

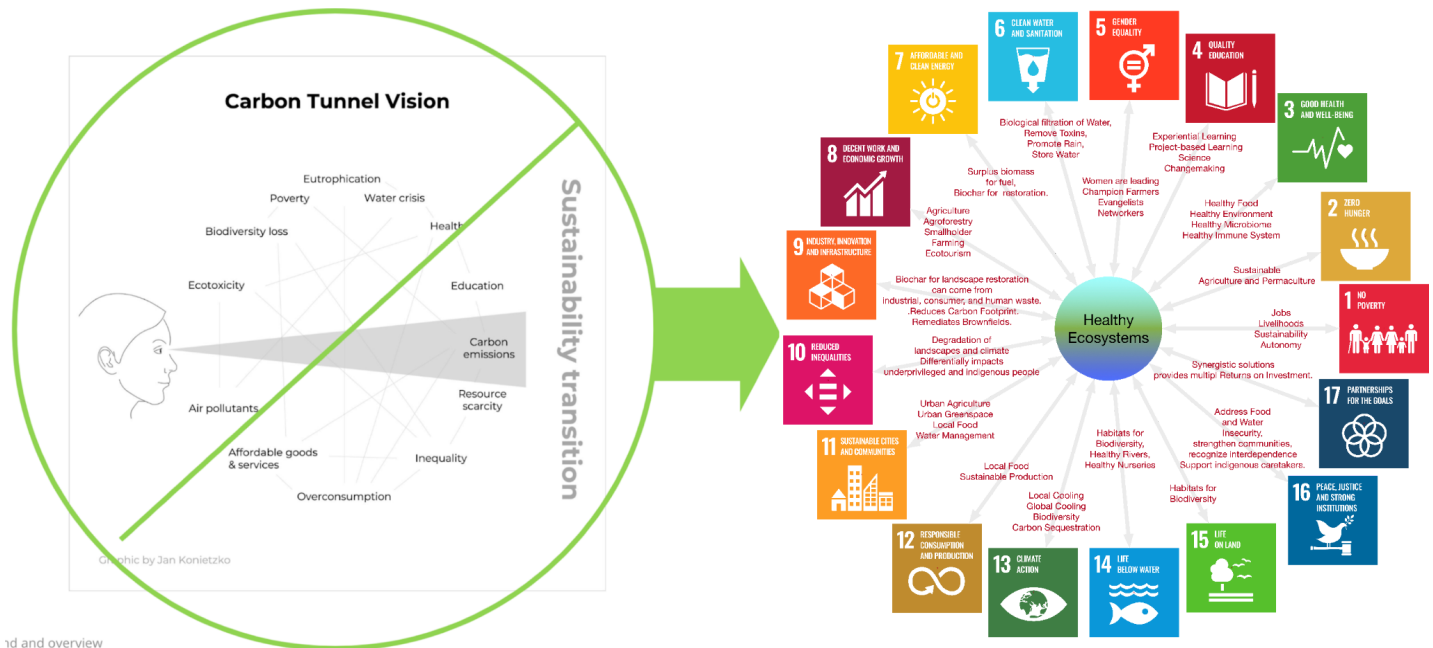
EcoRestoration Alliance (ERA) Whitepaper:

Healthy ecosystems will fix the climate and renew life on Earth.

13 March 2022

[Commentable Version](#)

The prevailing narrative on climate change is simple: accelerating CO₂ emissions have amplified the greenhouse effect, capturing heat, raising temperatures, causing excessive rainfalls, floods, droughts, and even famine. Therefore, as the story goes, we must reduce the emissions of greenhouse gases to reverse climate change. This narrative jumps right over the main issue: the surface of the earth is warming. That, actually, is the problem we urgently must solve.



The prevailing narrative is not wrong, but it is demoralizing and dangerously incomplete. Demoralizing because it will take centuries for emissions reductions to *lower* temperatures. Dangerously incomplete because it draws our attention away from an actionable strategy that could literally *reverse* global warming in a few decades: **restore the healthy ecosystems that (until recently) moderated the climate.**

Today, half of the earth's land surface is abnormally hot because it is dehydrated and degraded. Dead dry land turns solar energy into sensible heat, warming the surface and the atmosphere. Degrading land that used to be grassland or forest – lowering surface temperatures, moderating day-night extremes, hydrating and aerating soil, sustaining life, and sequestering carbon – heats the surface and sends vast amounts of heat, carbon, and water vapor (the dominant greenhouse gas¹) to the atmosphere. So we can reverse these processes, and cool the landscapes we live in, by restoring and regenerating degraded ecosystems.

