Agricultural Fields and Soils in Connecticut

This paper summarizes an analysis of the status and trends of agricultural fields in Connecticut, and how they relate to statewide data on agricultural soils of importance.

About the Project
The University of Connecticut Center for Land Use Education and Research (CLEAR) conducts an ongoing project, “Connecticut’s Changing Landscape” (CCL), that uses remote sensing technology to chart changes in our state’s major land cover categories over time. The project now includes five dates that span 21 years, from 1985 to 2006 (Figure 1). The major categories of interest include developed land, turf and grass, forest, and agricultural fields -- a category just added to the project in its last update. This particular Research Summary focuses on this last class, and its relation to the USDA/NRCS dataset on agricultural soils of prime or high importance.

Methods
CLEAR develops moderate resolution (30 meter pixel) Landsat-derived remote sensing land cover data as the basis of the CCL project. The CCL category “agricultural field” includes lands that have spectral qualities that correspond to land in active agriculture, such as crop fields and pasture (Figure 2). Lands identified as such by CLEAR’s remote sensing methods were also checked and corrected using high resolution imagery. The CCL land cover class of agricultural fields is not to be equated with other studies referencing “agriculture” or “agricultural land,” which may include all land owned by farmers, regardless of land cover.

The analysis described here consists of a brief summary of land cover status and change data from the original CCL study, plus a comparison of that land cover data with the USDA soils data compiled by the Natural Resources Conservation Service (NRCS). The soils data is widely available and has a minimum mapping unit of three acres. We restricted our study to soils labeled as prime farmland soils or additional important farmland soils (“prime and important soils”). Definitions of these two soil categories can be found at the NRCS website (box).

For more information on these datasets, see:
- http://clear.uconn.edu/projects/landscape
Results

Agricultural Fields: Status & Trends
The CCL agricultural field class covered about 363.4 square miles, or 232,576 acres, in 2006 (below, left). This represents about 7.3% of the total area of the state. During the 21-year period from 1985 to 2006, Connecticut lost about 61.8 square miles (39,552 acres) from the agricultural field class. This loss represents about 1.2% of the total area of the state. In relative terms, by 2006 the state lost about 14.5% of the agricultural fields present in 1985. The towns with the greatest loss of agricultural field acreage were in the upper Connecticut River valley, and in the south-central part of the state (Figure 2, below right). For more complete information, please visit the CCL website.

Figure 2. Left: the “agricultural field” land cover class in 2006, shown in brown. Right: towns with the greatest loss of agricultural field acreage during the 1985 - 2006 study period are shown in darker shades. Complete data can be found at: http://clear.uconn.edu/projects/landscape

Current Status of Land Cover on Prime and Important Agricultural Soils
Prime and important agricultural soils cover about 1348 square miles, or 862,822 acres (27.1%) of Connecticut. CLEAR land cover data for these areas was tabulated for 1985 and 2006, to investigate current (2006) status and past changes to the land overlying these important soil resources.

Figure 3 (next page) shows the distribution of major land cover categories over these soils in 2006. The largest area of prime/important agricultural soils, 38%, is covered by forest. About 20% of prime/important soils are classified as agricultural fields. Thus, about 58% of Connecticut’s prime and important agricultural soils are currently “supporting” forest or farm. The two land cover categories of developed and
turf/grass together comprise about 36% of the lands with prime/important agricultural soils; these two closely associated categories are often used by CLEAR to characterize the “footprint of development.”

The land cover distribution over prime and important agricultural soils exhibits differences from the statewide distribution. Figure 4 (below) shows land cover distribution for the entire state on the left, compared to the land cover distribution over prime and important ag soil areas on the right. (Thus the right column in Figure 4 shows the same data as the pie diagram in Figure 3). As might be expected, the percentage of agricultural fields is higher on high quality agricultural soils (20.0%) than it is statewide (7.3%).

There is a slightly higher percentage of developed land, and a much higher percentage of turf/grass, on areas with high quality ag soils, as compared with the state in general. This is probably due to the fact that some of the qualities of prime and important agricultural soil (flat, well-drained) are also conducive to development. Conversely, prime and important agricultural soils have relatively much less forest cover (38.2%) than the state as a whole (59.1%).
Land Cover Change on Prime and Important Agricultural Soils

Figure 5 compares the breakdown of land cover, in acres, over prime/important agricultural soils for 1985 and 2006. During the 21-year period forest overlying prime/important agricultural soils declined by about 37,690 acres and agricultural fields declined by about 30,893 acres; taken together, these losses approximately balance the increases in the developed and turf/grass categories. Forest was by far the most common land cover overlying prime/important soils throughout the study period. However, while the second most common land cover in 1985 was agricultural fields (203,663 acres), by 2006 the second most common land cover was developed land (187,136 acres).

Summary & Conclusions

In 2006, about 20% of the land overlying prime or important agricultural soils were agricultural fields (as defined by our CLEAR land cover, see page 1). Compared to the land cover breakdown for the entire state, in 2006 the land overlying prime/important agricultural soils had relatively more agricultural fields, but less forest. Nevertheless, forest is the most prevalent land cover on these soils, covering about 38% of these lands. Thus, in 2006 about 58% of the areas designated as having prime/important agricultural soils supported forest or agricultural fields. Also compared to the land cover breakdown for the entire state, in 2006 the land overlying prime/important agricultural soils had a slightly higher percentage of developed land, and a much higher percentage of turf and grass. The fraction covered by development now exceeds the fraction covered by agricultural fields.

During the period 1985 to 2006, Connecticut lost approximately 61.8 square miles (39,552 acres) of agricultural fields. About 78% of these lost agricultural areas – 48.3 square miles (30,893 acres) -- were overlying prime or important agricultural soils. Adding the loss of forest during this period makes for a total of about 108.3 square miles (68,584 acres) of farm and forest lost in prime/important agricultural soils; this equates to about 7.9% of the total area covered by these soils.

Our findings suggest two land cover-related considerations related to farmland preservation. The first, suggested by our simple Changing Landscape land cover data (Figure 1) and in line with existing programs, relates to protection of existing farms, especially where there are
significant concentrations of agricultural fields. How one defines these “nodes” goes beyond land cover, and involves economic and agricultural considerations that are outside the scope of this study.

A second consideration is suggested by our analysis of land cover in relation to farm soils, in particular by the data demonstrating the major role played by forested land. These data suggest consideration of programs protecting areas of prime and important agricultural soils that are still covered by farm or forest (Figure 6), an approach that would focus on preservation of potential agricultural lands for future use.

Statewide and town-level data tables, maps and charts from this study are available at the website below, to assist local decision makers and interest groups in their efforts to protect agricultural resources.

This study can be found at:  
http://clear.uconn.edu/projects/ag

Connecticut’s Changing Landscape project is at:  
http://clear.uconn.edu/projects/landscape

For more on CLEAR research, training and outreach programs, please visit:  
http://clear.uconn.edu

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