking and Design in Practice Harriett Crosby, Founder, Steward of 640-acre Fox Haven Farm and Ecological Retreat and Learning Center.

Fox Haven Organic Farm and Ecological Retreat and Learning Center is in Jefferson, Maryland, an hour NW of Washington, DC, on Catoctin Creek, which to the Indians meant "land of abundant wildlife". We are on Piscataway land and we see the land as sacred, as they did. I started buying land in the 1970's parcel by parcel just to protect it from development. Our farm manager, Dick restored it, filling in ravines, taking out fencing, using permaculture swales on contour lines to plant trees. He planted more than 120,000 trees to reforest the big open fields, with trees native to this land and cover crops to hold the soil in place. We restored the old buildings and started an ecological retreat and learning center to educate young and old alike about the ways of the natural world. Nature has been our teacher. Most of the 640 acres is now in conservation easement. All that we're not using for farming or programs is a nature preserve and wildlife sanctuary and we try to keep it as wild as possible.

Our philosophy is: "Be like water, always flowing to the lowest place, eating away at the hardest rock, shaping the landscape with the life giving flow of water." from the Way of Life, by Lao Tzu, Chinese Taoist philosopher.

My talk today is about the discrepancy between how nature works and how people think. People can change how they think. I am learning how to think like nature. The core ideas are that all living beings and ecosystems are nestled within larger systems. Each part serves and is served by the larger system and their survival depends on this interdependence. Nested and interdependent relationships are fundamental to the way that all life organizes and sustains itself. In nature, there are no independent, individual, separate parts which are taken for granted in our western way of thinking. According to Descartes "I think therefore I am." This is what's gotten us into trouble, competition, conflict, conquest, control, and war. If we go back to nature's way, every living being is meeting its needs, striving to express itself, fulfill its potential, and evolve in cooperation with others. Collaboration is the natural way to get things done in the natural world.

It is this multiplicity of mutually beneficial relations and cooperation between many diverse parts where all the parts come together to create a whole, a gestalt greater than the sum of all the parts. That's why we at Fox Haven are trying to align ourselves with the rhythms, energy, and vibrational frequency of the natural world, to live in harmony with nature. It's why we meditate and do yoga, have sweat lodges with Hopi medicine men, do ceremony to sing and dance together. Many of our guests comment on what good energy they feel here.

At Fox Haven, we try to balance the needs of people and the environment, participating in synergistic mutually beneficial partnerships. Fox Haven staff are in partnerships with lots of other organizations, with the Frederick County Farm Bureau, the public school farm to school lunch program, the local herb growers and apothecary's, the beekeepers' associations. Our work is not insular. Our success depends on our being a good influence on other landowners and farmers in the Catoctin watershed. Water quality is one measure of this; other landowners are planting erosion or holding the water in rain gardens to let it soak into the ground to improve water quality. Neighbors are learning about all this in programs hosted at Fox Haven. A neighboring dairy farmer who sells his milk to Organic Valley, grazes his heifers at Fox Haven and rotates them from field to field every day, which contributes manure and urine to the soil, breaking up and enriching the sod, building healthy nutrient rich soil and diversifying plant life.

It's a perfect example of a guild which is a permaculture concept. It is a web of reciprocal exchanges that brings together a diverse range of entities to co create a system that sustains all of them. Guild members of different species provide for one another's needs with their products. The grazing cows feed the dung beetles and earthworms and bacteria and fungi and microscopic organisms in the soil that grow the flowering plants that provide nectar to the pollinators to produce honey and grasses that feed the cows that produce the organic milk for us to drink. It's a guild, a whole community of different species that work together and feed each other - and we are part of it. It proves that we are a part of nature, not apart from nature.

I'll end with the story of Indra's net, a Hindu myth that uses the metaphor of s net to illustrate the interconnectedness of the universe. Like a spider's web, at each intersection of every thread, is a multifaceted jewel like dew drop that reflects all of the other jewels and is reflected by all of them.

There are many ways to say the same thing: In an Amish community, when a barn burns down, everyone gathers to rebuild it. The best life insurance can't be bought with money but is found in a caring loving community where everyone takes care of everyone else. At Fox Haven, when someone is sick, everyone pitches in to cover what needs to be done. Come out and visit us at Fox Haven. Feel the good energy of the place.

Rich Juricich, Respondent: Thank you, Harriett. Has your organization hosted conventional farmers, and if so, how have those conversations gone? What lessons have they learned and what have you learned from them?

Harriett Crosby: It has been very good working with the local farmers, most of whom are conservative, and many of whom vote for Trump. We have a farm manager who supports Trump and serves on the Farm Bureau. He has gotten excited about these ideas, using permaculture and biodynamic and regenerative agriculture – and he has been a very good influence on farmers around us. We do workshops, talking about the principles of permaculture planting trees and regenerating the soil with compost. They come and listen, because he's one of them. And he's one of us, and he's able to work between the worlds. So we have good relationships with the farmers. We also work with the Department of Natural Resources of Maryland. We may not be changing their political opinions, but we are showing another way to do agriculture that is not degenerative and destroying the soil with genetically engineered, denser crops that are poisoning the microscopic organisms in the soil and that lead to ill health among the people who eat the products with pesticides. We're providing an alternative. Local farmers want to get off the treadmill where they have to buy the roundup ready crops to get the insurance to keep their programs going. They're locked into a system that they are realizing to be disruptive, both to their health and to our whole economic system.

I was just talking with somebody who was out in Kansas, where farmers are waking up to the destructive, degenerative system, and are interested in alternatives that work economically and that serve human health.

Rich Juricich: I'm from California where we have cash crops like almonds and grapes for wine that now are trending towards more sustainable operations. What are your thoughts about lower value crops in terms of regenerative practices? Is it economically viable to get some of those lower value crops to work more regeneratively?

