

House Agriculture and Natural Resources Committee, informational meeting on the topic “Role of agriculture in carbon sequestration” on May 27th.

My name is Mimi Casteel. I have been gradually implementing regenerative farming practices at my Hope Well Vineyard since 2008 when we took over an 80-acre farm where the soil had been completely degraded by decades of intensive chemical farming.

Besides setting aside a substantial portion of the total acres to conservation and restoration of habitat, we embarked on a very ambitious goal of adding 50 species to the existing cover on the vineyard floor, as well as trees and shrubs to our headlands. Our goal was to achieve a structural and species diversity of perennial and annual plants and grasses, flower and (even some vegetable) species to have close to 100 species growing year-round green.

This strategy of maximizing the diversity that grows within the vineyard system is a major tenet of my philosophy of farming. We are responsible, first and foremost, for building healthy soil. To be clear, this doesn't mean 'not losing soil'; we mean to build soil here at Hope Well. Green plants use the sugars from photosynthesis to feed the microbial life in the soil that creates structure, breaks down minerals, fixes atmospheric Nitrogen, and build complex forms of stable Carbon from CO₂, and puts it deep in the soil. **This form of Carbon sequestration is only possible when the soil is left unbroken**, or uncultivated, and a diversity of green plants are growing year round to support the microorganisms that build the stable forms of Carbon so that it can truly be sequestered, **and not lost in the cycle of decomposition and oxidation that occurs when soils are continuously disturbed.**

Photosynthesis is the most powerful tool we have to affect climate change. Every year photosynthesis on agricultural lands across the globe draws down billions of tons of CO₂, and yet in less than two centuries, the modern industrial agricultural practice of continual aggressive soil disruption has caused many of the world's most productive agricultural soils to lose between 30% and 75% of their carbon, adding billions of tons of CO₂ to the atmosphere, whilst losing their ability to store water and nutrients.

Every green plant can be a Carbon pump, but **to sequester Carbon** it must be stably fixed in the deeper strata of the soil bank. Modeling using remote sensing of global patterns of cropland use intensity suggest that **a 5% increase in global photosynthetic capacity and/or photosynthetic rate would be sufficient to counter the global CO₂ flux from the burning of fossil fuels, provided the extra carbon was sequestered in soil in a stable form.**

Conclusion:

I do not wish to paint a too pretty picture of our success at Hope Well. While we have seen a truly gratifying increase in biodiversity and resilience on our farm in just a few years, the ecological disasters of the last three vintages have clearly demonstrated that our island of diversity and recovery is not big enough to stand against the failing health of the surrounding ecosystem. True recovery can only happen on the landscape level.

There is growing evidence that before our degraded soils can begin to *permanently* sequester Carbon, Carbon cycling must be recovered. In other words, we should take this moment of opportunity to focus our efforts on restoring process and function over a hyper-focus on Carbon storage.

Thoughtful policy that invests in **regional agricultural restoration** work would potentially make HUGE strides toward restoring climate balance, with yearlong green, perennial groundcover feeding and creating healthy soils that can store billions of tons of Carbon. Incentivize photosynthesis!