¹<https://climate.nasa.gov/ask-nasa-climate/3143/steamy-relationships-how-atmospheric-water-vapor-recharges-earths-greenhouse-effect/>

Ecorestoration also addresses the worst effects of climate change directly, quickly, and locally. In healthy ecosystems, plants and animals break up and create pathways into the soil so that rainfall infiltrates and soaks in so we get hydration rather than flooding and erosion. Ecorestoration also enhances biological absorption of decaying material (rather than leaving it to burn in fires), creates cooling microclimates (rather than heat waves), and fosters plant-regulated water-cycles (rather than torrential rains and droughts). By reducing runoff and pollution, this also improves the health of riverine and ocean biosystems, as well as the microbiomes in soil and water.

This, then, is *our* narrative, based on the experiences, findings, and demonstrable results obtained by scientists, story-tellers, and practitioners around the world. We, the EcoRestoration Alliance, believe that land degradation is an important cause of climate change, and that smarter, more ecological land use will help cool the earth.

Ecorestoration

- 1) helps cool the surface of the earth in mere decades
- 2) mitigates, and helps us adapt to, the most harmful consequences of climate change
- 3) increases food production,
- 4) increases production of clean water,
- 5) increases wildlife habitat and preserve biodiversity, and
- 6) addresses **all 17** of United Nations Sustainable Development Goals
- 7) and, by the way, converts vast amounts of CO₂ into healthy soil and living carbon

In the pages that follow, we detail our thinking and our conclusions.

Problem, Solution, Science, Theory of Change

The Problem

- The world is warming and climate stability is deteriorating due to the cumulative effects of land use, water mismanagement, and greenhouse gas emissions from fossil fuels and desertification.
- Reducing carbon emissions will *slow* global warming in a few decades, but won't **reverse** temperatures for centuries² because it takes time for carbon-charged oceans to equilibrate with atmospheric CO₂.
- Half of the earth's terrestrial surface is now desert, degraded, or dying.
- Many areas are suffering from extremes of temperature and of weather.

² Changes in greenhouse gas concentration affect global average surface temperature gradually over decades, because oceans absorb and release vast amounts of heat and carbon gradually.

<https://earthobservatory.nasa.gov/features/EnergyBalance/page7.php>

<https://royalsociety.org/topics-policy/projects/climate-change-evidence-causes/question-20/>

The Solution and the Science

Healthy ecosystems like forests, grasslands, wetlands, and regenerative farmlands with year-round cover crops cool the biosphere and moderate extreme weather.³

This means that **preserving and restoring healthy ecosystems could ...**

- cool the planet (and reduce methane release from melting permafrost)
- reduce the severity and frequency of extreme weather events
- preserve and restore biodiversity
- reduce extinctions
- provide livelihoods and food security to billions of people

And this could happen **quickly** because cooling starts as soon as plants start covering bare ground.

This is a breakthrough insight that should change everyone's approach to the climate crisis.

Here's what you need to know:

Healthy ecosystems cool the earth's surface.

This summer, the United Nations published a [Foresight Brief](#) explaining how plants absorb solar energy before it heats the ground; a small percentage of this energy is used to build biomass, and plants use a lot of the energy transpiring water and producing water vapor. When the water vapor rises, expands, cools, and eventually condenses into [cooling clouds](#), it even radiates some of that water-transported energy into space. Plants also emit molecules and microbes that seed the formation of droplets, clouds, and rain. And of course, plants create the sugars and carbohydrates that are shared with below-ground soil life that helps to sequester carbon and water in the "soil carbon sponge" which captures and holds the water that sustains life through dry spells. All these effects **channel more of the sun's energy into the life-sustaining carbon and water cycles and less into planet-warming heat**. In healthy ecosystems [plants, soil, and water cool the earth and moderate the weather](#).

We've degraded our global air conditioning system.

When humans burn forests, or when poorly-managed livestock overgraze, bare ground absorbs direct sunlight and heats up. The living soil bakes, loses moisture and carbon, and becomes dry, compacted dirt. Because dead dry dirt doesn't emit or absorb water, the "small water cycle" is disrupted and rainfall diminishes even as fires, floods, and erosion increase. And then the rains stop; as the soil-carbon sponge dries out, plants die and the natural water cycle fails. That's desertification, and it's accelerating.

³<https://bio4climate.org/wp-content/uploads/Compendium-Release-Vol-5-No-2-January-2022.pdf>

As ERA members Jan Pokorny and Michal Kravčik put it, our "[air conditioner has broken down](#)".

We now know how to fix this.