Harriett Crosby: We want to support small family farmers so the farmer and his family can grow a diversity of crops. Unfortunately, many subsidies go to big corporations who lobby Congress to get the subsidies. We'd like those subsidies to be going to the small farmers, providing economic incentives to diversify their crops, because of course, diversity is healthier than monoculture crops which can all be taken out by a single pest. When that happens, they have to make stronger Roundup Ready crops to tolerate more pesticides, and this destructive treadmill motivates farmers who can to begin to get out of that system in order to diversify their crops. We would like to see economic incentives for them to diversify small family farms.

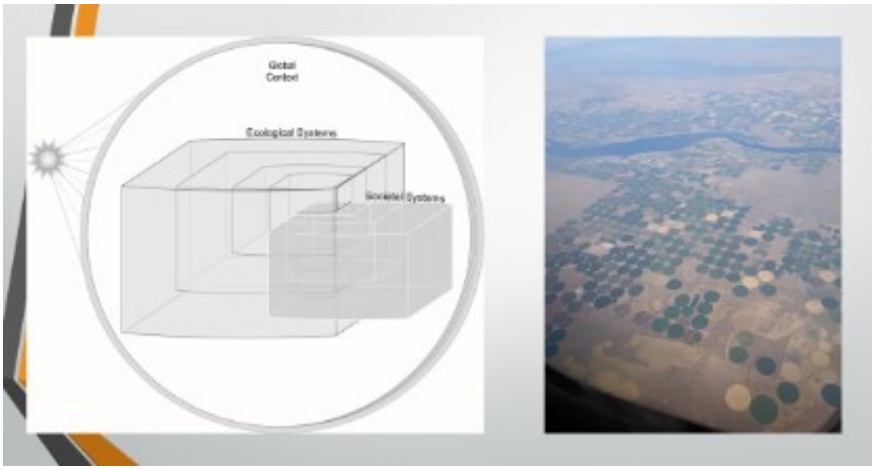
Rich Juricich: Here is a question from Marianna. “Do you interact with agribusiness companies such as ADM? Does your approach threaten their business model?”

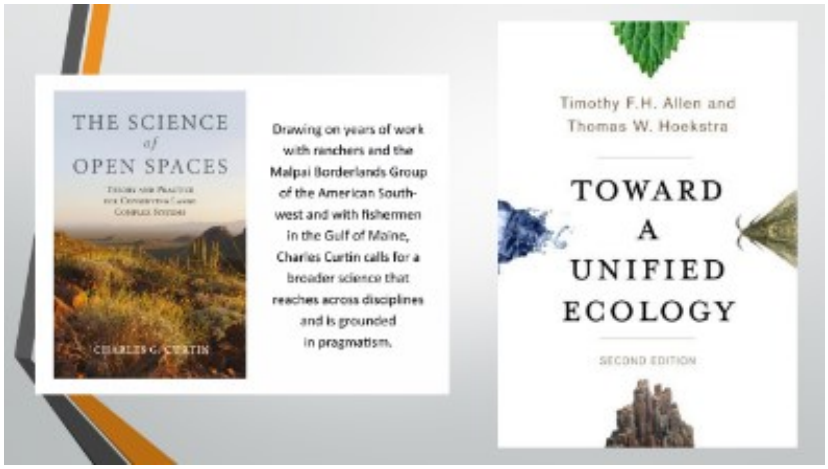
Harriett Crosby: Well, I think we're complementary because I think we will see a gradual shift to providing subsidies to small family farmers. But as we diversify crops and recognize the benefit of these alternative systems, we're seeing older, more rigid systems beginning to collapse. We hope to have the alternatives in there ready to sustain the farmers who want to stay in the business and work with more ecological, sustainable and regenerative agriculture.

Regenerative and Resilient Resource Management Ron McCormick, Ecologist, Bureau of Land Management

I work for the Bureau of Land Management as National Soil Scientist at BLM headquarters. The Bureau of Land Management is the largest land management agency in the US, managing about 250 million acres of surface land, and another 700 million of subsurface mineral rights, oil and gas, and hardrock minerals. We have the smallest budget of the five major land management agencies despite having to manage the largest portion. But we are a good deal. For each $1, we receive of federal funds, we returned $5 to the US Treasury. If you call your congressman and get us $2, then we'll still bring give back $5, but we can do it much more efficiently.

My nights and weekends though, are occupied with thoughts of the ecology of complex systems, and the mix of human organized societies and self-organizing systems. As other speakers have pointed out, and as this graphic shows, all societal systems are nested inside and fully dependent on Earth's ecological system which is run by the sun and nothing else.





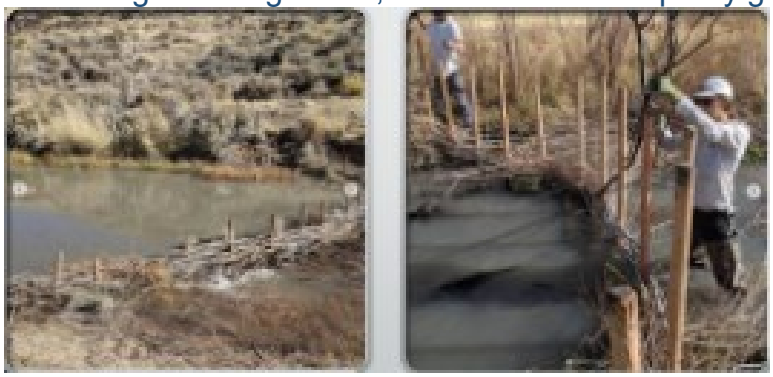
For suggested reading on the science of ecological systems I recommend these books: Open Spaces was done by a colleague of mine and is a very good very approachable book to read about systems and communities and interactions. Toward a Unified Ecology is also by a good friend and colleague of mine and has depth and detail on complex systems ecology.

