K-STATE Research and Extension
Department of Agronomy MF2852 Soil Judging

Estimating Soil Texture By Feel

The word *texture* describes the roughness or smoothness of an object. Soil texture is determined by feeling the soil.

- **Soil texture** is the proportion of sand, silt, and clay in the soil.
- **Soil texture** is considered by most soil scientists to be the single most important soil property.
- **Soil texture** affects many land uses and cannot be changed without great cost and effort.

Sand, the largest particle of the soil, is visible to the eye. It is gritty, holds little water, and is not slick or sticky when wet. Sand particles are between 2 and 0.05 millimeters in diameter.

Medium-sized soil particles are called **silt**. Silt feels like flour or talcum powder. It holds moderate amounts of water and has a somewhat sticky feel when wet. Silt particles are between 0.05 and 0.002 millimeters in diameter.

The smallest particles of soil are called **clay**. Most individual clay particles can only be seen with a powerful microscope. Clay feels sticky when wet, and hard when dry. Clay is more chemically active than sand and silt. Clay particles are less than 0.002 millimeters in diameter.

How to determine soil texture by feel

Laboratory analyses of soil texture are costly and take time, while feeling soil texture by hand is quick, free, and, with practice, highly accurate. The two basic steps in the texture by feel method are shown in figures 1 and 2.

After completing these two steps, and following the flow chart diagram, determine the soil textural class for your soil sample. The textural triangle organizes the textures into 12 classes. Notice that the loam textures are toward the middle of the diagram, because they contain a significant amount of sand, silt, *and* clay.

The term coarse-textured is often used for soils that are dominated by sand. Fine-textured refers to soils that are dominated by clay, and medium-textured soils are a more balanced mixture of sand, silt, and clay particles.

Why is soil texture important?

Soil texture is one of the most important properties to know how to measure, as it affects many other chemical, physical, and biological soil processes and properties such as the available water-holding capacity, water movement though the soil, soil strength, how easily pollutants can leach into groundwater, and the natural soil fertility.

Figure 1. *Step 1: Take a handful of soil and break it up in your hand. Add water, and knead the mixture into a ball. The mixture should have the consistency of putty or Play-Doh®. Press the ball of soil between your thumb and forefinger, and try to make a ribbon. See how long you can make the ribbon before it breaks. Measure the ribbon length. Remember, there are 2.5 centimeters in 1 inch.*

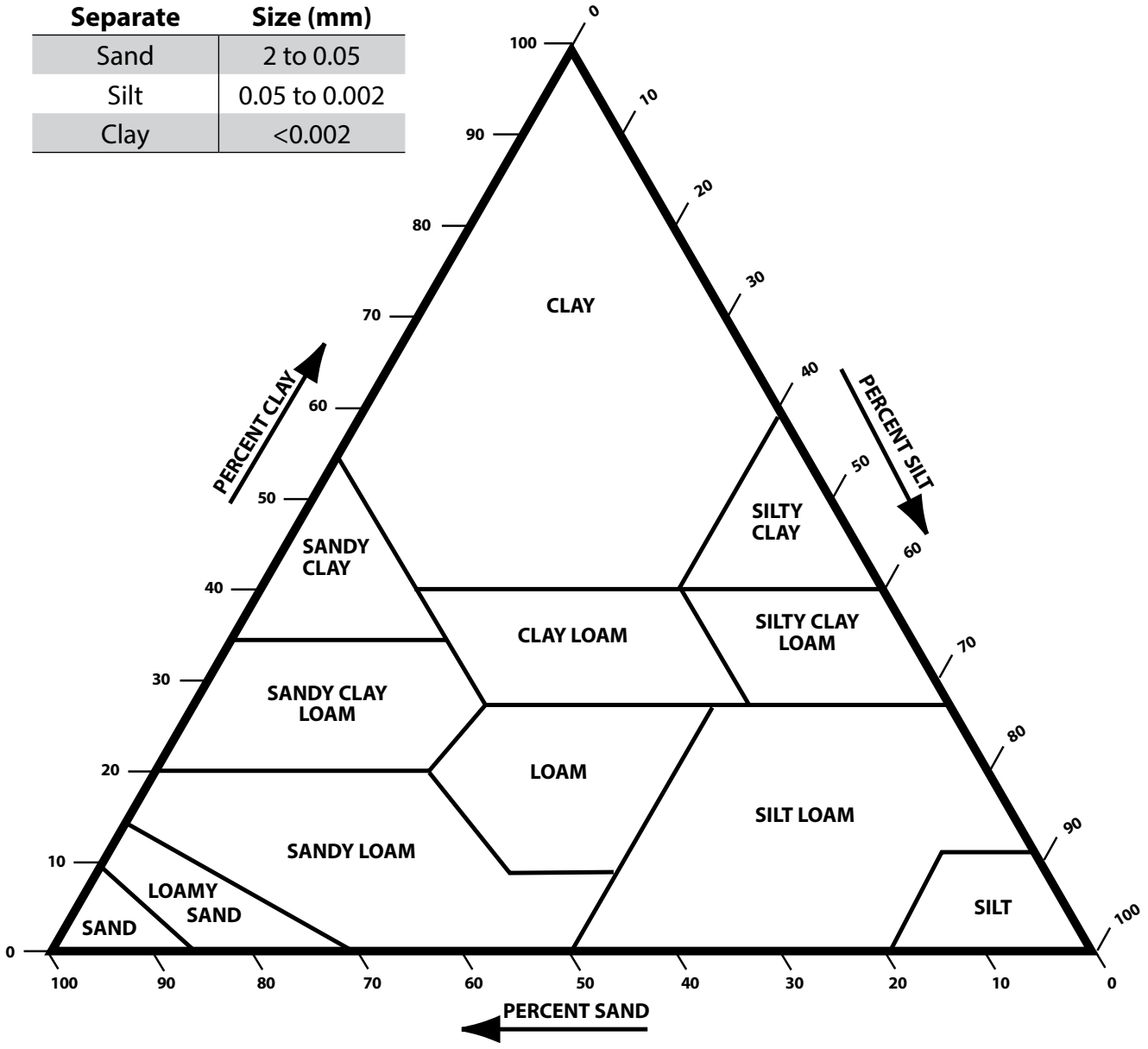
Figure 2. *Step 2: Take a pinch of soil from your texture ball. Place it in the palm of your hand, and add water. Rub the soil and make a muddy puddle in your palm. How gritty does this feel?*

