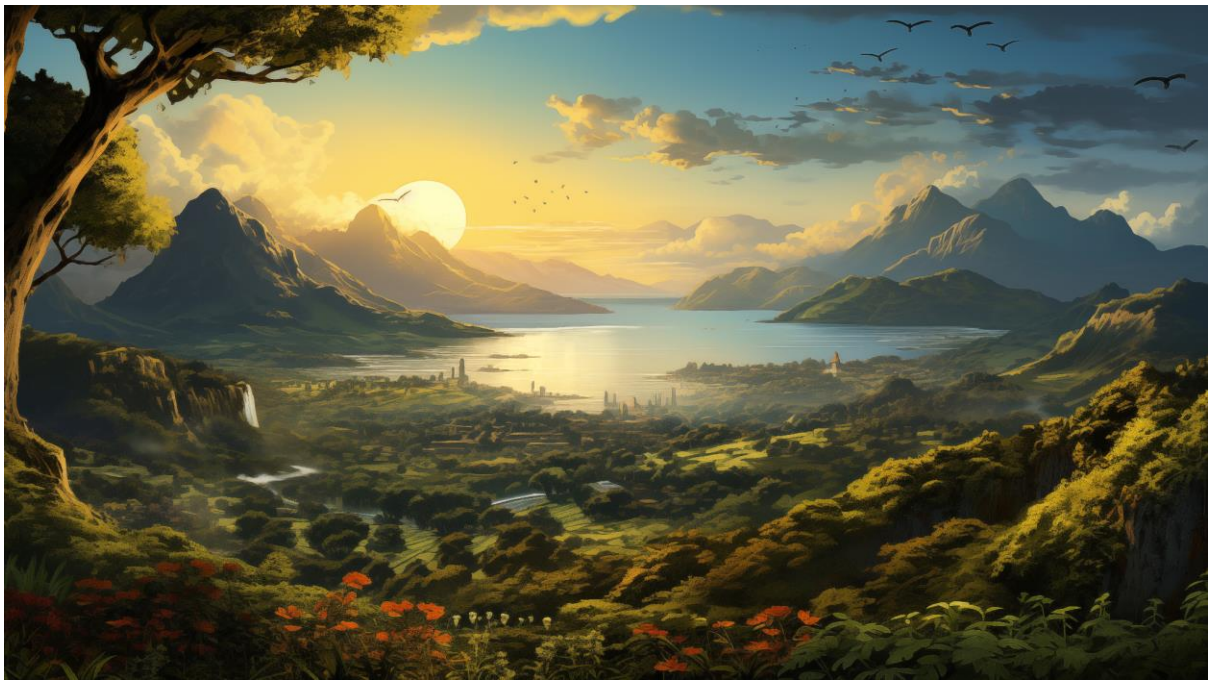
CHOOSE LIFE, LET'S COOL CLIMATE CHAOS

Can we stabilize the climate and cool the planet within twenty years?

"If you want to make major changes, you have to change the way you SEE things."



Let's understand our planet, the living Earth, as one functioning organism, with all species and ecosystems playing a role in establishing the conditions for life to thrive in a hostile universe. The biosphere is responsible for creating and maintaining the livable climate within which we've all evolved. Many Indigenous peoples have long held that story and so has James Lovelock with the Gaia theory.

Greenhouse gasses trap planetary heat, but another major factor almost completely overlooked is water. Water, in its various states (ice, liquid water and vapour), interacts with plant life and the atmosphere, driven by photosynthesis and sunlight. This interaction stabilizes weather and cools the climate. The destruction of ecosystems and living biomass all over the Earth is responsible for a lot of the temperature increases and extreme weather events we're experiencing. Anyone who understands the role of plants and the water cycle in stabilizing our climate will intuitively know that this is the case, and understanding this is crucial for addressing the climate crisis. Global warming is not entirely caused by CO2. The other huge cause is the degradation of the cooling capacity of living ecosystems.

Healthy ecosystems, soils, and plants stabilize weather and cool the planet, offering effective, tangible solutions that we can and must leverage to stabilize our climate. Once the damage to the biosphere is reversed, the planet regains its capacity to regulate its own temperature. Ecological restoration, done by everyone, everywhere, is our fastest way out of climate chaos.

But how much do we have to do to reverse climate chaos?

To stop further warming within 20 years and reduce extreme weather events, we need a strategic plan involving the global population, powerful institutions (governments, armed forces, corporates, etc), and place-based solutions. We must also operate from a risk management perspective, acting at a necessary scale and speed to avert collapse of societies. Key priorities include:

- Supporting, via finance, information and tools, 500 million indigenous and smallholder families worldwide, mostly in the Global South, to transition to regenerative agroforestry food production and protect remaining forests and ecosystems NOW! This will restore small water cycles, regenerate soils, protect biodiversity and increase living biomass. According to our calculations regenerating vegetation on 250 million hectares of land in the tropics, transitioning to agroforestry or reforested area will stop the planet from heating up further.[1] A plan for this has been written.[2] The estimated cost is 0.5% of Global GDP or around 500 billion dollars per year for 20 years.
- Mobilizing large networks of organizations, such as Rotaries, Red Cross, Oxfam, and climate action groups, to support communities in regenerating local ecosystems and improving their well-being.
- Implementing an ocean and coastal marine ecosystem restoration program, delivering nearly immediate positive socio-economic results. We already know how to do this[3], with an estimated cost in the tens of billions of dollars.
- Developing a Digital Gaia to support restoration efforts. An outline has been written, almost all parts already exist[4], with an initial launch cost of 10 million USD.

Funding for this planetary restoration project will come from governments, philanthropy, investment programs, carbon credit finance and the aggregation of projects into large de-risked funds making them investable for pension funds, hedge funds, reinsurers and sovereign wealth funds.