Let's put some context to the current condition of our public lands that we are responsible for managing. They initially were managed by the original peoples who migrated to the continent at the end of the last glacial event. There were bison here and cougar, bear, and sage grouse. There was natural wildfire and flooding, but the people also managed those landscapes for both hunting and gathering and intentionally set fires with purpose.

Changes that came with colonization and creation of the United States has resulted in the very highly altered landscape. We have bison, cattle and feral horses. We've taken out the top predators so we can't keep the underlings down. We have invasives - cheat grass is a scourge on Western landscapes and Pinyon Juniper needs control as well.

We put in fire breaks and do control burns. We used to have the “10 am rule” that every fire had to be out by 10am the next day after it started. The approach was to have a human dominated very large landscape. We dammed ditched and diverted and irrigated pretty much the entire West at that time. Because we took out the top predators, we have a lot of coyote, fox and raccoons so we had to develop nuisance control laws, which are to poison, trap or shoot, because they're a nuisance to us.

Talking specifically about my agency and some of the other large federal land management agencies, we've made some pretty good progress in the last couple of decades getting away from the command and control ecology of the mid-20th century. Biologists have moved toward restoration for resilience. Examples are dikes and man-made “beaver dams” – simple designs using mostly local materials against drought, to trap sediment, slow runoff and create pools for fish and frogs.



With regard to some specific things that BLM does, perhaps our biggest program of regeneration is **Seeds of Success,** a 20-year-old program, mostly but not entirely in the West, that is a national native seed collection program. SOS has more than 26,000 native seed species in its National Collection. This material is used for research such as germination trials, common garden studies, and protocol establishment. We store tons and tons and tons of seed and new legislation is requesting about 10 times what we have done up to this point. It's is a good program. We're using those seed mixes for post-fire rehab, and I suspect we will be doing some out-planting to test for genetic plasticity with climate change.

We are supporting different ways of doing grazing than what has been done in the past - less prescriptive and more allowing the rancher to determine timing with the early and late seasonal shifts that are catching up with us.

In the past, we did not have a way to present BLM’s plans. So about 10 years ago, the AIM Assessment Inventory and Monitoring Program was started. It is a consistent and defensible methodology to understand the condition of lands, surface soil and plant

community. We are putting together the 10-year retrospective of all those data at this point. It will be interesting to see the draft coming out this week.

Let's put this in the context of the societal pressures that public lands are facing at this point. Most innovations or projects or programs are localized at relatively small scale and effort. Supposed uses of federal lands, pretty much introduced in pursuit of the green New Deal, which you may see my word up there.

We as land managers face the dissonance of decisions. Do we permit disturbances that have absolutely no hope of following the requirements that were mandated by Congress to conserve a draft landscape species and communities both natural and human? There are proposals for 100,000 acres of solar installations in the southern Nevada - California desert, which includes plans for scraping clear and flat and putting solar cells. That's neither resilient nor a regenerative landscape. The environment is challenged by Lithium mines to build all the batteries, copper, other rare minerals, and uranium is starting to get a look now that Nuclear is not so bad anymore to some people. This is a onetime harvest of non-renewables. If you have read about Myanmar and the lithium mines there, there are issues with sourcing from outside the US. So the pressure probably is coming back to the US and much of it on federally managed lands,

All of this is going to require burning fossil fuels as well, for which BLM permits the drilling and transport. So public lands are going to bear the brunt of the green New Deal, as it's discussed right now. It not sustainable - it's not even rational, given what it will take. A Circular Economy is talked about but there is no proven technology to recover those individual minerals to then use for a second round of building generators and solar cells and other things.

So “electrify and decarbonize´ is the is the mantra of, of the Green New Deal but it is just continuous growth in a different form. We are currently in overshoot and in overpopulation. “Beyond the Limits” was published over 50 years ago. The lead author was Donella Meadows, one of my heroes as well. This is the system model that we are still tracking and we are right at the cusp of a bunch of thresholds at this point. So bringing it back to where we started, complex social, ecological systems, everything that you do is embedded in one, regardless of whether you knew it or not. The differences now that these arrows from the social issues social system, going into occurring at all levels in the system.

Another issue is that we know, with CO_2 from burning fossil fuel, we are affecting the global context in an unplanned, unprecedented and unknown outcome experiment. You'll see some of this in the ecosystem approach we talk about in the Real Green New Deal project. And I'll leave you to contemplate that,

Stan Bronson, Respondent:
Thanks very much for that presentation. My question is about the Real Green New Deal Initiative. How much of a shift by the powers that be does it take to get this understood? Sometimes, people that do legislation don't get it because scientists don’t speak their language. So do you think about how about as the old country saying goes,” getting the fodder where the calf can eat it?”

Ron McCormick: We're very aware of that problem. I knew the answer to that, I would retire to write books and make money on the circuit. There is no straightforward way we can economically work our way out of this situation. We need to work beyond classical economics and monetary theory. We need full cost accounting to include environmental

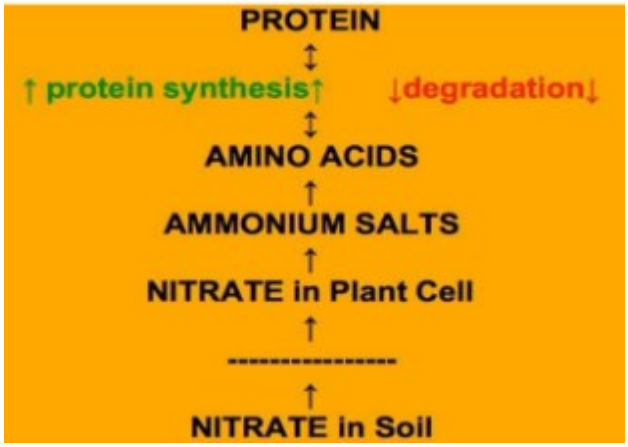
costs and depletion as the environmental movement says. We are in overshoot, so we need de-growth. And that is a very tough thing, because it's also population control. These are not subjects people want to talk about. But as an ecologist, I'm pointing out that as a society we have to decide what we value and what we're willing to do about it.