In the last 30 years, eco-restoration pioneers around the world have restored and rehydrated deserts, degraded forests, agricultural lands, vacant lots in urban areas, and exposed soil everywhere. The data are now clear: [temperatures can be reduced](#) in *just a few years* by turning dead dry dirt back into cool living soil covered with growing vegetation. Through water management, managed grazing, cultivation of native plants, and multi-species ecosystem restoration, successes are now well-documented in [China](#), [India](#), [Saudi Arabia](#), the [Sinai Desert](#), [Slovakia](#), and countless [yards](#), [gardens](#), [parks](#), [grasslands](#), and [restorative projects around the world](#).

Within one season, year-round vegetation can

- grow again in deserts, depleted farmlands, and de-paved parking lots
- begin cooling the land
- begin restoring the rain
- nurture humans and other animals
- pull heat-capturing CO₂ out of the atmosphere and convert it to soil-enriching organic carbon
- convert heat-capturing greenhouse water vapor haze into cooling rain

So we need to act wisely and quickly to repair the air-conditioners: green plants.

Preserving healthy landscapes and restoring degraded landscapes is thus

- the short-term solution for global warming, extreme weather, run-away degradation of the environment, loss of biodiversity, extinctions, and even hunger.
- the best long-term solution for re-capturing atmospheric CO₂, and putting it to the best possible use.

Editorial:

In the 1960s IPCC reports recognized both biogenic and anthropogenic causes of climate change. In recent decades, the mainstream narrative has focussed so intensely on CO₂ that powerful and short-term ecological determinants of local and global climate have been neglected.

Even the Nature Conservancy, which [estimates that nature-based solutions could address 37% of the carbon emissions-reductions](#) required by the Paris agreement to keep global temperature rise below 2 degrees C, ignores direct impacts of healthy ecosystems on local and regional temperatures, cloud cover, and rainfall.

It's time to act. We can't just wait for the scientific and political establishments to catch up while the planet burns. We call for accelerated theoretical and empirical investigation of eco-climate interactions matters *in parallel* with increased practical application of

already-proven water and soil management techniques being pioneered by ecosystem restorers around the world.

Theory of Change:

Two exponential technologies, appropriately coupled, will address our multiple global accelerating crises and replace "CO₂ tunnel vision" with a holistic natural vision that can sustain us through the 21st century and beyond.

- bio-geo-engineering to amplify and unleash the synergistic potential of exponentially self-replicating plants and animals: a.k.a. healthy ecosystems
- cultivation of exponentially self-replicating collaborative communities of EcoRestorationists that can recognize and sustainably realize the tremendous **local and regional benefits** of eco-restoration while collectively solving the global crisis.
- Developing programs, advisories, explainers, and compelling stories that will help communities and policy-makers support and invest in eco-restoration.

The EcoRestoration Alliance

We formed an alliance of **ecosystem restorationists large and small**, to [collectively compete](#) for the \$50 million Carbon Removal XPrize. We'll need millions of participants to win, so no one is going to get rich on this. But we're not doing it for the money.

We're doing it to bring attention to this once-in-a-planet opportunity, by alerting Elon Musk's XPrize community--and everyone else--to the short-term and long-term earth-saving potential of ecosystem restoration.

And we're doing it to recruit you.

Benefits of membership.

- **Pool knowledge**
- **Grow your network**
- **Amplify your impact**
- **Solidarity, synergy, purpose**
- **Access to, and governance of, a grant program**
- **Connect your work to a global solution and community**
- **Spread understanding of why your work is so important**
- **Help solve the biggest challenge in human history**

Current members include:

1. John Liu, Pieter van der Gaag, Jan Hein, *Ecosystem Restoration Camps*
2. Anna Kovasna *Global Ecovillage Network*
3. Rob Wheeler, *Global Ecovillage Network & Sustainably Wise*
4. Alfred Brownell, *Green Advocates International, Liberia*
5. Michal Kravčik, Jan Pokorny, Peter Gabris, Dusan Travnicek *New Water Paradigm, and People & Water*
6. Mooyoung Han, *Seoul University ("Dr. Rain")*
7. Ananda Fitzsimmons, *Regeneration Canada*