Soil Properties Related to Texture

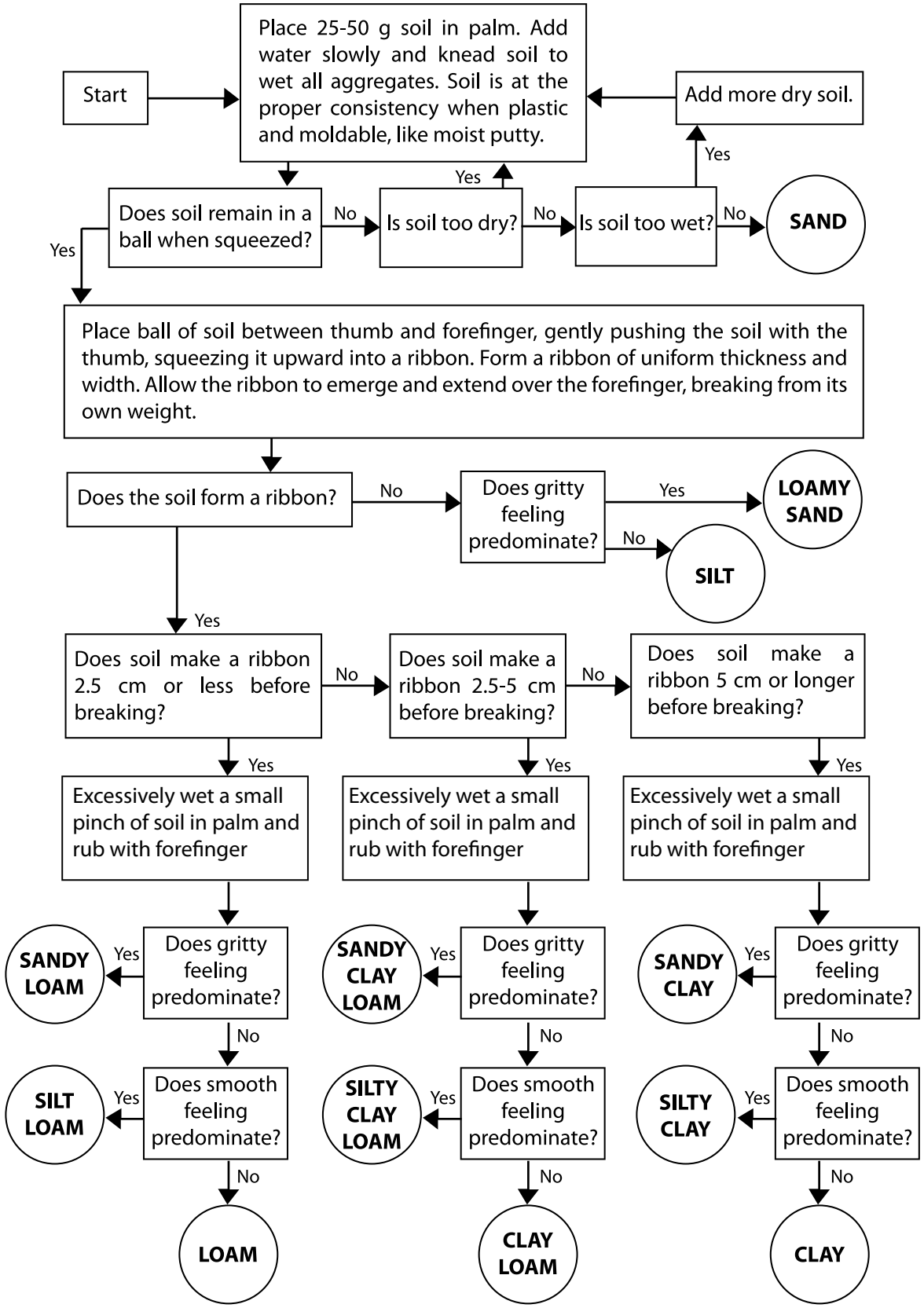
	Coarse	Medium	Fine
Water storage	Low	Medium	High
Water movement	Low	Medium	High
Power needed for digging or tillage	Low	Medium	High
Wind or water erosion (Ease of particle detachment)	High	Medium	Low
Wind or water erosion (Ease of transport)	Low	Medium	High
Plant nutrient storage	Low	Medium	High
Contaminant movement	High	Medium	Low

Soil Textural Classes

Separate	Size (mm)
Sand	2 to 0.05
Silt	0.05 to 0.002
Clay	<0.002



Procedure for Analyzing Soil Texture by Feel



References

S.J. Thien. 1979. *A flow diagram for teaching texture-by-feel analysis*. Journal of Agronomic Education 8:54-55.

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