David Berry: Thank you Ron. Your summary is true and it's stark. I often say that we have forgone the opportunity to learn the easy way so now we're learning the hard way.

A New Agronomic Revolution: Ulrich Loening, Molecular biologist, Director of the Centre for Human Ecology (retired), University of Edinburgh

I called what I am presenting a revolution in agronomy, but it is and old idea published and neglected till now, and recently presented in English translation as Heathy Crops. The Revolution has to be re-launched. As Donella Meadows has been mentioned twice, I want to start by saying, I gave a talk about this, in a slightly more primitive version, in 1989 at the IFOAM Organics International Conference in Budapest, Donella Meadows was in the audience, and she was thrilled by the prospect that we were at last understanding why organic agriculture works. Now we tend to call it regenerative agriculture but the title doesn't matter.

My background was growing up in the country and then studying biochemistry and molecular biology to learn what life and agriculture was about. In 1985, one brave Frenchman, Francis Chaboussou, wrote a book on the health of plants and crops. He made the proposition that, the resurgence of pests and other problems we are facing, are due to agro chemicals, in particular, the pesticides and herbicides we are using. What they do is upset the metabolism of the plant in such a way that it feeds the pests better. His thesis is that if the amount of free amino acids and of sugars in the cell sap of a plant changes according to its nutrition and health. The amino acids make proteins and sugars provide energy and polysaccharides. If both of those are low in concentration in the cell sap, then the pests can't feed So, healthy plants actually starve the pathogens. My first slide pictures this. We, start at the bottom. Nitrate comes out of the soil as the plant takes it up with water intake. The nitrate is reduced to ammonium; which plants use to make amino acids which are the building blocks of protein. The pests and pathogens need both amino acids and sugars. If they can't get sugars and free amino acids, they can’t grow.



Usually, plant metabolism maintains low concentrations of amino acids and sugars, because these are quickly used while growing healthily to make proteins, starch and cellulase. There is not much to feed pests, the plant starves them. Anything that upsets that metabolism, like fertilizers pushing up nitrate in the cells, or pesticides, cause these available nutrients to rise, and provide food for pests. Now my colleagues and I have reviewed the literature for evidence and found all of it to be circumstantial, allowing the theory to be correct but not directly supporting it. It is time for direct experiments.

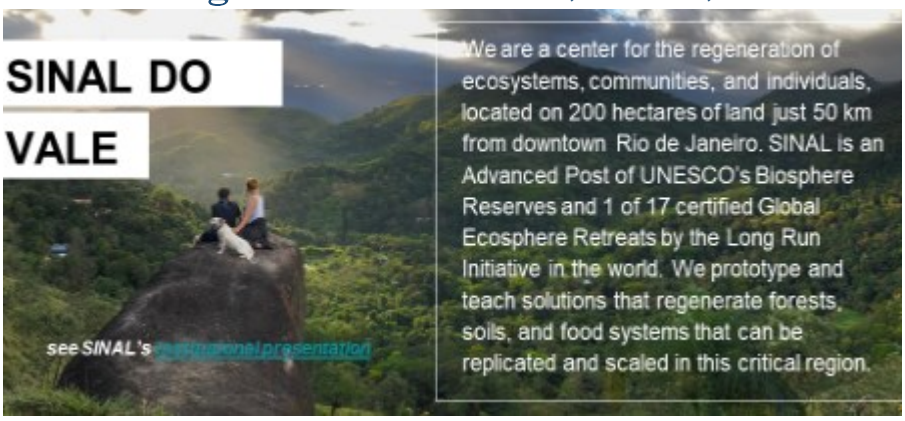
All this could explain why agro-ecology and organic growing works, and could improve its practices. A key component may be hormonal, keeping the plant healthy. Jose Lutzenberger made a commercial product out of the waste from a cellulose factory; this product prevents aphids on his cacti, and it serves instead of pesticides for commercial greenhouse flower growers in Brazil. 'Maxicrop', an anaerobic digest of seaweed, possibly works the same way.

Refs: Martinez, D. A., U. E. Loening, M. C. Graham, & A. Gathorne-Hardy. 2021 When the Medicine Feeds the Problem; Do Nitrogen Fertilizers and Pesticides Enhance the Nutritional Quality of Crops for Their Pests and Pathogens? Frontiers in Sustainable Food Systems 5: (DOI 10.3389/fsufs.2021.701310).

Chaboussou, F, Healthy Crops: A new agricultural revolution. 2004 https://www.gaiafoundation.org/post-library/healthycrops/

Regenerative Thinking and Forest Agriculture

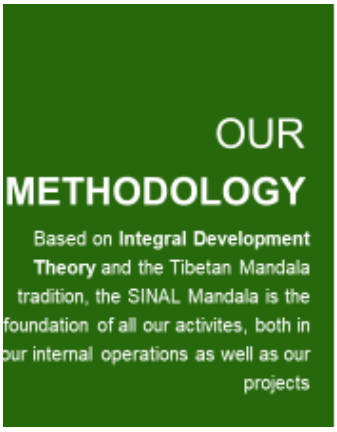
Thais Coral, Founder, Sinal do Vale, Brazil

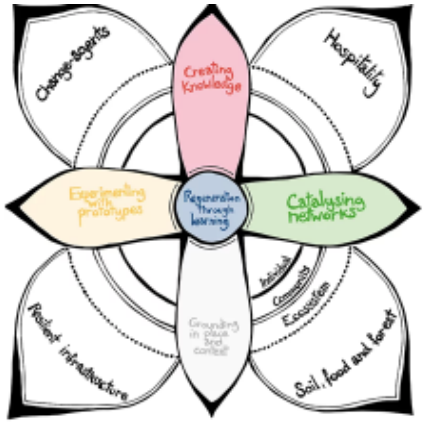


Sinal do Vale is a center for the regeneration of ecosystems, communities, and individuals that inspires relationships and learning experiences through projects, hospitality services, and educational programs in agriculture and land stewardship is a basis for integral development. We have 200 hectares of our own land where we do all kinds of experiments, in terms of regeneration. We also work on reforestation of thousands of acres nearby.