8. Liora Adler, Andrew Langford, *Gaia University*
9. Peter Andrews, *Natural Sequence Farming*
10. Vijay Kumar, *Community Managed Farming Systems, Andhra Pradesh, India*
11. Mark Shepard, *Restoration Agriculture Development*
12. Marie-Noëlle Keijzer, *WeForest*
13. David Morrison, *SoilWatch*
14. Marcel Berg, Pieter-Paul de Kluiver, *GreenWaterCools*
15. Chandrashekhara Biradar, C.Biradar@cgiar.org
16. Max Abouleish-Boes, Hugo Stekelenburg, *Sekem, Egypt*
17. Ed Huling, *Soil Carbon Partners LLC*
18. Kevin Maher, *Cranmor Advisors*
19. Doniga Markegard, *Markegard Family Grass Fed*
20. Festus Kiplagat, Kristin Kemery-Toone, *GPI2050.org*
21. Anamarija Frankic, *Green Harbours Project*
22. John Roulac, *Agroforestry Regeneration Communities*
23. Anastassia Makarieva, Andrei Nefiodov *Biotic Pump theorist*
24. Jake Kelley, *Blue-Green Futures*
25. Arend de Haan, *African Conservation*
26. Bernd Mueller, *Berndwmueller@gmx.net*
27. KS Varaprasad, *Andhra Pradesh and Asia Pacific Association of Agricultural Research Institutes*
28. Mike Hands, *Inga Foundation*
29. Aniq Moinuddin, Heather Wilbur, *Platform Architect*
30. Anthony Myint, *Zero Foodprint*
31. Dan Kittredge, *Bionutrient Food Association*
32. Deb Phenicie, *Renew Land and Water*
33. Milan Ovsenik, *Union of Private Forest Owners*
34. Judith Black, Fran Stallings, *Stories Alive*
35. Thomas Landrain, Patrick Campbell, *Just One Giant Lab*
36. Judith Schwartz, *Independent Publishing Professional*
37. Rochelle Bell, *Monroe County City Planner*
38. Sue Butler, *Regeneration at Martin House Farm*
39. Maryanne Mott, *B Bar Ranch*
40. Millán Millán, *CEAM & Environmental Assessor for the European Union*
41. Sally Dodge, *Old Quarry Hill LLC*
42. Peter Donovan, *Managing Wholes*
43. Laura Perez-Arce, *Bosque de Agua*
44. Thomas Grimm, *Carlsbad Aquafarm*
45. Christina Engelsaar, *Activist and Educator*
46. Steven Apfelbaum, *Resource Environmental Solutions LLC*
47. John Steven Bianucci, *Applied Ecological Institute*
48. Jessica Alvarez-Parfrey, Marissa Mommaerts, *Transition US*
49. Adam Sacks, Paula Phipps, Jan Lambert, Zuzka Mulkerin, Russ Speer, Philip Bogdonoff, Cole Enos, Nancy Wood, Jon Schull, Louise Mitchell, Charles Shore, Fred Jennings, *Biodiversity for a Livable Climate*
50. Rob de Laet, *Amazon Investor Coalition*

Organizational Design Principles

- Alliance of teams and organizations operated as a cooperative
- Minimal governance, maximal autonomy
- Sharing, caring, transparency
- Broadly shared leadership
- Voluntary participation and facilitation rather than rules and regulations
- Personal and financial accountability

Operating Procedure: distributed synchronous and asynchronous “do-ocracy”

- Recurring Synchronous Town Hall Meetings
- Ongoing Asynchronous collaboration Forum.
- Collaboration Spaces for Teams
- Communities of Practice that cut across Teams
- Shared documents
- Integration with the Global Landscapes Community
- Collective governance through collectively-developed processes.

Join us!

Our team and our collective achievements are growing rapidly but we can already boast over 1 million acres of land already improved, and many more tons of carbon already moved from the atmosphere into biomass and the soil carbon sponge.

The EcoRestoration Alliance is open to all who are involved, directly or indirectly, in the restoration of degraded landscapes.

Individuals and Organizations can join the Restoration Alliance by agreeing:

- To help us map your sites and areas, and estimate carbon sequestration.
(We will be happy to help with mapping and estimation.)
- To be identified as part of the EcoRestoration Alliance
- To aggregate your data with that of other participants
- To participate in the Alliance's decision-making process
- That new members can join by consensus of the Alliance
- That existing members can withdraw without penalty
- That XPrize or other awards will be distributed among existing members in proportion to their contributions
- To participate in site inspections, if required by the XPrize committee.

(We recognize that the XPrize committee will be defining the evaluation process over time and that their process could become onerous for some or all of us. If that is the case, we anticipate that some Alliance members may choose to withdraw from the competition, but remain a part of the mutual aid community we have created.)

So please consider joining, and urge other groups to join, the EcoRestoration Alliance. Questions or suggestions? Email jon.schull@bio4climate.org or cole.enos@bio4climate.org

We're all in this together!