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Title: SOIL QUALITY AND CLIMATE IMPLICATIONS OF AGROECOLOGICAL PRACTICES ON VERMONT FARMS

Agriculture is one of the greatest anthropogenic threats to the environment worldwide-- its contributions to greenhouse gas emissions, loss of biodiversity, pollution and use of water, and soil erosion are immense. Meanwhile, soil fertility worldwide has decreased as a result of a range of activities including over-tillage, poor nutrient management techniques, and mono-cropping. A shift in agricultural practices has the potential to reverse these negative trends and play a positive role in climate change mitigation, production capacity, and more. Agroecology, or ecological agriculture, has been noted as one of the best strategies to reduce the impact of agriculture on the environment while simultaneously improving soil fertility and productive capacity. Agro-ecological farming practices, such as no-till, deep rooting crops, improved application of soil amendments, and organic farming, have been known to sequester carbon, a process which leads to improved nutrient retention in soil and decreased levels of atmospheric carbon. In the state of Vermont, 1,233,313 acres of land are devoted to agriculture, of which cropland constitutes 41.9%. This research uses surveys to explore the extent to which no-till agriculture, an agroecological practice, is currently in effect in cropland in Vermont. Using current estimates found in literature, it also estimates the potential for soil carbon sequestration through a shift from conventional management practices to no-till practices in Vermont.