It is a holistic project, so I'm going to talk about agriculture and about community which has education at the center. We focus on food systems as key to our model on what we call a campus for place based regenerative education as a new frontier for human development. We are a center for regeneration of ecosystems, communities and individuals with bioregion perspective as the basis for meeting the UN's SDGs and ecosystem restoration goals. We finance our work 50% with hospitality, 20% with donations and about 30% with projects and products.

Sinal is located in a buffer zone around Rio de Janeiro which sits on a bay. A population has been there for 500 years, and in colonial times was the center of the Portuguese empire in Brazil. Many slaves worked in agriculture on the lands. Since that time our valley has gone through several cycles. The first cycle was as coffee plantations. It is very hilly and of course, has had a lot of deforestation. We are located in the Mata Atlantica – the Atlantic forest on the coast of Brazil, which is one of the hotspots of biodiversity in the world with more species of animals and plants in one hectare that in some entire countries. It is a pity that only 12% of the forest remains today. Among our main missions is not just to restore the forests, but also to share the idea that the forest brings ecosystem services including food, water, landscape and the fresh air we breathe. The forest also gives biodiversity and protection from climate disaster. Our work on the Long Distance Trails program is a way to implement Nature Based Solutions in conjunction with farms and communities creating a bioregional community. This strengthens in a practical way, partnerships in the public and private sector with concrete results.





Our methodology is based on the Integral Development Perspective of Professor Alexander Schieffer, a holistic model. We also use a Tibetan mandala to illustrate the sequence of how we do things. All we do is anchored on the land in a regional context. The center of our mandala is regeneration through learning. We create and share knowledge through networks and teaching programs. One outer petal is hospitality for change agents. We receive young people from all over the world, most of them interested in food systems and regeneration of agriculture and of bio regions. We have food forests with products such as jackfruit, which yielded over 6000 kilograms this year, as a main project area.

OUR TEAM

We have a very diverse team of people from different cultures, but also different races and genders. So, we really try to keep a diverse culture of diversity, not only the diverse species of animals and plants in the forest place in where we are but also in our team: A diverse community to inhabit lands where we restore nature's mechanisms.

Rhonda Kranz, Respondent: Thank you Thais. That was really wonderful. All the things you're doing are exciting. At one point you talked about how you've got eleven municipalities in the area, Typically, it is difficult to work with that many groups, especially with the changing of the politics and the politicians. Can you describe how you manage to work with that many groups on projects that that might benefit them, but in which they are not particularly interested?

Thais Corral: Thank you very much, Rhonda. Mainly until now, Sinal has had our attention focused on the Center. We were concentrating on our land which is 200 hectares or about 500 acres and many of our projects are on our land, but the whole mission of Sinal is to serve a bioregion of 10,000 hectares or 25 thousand acres, in which there are many communities totaling about 500,000 people. Our idea is to serve them through the creation of long distance trails or caminhos. And we are not doing that alone. Sinal is a catalyzer of public policies of foundations of people who are willing to do things in the region. And we created a thread or a pathway to get something done. We are not a government but we are offering a strategy and some examples of what can be done such as the Jackfruit, the reforestation, the agroforestry, the agro-ecology and the products and benefits that can emanate from group ecotourism if the region creates a market for that. This has been a forgotten area It was once an area which provided a lot of products. But it has been neglected because it was mainly an area where the slaves were working. Once slavery was abolished, it became under-served region and it is still very stigmatized. We are willing to change that stigma so an economy can emerge in which people can participate, a local economy.

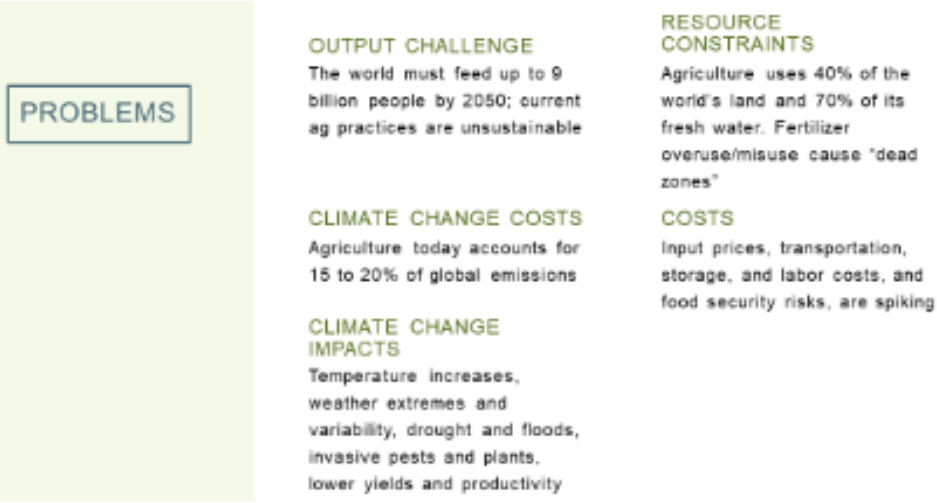
Rhonda Kranz: Great, thank you.

Climate Change and Regenerative Agriculture: Scaling up Learning, Action and Investment: Anne Pence, founder/CEO of Blue Marble Strategies, LLC and a member of the Stimson ACRE Board of Counselors.

