

Managing for Better Soil Health on Long Island Farms

Overview

To enhance our understanding of soil health on farms on Long Island (LI), the New York Soil Health Initiative analyzed over 300 soil samples using the Comprehensive Assessment of Soil Health (CASH) test between 2014-2021. Agricultural production environments on LI (soils, climate, cropping systems) are distinct from the rest of New York State (NYS). These findings can support more realistic soil health goals and provide regionally tailored policies and management practice recommendations.

Background

Healthy soil is critical for the long-term productivity and sustainability of farms and is impacted by both natural and human factors. A New York Soil Health Initiative report¹ and peer-reviewed paper² found that both cropping system and soil texture impact soil health levels on farms across NYS. A more recent study highlighted the need for smaller regional-level analyses within NYS to enable farmers to compare their soil health levels to peers within similar production environments to meet realistic soil health goals³.

Suffolk County, the eastern two-thirds of LI, is home to over 550 farms and a tremendous diversity of agricultural operations that are integral to the region's identity and economy (Figure 1). Land values are higher and markets more focused on high-value specialty crops compared to the rest of NYS, while the climate is warmer, and the soils are more coarse-textured (high sand and low clay content). Despite being ideal for crop production, deep well-draining soils are more prone to nutrient and pesticide leaching, lower organic matter levels, and poor structure. Identifying and implementing practices that improve soil health is critical for protecting the environment, increasing the resiliency of farms to climate-related risks, and maintaining LI's agricultural industry.



Fig. 1. The five cropping systems analyzed in Suffolk County (n=304): woody plant nurseries, pasture and hay land, mixed vegetable, process vegetable, perennial fruit

Policy Considerations

- Long Island (LI) soils need to be regarded as distinct from soils found in other parts of NYS.. Soil health programs and goals need to be appropriate for its farms and urban areas.
- Soil and environmental programs must encourage the use of soil-building practices that are regionally appropriate for LI's warmer and more humid climate, such as cover cropping adapted to the local crops and longer growing seasons, reduced tillage and mulch-based systems.
- LI offers great opportunities for cycling organic wastes from urban and peri-urban areas to the regional farms (e.g., food and yard waste, tree cuttings, horse manure, etc.). These can be processed locally into high quality organic materials (e.g., composts, mulches, and biochar) and utilized to build soil health on farms, enhance carbon storage in soils, reduce fertilizer and pesticide use, and lessen nutrient losses to surface and groundwater.
- Policies that impact LI farmers must reflect their unique production environment challenges while considering local food needs, farm viability, and high land and labor costs.

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Results

A comprehensive report on the status of Long Island soils⁴ provides valuable insights into the regional soil health challenges and opportunities. The texture of the soil influences its ability to retain organic matter, as well as its ability to hold water and nutrients. Soils higher in silt and clay particles (fine-textured) can hold more organic matter than sandy (coarse-textured) soils. Results showed that Suffolk County soils contained up to 15% clay, while soils in the rest of NYS contained 15-30% or more clay. Not surprisingly, soils were found to have, on average, 0.8% lower organic matter levels than the rest of NYS. This difference in organic matter levels is also attributable to LI's warmer climate.

Among crops grown on LI, mixed vegetable and perennial fruit farms supported higher levels of organic matter than processing vegetable and pasture and hay land systems. Mixed vegetable, perennial fruit, and pasture farms generally supported higher soil health indicator levels than processing vegetable systems. This is likely because processing vegetables are more intensively managed (i.e., greater tillage) and do not cycle enough organic inputs (e.g., cover crops or compost) to compensate for the organic matter lost through crop harvesting and management practices (Figure 2). Woody plant nurseries showed more variable impacts likely due to crop type, age, and the necessary management practices at that time.

Soil health interpretation and goals appropriate for LI's unique production environments and peri-urban settings differ from the rest of NYS. Farms can achieve high soil health scores when certain management practices are implemented (Figure 3). Still, their ability to do so depends on many factors, including farm size (acres), time, money, equipment availability, and labor.



Fig. 2. Winter cereal rye as a cover crop. It is fall-planted for erosion and weed control, biomass production, and nitrogen scavenging.

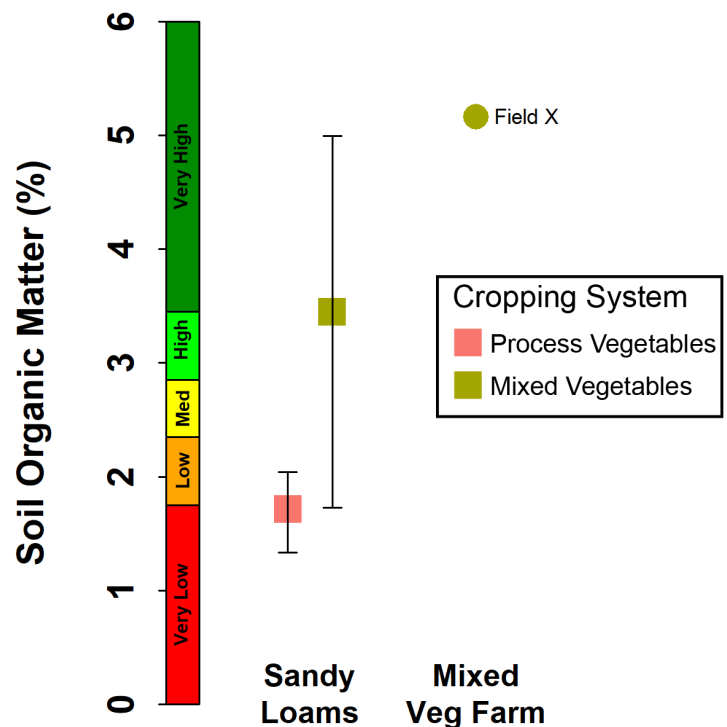


Fig. 3. Benchmarking of SOM data for processing and mixed vegetable cropping systems compared to Field X.

¹Amsili, J.P., H.M. van Es, R.R. Schindelbeck, K.S.M. Kurtz, and D.W. Wolfe, G. Barshad. 2020. *Characterization of Soil Health in New York State: Summary*. New York Soil Health Initiative. Cornell University, Ithaca, NY.

²Amsili, J. P., van Es, H. M., & Schindelbeck, R. R. 2021. *Cropping system and soil texture shape soil health outcomes and scoring functions*. *Soil Security*, 4, 100012. <https://doi.org/10.1016/j.soisec.2021.100012>

³Amsili, J.P., H.M. van Es, D.M. Aller and R.R. Schindelbeck. 2022. Empirically-based production environment soil health goals. *Soil Science Society of America Journal*. In Review.

⁴Aller, D.M., Amsili, J.P., and van Es, H.M. 2022. *Status of Soil Health on Long Island Farms*. New York Soil Health Initiative. Cornell University, Ithaca, NY.