While reducing emissions remains important, we must focus as well repairing nature and water cycles worldwide. Implementing regenerative agricultural practices and agroforestry (where appropriate), while reviving adjacent ocean and land-based ecosystems, will restore a balanced climate, mitigate extreme weather, and cool the planet and sequestrate tens of gigatons of CO2 each year, contributing massively to our emissions-reduction goals.

[1] Restoring the Earth's damaged temperature regulation is the fastest way out of the climate crisis
[2] Arara - Repairing the Climate - bullet sheet
[3] Restoring the Oceans - bullet sheet.docx
[4] Outline available upon request

Emergency priorities to stabilize the planet's climate:

1. Avert the **tipping point of die-back of the Amazon rainforest** and strategically reforest the biome to restore the full vigor of the biotic pump function[5] over the area, for fast regrowth of huge forest areas in the Americas and a transition to agroforestry food production.
2. Create and apply a global plan for the **fast revival of ocean biology in strategic locations** including the fertilization of ocean deserts to sequester carbon, restore the ocean food chain, increase vertical mixing of the water column, increase planetary albedo through increased aerosol production and cloud formation.[6]
3. **Green the desert areas** from the Thar desert to the Sahara and the desertifying Mediterranean through strategic ecosystem regeneration connecting the Indian monsoon moisture streams with the West-African monsoon and the Mediterranean.
4. Strategic reforestation over the Indian subcontinent will likely **increase precipitation on the Third Pole**.[7]
5. Organize the best minds around the world to **reverse polar amplification** by reversing the melt of polar sea ice on both sides of the planet. We do not know how to do that but a lot of plans are forming both with Nature based Solutions and some more technical interventions.

See below for more detailed information

For those who want a bit more background on how the climate really works:

Plants cool through evapotranspiration, turning water into vapour that rises up to the higher atmosphere, carrying large amounts of absorbed solar energy (in the form of latent heat) with it, avoiding the warming of the lower atmosphere. With that, plants cool the Earth's surface. At the same time, plants also send up a variety of biological aerosols together with the water vapour, which serve as the condensation nuclei for water droplets.
So this helps the water vapor to condense on these aerosols, forming clouds, increasing albedo[8] while enabling the transport of latent heat into the higher atmosphere, dissipating from there into space.

Plants seed clouds and rain!

Of the energy that the water vapour releases at the moment of condensation, at least half leaves the atmosphere into space. As vapour condenses into clouds, they cool the Earth by reflecting sunlight back into space. Under certain conditions clouds can also warm the Earth's atmosphere but on balance they cool. The condensation into clouds, while creating rain also produces wind. A volume of one thousand cubic metres of vapour becomes one cubic metre of rain, creating a sudden vacuum which draws in air from below and from the side, creating wind. Over large forests, these processes

[5] https://en.wikipedia.org/wiki/Biotic_pump

[6] Restoring the Oceans for CCC.docx
[7] https://en.wikipedia.org/wiki/Third_Pole
[8] https://en.wikipedia.org/wiki/Albedo

are so strong that they drive a powerful biotic pump, which draws in humid air from the oceans, bringing rains deep inland and enabling the forest to thrive thousands of kilometres away from the coast.

The condensation nuclei cause moderate rains, minimizing the potential for extreme flash floods. An intact biotic pump averts droughts by extending the rainy season while bringing moderate rains. This also increases the production of living biomass which in turn draws down carbon. Heatwaves, droughts and flash floods are avoided when the rain is created around these biological aerosols. When the rain falls on healthy soils, with thriving societies of bacteria and fungi, there is little or no erosion. Healthy soils work as sponges absorbing the water to be released slowly with some of it percolating into the aquifers, where it can be retained for a long time.

Meanwhile, the sedimentation from land-based erosion which can seriously inhibit marine vegetative growth, is reduced significantly. Phytoplankton, crustaceans, and various marine organisms play a crucial role in capturing carbon dioxide from the atmosphere. They use this carbon to create calcium carbonate, which becomes part of their carapaces and shells. Upon their demise, these calcium carbonate deposits accumulate on the ocean floor, eventually forming extensive reserves that, through geological processes, transform into the limestone mountains found on land. This metabolic activity is essential for mitigating ocean acidification. Therefore, it's imperative that we prioritize the protection and revival of ocean ecosystems as diligently as we do terrestrial ones.

The uncertainty around the climate sensitivity of CO2

1. The bandwidth of 1,5-4,5 offered by the IPCC is unworkable and long term average climate sensitivity calculations indicate a value that may even be closer to 0,7 C. Climate sensitivity in the short run is also place dependent. The relationship is likely logarithmic, so with increased temperature the interaction between water vapor and CO2 probably gives a higher climate sensitivity at higher temperatures. The rest of global heating comes from degraded cooling capacity of living biomass doing photosynthesis and driving the water cycles including cloud formation with aerosols, etc. This process does sequester a lot of atmospheric carbon. We have destroyed half of living biomass, 550 Gt since the start of agriculture. No matter what the climate sensitivity of CO2 is, the cooling capacity of water in interaction with the biosphere must be a priority as it cools by itself and sequesters a lot of carbon.

2. Short term climate sensitivity of CO2 should be measured as a localized,temporalized factor. The climate sensitivity over a wet rainforest is near zero because of the extremely low bowen ratio[9], the bowen ratio over a city or a bare field near the equator is much higher because of the Stefan Boltzmann law[10]. Once this is properly understood, restoring land to its lowest climate sensitivity makes a lot of sense.

If you are interested in more detail, please mail me at robdelaet@yahoo.com

[9] Bowen ratio - Wikipedia
[10] Stefan–Boltzmann law - Wikipedia