As a farm girl, I benefited tremendously from US federal government programs that had me working in the Oregon legislature at age 15 on renewables policy in the 70s. I noticed in this group is that we are all cheerful warriors on behalf of the natural systems of our planet. And I don't think any of us could be that if we hadn't fallen in love with them from a very early age. And that gives me hope that we can inspire the imaginations of people for change.

There are many things in the world today, some of which we don't like very much, but many things that nobody could not imagine 50 years ago, even 25 years ago. So we have to have hope that we can get past this very challenging, complicated and sometimes divisive era, and move to something where we all feel healthier, we all feel

more connected, and where we all understand and respect actively, our relationships to these natural systems.



So I wanted to throw out that you all have given me greater hope, and I never flag but it always helps to be around people who also care about these things and are working to be smart about how to move us to new levels of understanding. I am not a regenerative agriculture specialist. I've been working on climate change since the 90s. I was a climate negotiator for two presidents. But I also am a development economist. I lived in Africa for some years and spent a lot of time working around the world on food security, sustainable agriculture, poverty reduction, and climate change. And it was always clear to me that those things were all integrally and intimately interrelated.

I am currently working with Stimson Center on some climate initiatives. We all know that the world will need to be able to feed an estimated nine to 10 billion people. Ron mentioned that we have a lot of people in the world and we sure do, we're going to be able to have to feed those folks by 2050. Even today, a billion people go hungry quite regularly. Current food and agriculture systems worldwide are not sustainable or scalable in the face of climate change and massive pressures on natural systems upon which we all rely; With temperature increases, weather extremes, widespread drought and flooding, the spread of invasive crops and paths and damage transportation corridors, crop yields and livestock productivity are actually down even as input costs are spiking. Biodiversity losses, which can include the permanent loss of opportunities to improve agriculture, are at historic levels. And at the same time, Agriculture remains a major source of net emissions overall accounting for as much as 30% of global totals.

While we have made progress on deforestation in recent years, methane from livestock and nitrous oxide emissions from fertilized crops are up substantially. Something needs to change, we need to think in terms of healthy systems, water, energy, soil, plants, and forests, and biodiversity are fully interconnected systems upon which we depend is the source of all of our livelihoods. It is the source of our social equality as well as our stability. National security experts are telling us that the pressures that climate change is causing out migration, greater tensions, and resource scarcity. Even so, governments stakeholders and investors are struggling to manage these complex changes occurring across ecosystems. And they're struggling to make sure those systems thrive, especially given climate change. So systems thinking, which underpins regenerative agriculture can really help to increase the sustainability, the regenerative capacity, and the stability of our food and agriculture systems at every level.

Droughts, floods, fires, extreme weather have finally made the high and growing human and economic costs of unsustainable habits and practices pretty clear to all, but people/companies/communities/governments still don't know about good, affordable solutions, and there is some powerful resistance to change;

We hear from Harriet and others about the benefits regenerative agriculture has at the farm level. But I think it's also important to understand that it can benefit Food and Agriculture systems more broadly, some of the largest food and beverage companies in the world that committed to trying to achieve net zero emissions by 2050

by reducing emissions across their entire supply chains. And given that 70% of all total emissions from food systems come from land use and land use changes and farming activities, those strategies have to include reductions in emissions at the farm level. So by supporting and investing in regenerative practices, or in permanent beneficial changes in their value chains, corporations can help to bring regenerative agriculture to greater scale.

Experts estimate that agriculture takes up 40% of the world's lands accounts for 70% of fresh water use, and causes up to 30% of greenhouse gas emissions. We can't go on this way. The overuse and misuse of fertilizers creating dead zones and oceans, affecting those habitats also lakes. Our current approach conventional to agriculture is simply unsustainable, yet there are no clear definitions and no clear scientific targets for regenerated and sustainable food systems. Despite initial efforts by groups such as the EA T Lancet Commission on food, planet and health. That Commission's 37 Scientists from 16 countries considered so called planetary boundaries for the production of adequate healthy food, including cropland use, biodiversity loss, US water use, greenhouse gas emissions and nitrogen and phosphorus pollution. They concluded that the next food revolution is indeed possible, and that we can feed a growing population, but that it will require collaboration in all parts of the food system. Regenerative practice on farms, improving soil health, is the world's largest carbon sink. Those practices offer improvements in the efficient use of water, land and other inputs. In climate negotiations. We used to call those co benefits and we tried to understand them.

The work that today's participants and others, including the private sector are doing on regenerative agriculture offers us insights and lessons learned and understanding of best practices that needs to be assessed, understood, and scaled up in measurable ways based on evidence so that we can take these wonderful examples that we've seen today, and help others understand how to apply them in the broader context in which we live. Based on direct experience in helping to organize and manage public, private and non-government collaborations.

I wholeheartedly agree with the EA T Lancet Commission that multi-stakeholder collaborations will be essential to achieving these goals. What does that mean? We need to bring together government officials from around the world, multilateral institutions and experts, farmers, academicians and researchers and the private sector to scale up regenerative and sustainable agriculture. And by that I mean all definitions of it so that we can continue to thrive inside healthy natural systems. There are plenty of agri-collaborations out there already. But many of them do not hold themselves or their participants accountable for clear, measurable goals and effective operational strategies consistently over a long enough period of time. The Stimson Center has been doing that for over three decades, they bring together unexpected partnerships with unexpected collaborations of different kinds of stakeholders. And they use technology and science

as well as the evidence and the understandings from people's direct experiences to try to solve these complex global challenges

I'm working with a team there right now to build upon the 200 plus acre Alliance for Climate a Climate Resilient Earth to create a collaboration platform focused on key sectors such as food and agriculture, it will provide its participants access to share data, to share it analysis to evidence to science.

And it will facilitate discussions of what the challenges are that we face, and what sorts of solutions might be brought to bear to meet local needs. As Harriet said, you really have to talk to people in very direct personal ways about what their needs are, and not come at them as if they are there are your enemies, even if they're doing things in ways that you don't think, make sense and cannot sustain us, because that's the only way they're going to change.

