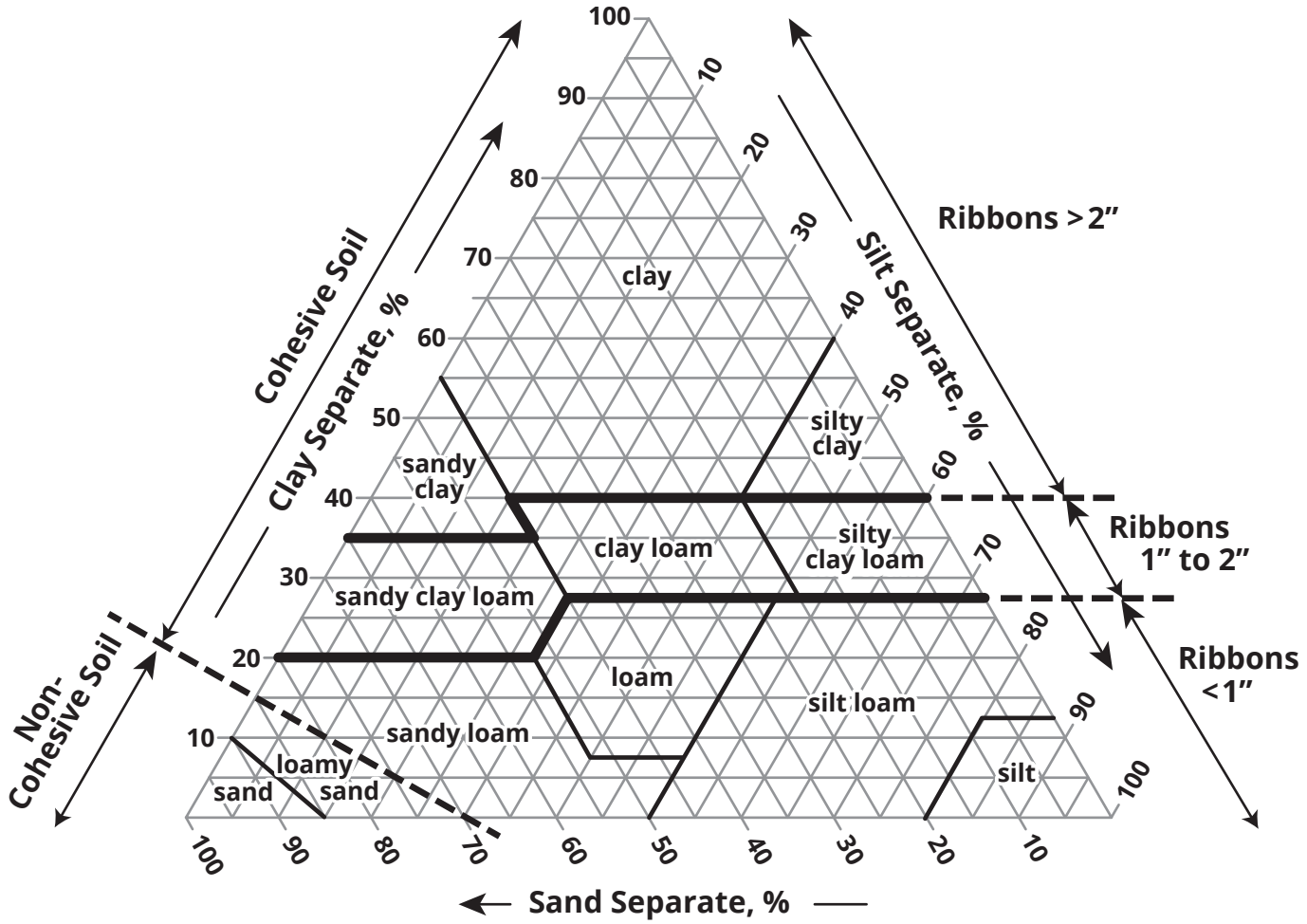
Figure 12. Soil Textural Triangle
Divided into Zones (Cohesive/ Non-Cohesive) and Ribbon Length



Source: Modified from the U.S. Department of Agriculture, 2012.

3.3 | Structure

Following soil texture, we commonly describe the structure of the soil. Soil structure is a critical parameter because the grade, size, and shape of structure can be correlated with estimated values for infiltration rate, wastewater loading rates, hydraulic conductivity, porosity, moisture retention, root penetration, and surface water runoff.

Soil structure relates to the size, shape, and degree of stability for individual soil aggregates known as peds. A ped is made up of a relatively permanent "cluster" or "grouping" of sand, silt, clay, organic material, and biological slimes and secretions which is separated from other peds by visible near-vertical planar spaces. The width of peds is usually on the order of inches or less.

A clod or soil fragment resembles a ped but is either formed naturally by frost action or artificially by agriculture, especially plowing, resulting in a shallow, near-surface feature measured in inches deep in contrast to the ped, typically around six feet deep.

There may be an interesting parallel in this structural feature between a body of soil and a body of rock although at different scales. A body of rock is often broken up by near vertical planar fractures known as joints with a typical separation of tens of feet. The vertical joints tend to form at nearly right angles to one another, resulting in roughly square blocks of rock tens of feet on a side.

The joints, however, gradually disappear with depth, usually on the order of tens of feet. The rooted block of rock (not given a name in geology), bounded on the sides by vertical planar fractures (the joints), is analogous to the much, much smaller ped whose vertical boundaries, not given a name in soil science, are equivalent to the joints in the rock body.

In both cases, such vertical separations are very important in the vertical movement of water through the rock or soil body which usually happens much faster through the separations than through the ped or rock block itself. In soil science, the spaces between the peds create a macroporosity in contrast to the microporosity between the soil particles in the ped itself.

Soil horizons that do not have peds are considered soils that lack structure, i.e., structureless and the grade of the structure uses a short-hand notation of zero (0). For these conditions, the two primary structureless conditions are single grain and massive.

In summary, there are three general soil structural groups: Natural Soil Structural