

Testimony of Professor William R. Moomaw PhD on S. 43, an act to create the Vermont Regenerative Soils Program

Good Morning. I am Professor William Moomaw from Tufts University. I am a chemist who has worked on the science and policy of climate change since 1988, and I have served as a Lead Author of five Intergovernmental Panel on Climate Change reports. My research also addresses nitrogen pollution of our air and water.

I appreciate the opportunity to speak on behalf of the innovative legislation S. 43 that would create a Regenerative Soils Program. Let me first focus on the purpose of the bill and what it might achieve for Vermont, and then explain why I believe that it is important for Vermont to take the lead in this effort.

Back in the 1960s I assisted my long time friends Samuel and Elizabeth Smith to find and purchase land in Williamstown Massachusetts for their highly successful restoration of a soil depleted 19th century New England farm. Their use of regenerative methods restored carbon, and all of the nutrients required to take Caretaker Farm to a soil quality and production level that astounded the agriculture extension service in our state. Caretaker became the second Community Supported Agriculture farm in the country and currently serves the produce needs of 200 local families in northwest Massachusetts and Southwest Vermont. In recent years, I have come to know Alan Savory who developed a form of intensive rotational grazing that restored hopelessly degraded grasslands in pastures into highly productive pastures in four continents. I have visited farms in Vermont and met farmers like Jesse McDougall of Shaftsbury who is accomplishing these same productivity increases with local adaptation of these practices.

The impossible has been accomplished and facts *in the ground* demonstrate that we can halt the loss of organic carbon (humus) in our soils, reduce erosion, increase productivity and make our agricultural system more resilient to a changing climate. Furthermore as the name implies, the soils become regenerative. Instead of depleting soil quality that requires intensive chemical and mechanical treatment, these soils regenerate and increase their productive capacity each year.

The strength of the Regenerative Soils Act is that it is voluntary, but creates an incentive for farmers to act in their own interest by rewarding them with certification. Importantly, the act also specifies a scientifically rigorous process for Measuring, Verifying and Reporting on the improving quality of soils over time to maintain certification. Finally, it is an economically efficient way to increase agricultural productivity and to reduce the pollution effects associated with conventional agriculture.

Vermont is well known for the quality of its products including some of the world's best cheeses, ice cream and maple syrup. Vermont is seen not only as the Green Mountain State, but also as a "Green" state that is committed to developing in a sustainable manner so that future generations of Vermonters continue to share in the natural and social capital of this state. This additional certification adds another reason for people to favor *Vermont Made* products.

For the larger society, the benefits of these practices range from local to global. Regenerative practices reduce soil erosion that clogs rivers and streams and creates “poor farms.” From my work on nitrogen, I can verify that wide-scale adoption of regenerative soil practices will reduce the run-off of nitrogen fertilizer and other agricultural chemicals that now plague Lake Champlain and other water bodies within the state. Building soil carbon removes carbon dioxide from the atmosphere thereby reducing the main cause of global climate change.

One might ask, why Vermont should be at the forefront of an innovation like Regenerative Soils? How much difference can a small state like Vermont make on such huge global problems such as climate change?

Let me share an experience I had back in the 1970s. I went to Washington to work as a science staff member in the US Senate. The issue was stratospheric ozone depleting chemicals. Vermont and Oregon had banned the use of CFCs in spray cans, and the chemical industry wanted the national government to forbid states from making such regulatory decisions. Instead, the wisdom of Vermont’s audacious action was recognized, and the US became one of the first nations to unilaterally forbid the use of these chemicals. Ten years later an international agreement, the Montreal Protocol began a process that culminated in the complete ending of the production of all these chemicals worldwide by 2010.

Thank you, Vermont!

In 2015 in Paris, all of the nations in the world offered a set of actions to reduce the extent of future climate change. The French government introduced a separate proposal called “4 per thousand.” Four parts per thousand or 0.4% is the annual amount of carbon that if added to the world’s agricultural soils would stabilize carbon dioxide in the atmosphere while we reduce our climate altering carbon dioxide emissions from fossil fuels. See next page for further information <http://4p1000.org/understand>

Once again, Vermont can be a leader and a catalyst for making big changes that are in the interest not only of its own citizens, but can show the way globally as well.

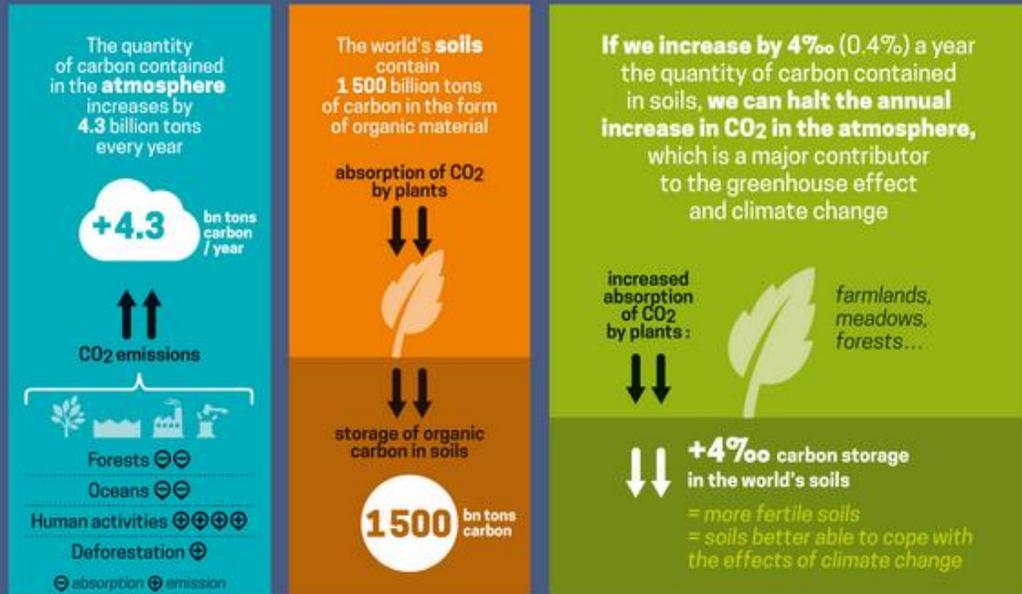
I strongly support this legislation, and congratulate Senator Brian Campion and his co-sponsors Senators Christopher Bray, Alison Clarkson, Christopher Pearson, Anthony Pollina and Dick Sears for introducing it,

Thank you for inviting me to testify on behalf of the Regenerative Soils Program Bill S.43

4 PER 1000

CARBON SEQUESTRATION IN SOILS FOR FOOD SECURITY AND THE CLIMATE

Ministère de l'Agriculture, de l'Agroalimentaire et de la Forêt



HOW CAN SOILS STORE MORE CARBON?

The more soil is covered, the richer it will be in organic material and therefore in carbon. Until now, the combat against global warming has largely focused on the protection and restoration of forests. In addition to forests, we must encourage more plant cover in all its forms.

- Never leave soil bare and work it less, for example by using no-till methods
- Introduce more intermediate crops, more row intercropping and more grass strips
- Add to the hedges at field boundaries and develop agroforestry
- Optimize pasture management – with longer grazing periods, for example
- Restore land in poor condition e.g. the world's arid and semi-arid regions

*"This international initiative can reconcile the aims of **food security** and the **combat against climate change**, and therefore engage every concerned country in COP21."*

Stéphane Le Foll, French Minister of Agriculture, Agrifood and Forestry

<http://4p1000.org/understand>