The collaboration platform that we're looking to design will encourage its participants to come together around these learnings and to actually undertake model activities and projects on the ground throughout the world. Because as we know, there are many parts of the world, including Africa, which has a huge amount of arable land has not used a lot of modern agricultural methods, and is ripe for a combination of regenerative and, you know, nature based solutions, in order to show us the way to do agriculture in a new and different manner. If we can have the imagination to take that on. The US

government including USDA, US A//ID, the Bureau of Land Management, UN agencies, the World Bank, FAO, Sega, our universities and research organizations around the world. And wonderful people like those who have spoken with us today all have the capacity to teach us how to leapfrog these challenges, and bring what may now only be in our imaginations to fruition so that we can have a real revolution, not just in agriculture, but in how human beings view their relationship to those natural systems.

Turning "unimaginable" change into everyday practice takes time, but it can, does, and must, happen -- solar energy now comprises 50% of newly installed power, and renewable energy (and materials and processes) innovation and use is accelerating worldwide with the promise of transforming societies.

Inclusive, multi-stakeholder, global collaboration can help to highlight and accelerate the production and deployment of affordable, scalable solutions that will make people's lives demonstrably better and more secure. To sum: change feels scary and risky, but together we can show that moving to food and agriculture systems that repair, protect and respect natural systems will make us all safer, more secure, healthier and less vulnerable to crisis and disruption, while supporting economic well-being.

Stan Bronson. Respondent: People and organizations tend to silo themselves because we think that our area of expertise or interest is distinct and more important than it is. Can you speak about how the Stimson platform can we work horizontally instead of vertically?

Anne Pence: I saw that all the time in government, my job was to coordinate ideas and perspectives across over 20 US government agencies on issues with food and agriculture being just a few of them. I discovered in doing that, I felt humbled by the whole process, because I thought, why would anyone want to talk to each other, and they're just going to be negative when I try to get them to do so. But what I found and I think people today have alluded to this is people get very excited by learning new things, especially if it's done in a non-threatening way, they get very excited about the prospect of being able to solve real challenges on the ground, as long as they feel it might actually be possible. And as long as they can see resources and opportunities to get it done. I think people stay in their silos because there's, there's a risk to getting outside of your silo. And there's also a human disappointment in getting out of your silo and not being heard and not having an opportunity to contribute.

We did a lot of things on famine, we reformed the US Food Assistance Program, we did a lot to bring countries together across these very deep north south boundaries, where there's a lot of distrust, and a lot of differences in the way countries manage their markets, and perceive of the role of the state in their economy and in their society.

I think what people were reflecting today is how much fun it can be to cross those boundaries, and how much real thinking can come out of it. I also think of examples I've experienced in the pharmaceutical sector, where brilliant scientists knew the microbiology and the physics and the underlying science of the human physiology, but also the chemistry of the pharmaceuticals they were dealing with, and were able to teach someone like me, how we can take these particular compounds that have been designed for use and approved for one thing, we think it's going to work for this other thing, and here's why. And I learned a lot from those people that I think is applicable.

Ulrich has taught us that there is a lot more to be learned from these basic scientific processes. I don't think we have a choice. We're at the verge of some very serious

tipping points that we can begin to understand in these natural systems, and they're quite dangerous. And we will either get smart now, or systems will re recalibrate whether we like it or not. So I believe collaboration works. I've seen it work. And I think that drawing from by taking investors, financial actors, academicians, farmers, the agribusiness companies, instead of working against each other, we can tease out and bring to fruition the most practical elements and learnings and put them into action on the ground as some of the folks here have actually tried to do. But we have to be able to scale this up across an entire planet. And all that's a rather daunting prospect. I truly believe we can do it and that we have to do it and that the only way to do it is by real collaboration that shares its learnings that weaves the communities together in a durable manner and makes real difference on the ground. And that's what we're going to try to do.

Open Discussion Among Presenters and Participants

David Berry: Thank you very much, Anne. We will now move to an open discussion.

Ulrich Loening: Anne, thank you very much for your terrific optimism. But my desperate comment is yes, we can. But no, we don't actually do it. And everywhere. And we've seen it at this meeting, which has been absolutely terrific. There are a lot of wonderful projects going on all over the world. And one would think, therefore the world was not in the trouble that it's in. But it is in that trouble. Cooperation is great. But we haven't come to grips - How do we actually get it done? It's too big a question. Of course. That's what the comment of this meeting is about.

Anne Pence: I want to say that each and every day, I spend at least an hour or two perusing the new technologies and breakthroughs across the world in everything, from quantum physics, to battery technology, to materials, nanotech to biotech. Every day, I spend at least two hours looking at the science and the breakthroughs. And I believe things are happening that we didn't have before.

When we did the Montreal Protocol on acid rain a million years ago, it was a much smaller problem not affecting the entire world and every aspect of our natural systems and society. But people could see the hole in the ozone, they were terrified of it, and we had solutions that were tractable, and could be put into place. We have not had that on climate, we have not had that in terms of our relationship to our natural systems. For the first time in my lifetime, I'm actually beginning to see Ulrich, that regular people in their regular day, see right in front of them, that we have to make these changes and what it's costing them, to not make them.

Where I don't think we've gone far enough is in telling people that we have real solutions, that they are tractable, they are practical, and they can be put in place. And there are too many people telling folks that that isn't the case. I disagree. And I think we have to be much louder, not just optimistic, but fierce to tell people that we do have solutions, what they mean and they are affordable from the point of view of a full recognition of value in the value chain that involves human beings and their own thriving.

We can't go on like this, but we do have the solutions. Stimson is also working with you know, a large group of scientists and research organizations on new tech that exists to scale it up and deploy it worldwide. We're not going to quit.

David Berry: I see a comment in the chat from David Brooks

David Brooks: I'm a Canadian who works with a Crown Corporation owned by the Parliament of Canada to support research in the lower income developing countries. In many cases, the potential improvements towards small scale Permaculture is less lack of knowledge than lack of money. It's not only lack of funds, but often lack of tenure. Why should somebody put money in if they don't know that they're going to own that piece of land in the future? Someone mentioned Africa before but I don't think this is a big problem in the United States, not so far as I know certainly not. In Canada, but small holdings in most of the developing world is a big problem. And, and tenure is almost always at the base of a comment on it.

Rhonda Kranz: This is for Ron, or whoever wants to answer. It is important to note that all of these issues are very complex and not everybody sees how they are connected. That is part of the problem. Some of us are ecologists, trained to think that way, and other kinds of thinkers see the relationships too; but not everybody does, including many of those making decisions. We're not going to educate everyone, and some people really don't think in that systemic way. So what do we do?

Ron McCormick: What is it with unanswerable questions today**?** How do we come up with a narrative that you can tell people that doesn't involve systems vocabulary, which they're just going to hear as some sort of wonky jargon from scientists?

You are right. We don't have to convince everybody. We have to convince just enough people. Yes, we have the knowledge, we have the technology, had we started 50 years ago doing what we should have done. My biggest worry right now is even if we could convince everybody in Congress tomorrow. I am not sure we have the time. And that's the thing that keeps me awake at four in the morning. It's an unanswerable question.

Anne Pence: Quick comments on the question that was asked to Ron, I don't think we have to convince Congress, we just put a bunch of money behind this, at least for the US. I think what we have to recognize right now is climate impacts and the impacts of an unsustainable economic system are upon us, and they're very high. And so there are economic incentives that don't require Congress. And Congress is getting behind some of it anyway, for these changes to be made. And there are, unfortunately, or fortunately, now economic incentives to make these changes that didn't exist before and people are responding to them, including big companies that weren't even a bit interested in this stuff just 10 years. Yes, we're running out of time. But what we've got right now and what's on the horizon can make a real difference. So I think with the combination of government incentives and economic incentives, we might have a chance. We don't have to convince people to think in terms of systems - we just have to tell them we have solutions to problems and that they're cost effective and profits can be made. We can do that.

In terms of the international situation, I helped design and stand up the US Millennium Challenge Corporation. The entire premise of that agency was that we should work with

countries that made commitments and that were transparent, and that were willing to help their own people. It is an arduous process. It requires them to do competitive procurement, and all kinds of things that they don't like to do, because then they can't, give their cousins an income and so on. But for small land holders, and in terms of land tenure in those countries, that is a major focus for many development organizations. There is a whole lot being done on that issue. It is a well-recognized problem right now. What we can't do, is force governments to make the changes. Where we've been successful in some places is in convincing them that they would benefit from those changes, and get a lot of money to support it. So they did it. Those examples are out there, and we're going to build on them.

Jim McMahon: Thank you for having me here. I think the statement was made earlier that it's about community values, we get to choose what we do, we have chosen to emit pollutants. And that's what we're doing. Policies at all levels of government need to be consistent with our climate goals. Our policies are not sustainable. That includes incentives, but also most importantly, regulations. I've worked on energy policy for 40 years and mandatory things are very important.

The second solution is investment that needs to be consistent with our climate goals. That involves carbon taxes or other policies. The technologies exist, the solutions exist. The problem is that money is being spent mostly for short term profit. That needs to be redirected to sustainability.

Julie Suhr Pierce: I have a few thoughts. When Anne was talking, I couldn't help thinking about the One Straw Revolution. The author, Masanobu Fukuoka, was motivated by biology and microbiology initially, and was fascinated by what he was observing. He figured out how to do the right thing for almost no money, and created a regenerative food forest, that was wild. I think about that all the time, and how simple it was for him on a very small piece of land to grow enough food to support a pretty large number of people from time to time. I find that to be such an inspiring example. Another thing I wanted to say in response to what Ron said is that I feel the same way. I lay awake at night for months and months, feeling just sick about what I was observing, and feeling like it was too late, that we'd waited too long, and there was nothing we could do. And then finally I realized I love the book title, All We Can Save, a bestselling anthology of writings by 60 women at the forefront of climate work. Every day that we work helps us to postpone the worst outcomes. And every work that we do, reduces the magnitude of the worst outcomes. I know there are tipping points we might go past that it will make things so much more difficult. But everything we do matters no matter when it is or how far into this we are. I'm heavily involved in NRCS and USDA climate change work. I was just appointed to be a co-lead for one of the USDA climate hubs, which is exciting. I'm actually missing training to be in this meeting today. I didn't know this was going to happen at the same time.

There is a lot of really good work going on in the US Government. NRCS is doing great work, looking at how we can help to both mitigate and adapt to climate change, and help produce food in a sustainable way, in spite of all of the really difficult things that are coming. I think there is a lot of good stuff going on. An important part of what we're doing is trying to make it pendulum proof so that changes in the political climate in Washington, DC, will not undo incredibly good work that a lot of people are working hard to do.

David Berry: Thank you Ulrich, Rhonda, David. Anne, Ron, Jim, and Julie for your questions and comments in this discussion.

I would like to say a word about the Sustainable & Resilient Resources Roundtable. You may have thought you were observing a meeting of the Roundtable. But there's only one qualification to be a member of SRRR, and that is to participate in a meeting. So congratulations on your admission to full membership. You will get announcements of future meetings.

Thank you all so much for being part of this workshop. I'd like to acknowledge all of the speakers. And I'd like to thank the respondents who listened and responded well. Also, my co-hosts who helped with the logistics.

We will put together proceedings. The speakers will see a draft first so they can add a couple of things they wished they had said and can delete a couple of things they wished they hadn’t said.