Soil bulk density $D_b$ is the ratio of the mass to the bulk or macroscopic volume of soil particles plus pore spaces in a sample. The mass is determined after drying to constant weight at 105°C., and the volume is that of the sample as taken in the field.

Bulk density is a widely used value. It is needed for converting water percentage by weight to content by volume, for calculating porosity when the particle density is known, and for estimating the weight of a volume of soil too large to weigh conveniently, such as the weight of a furrow slice, or an acre-foot.

Bulk density is not an invariant quantity for a given soil. It varies with structural condition of the soil, particularly that related to packing. For this reason it is often used as a measure of soil structure.

The clod method, core method, and excavation method consist essentially of drying and weighing a known volume of soil. These methods differ principally in the way the sample of soil is obtained. A different principle is employed with the radiation method. Transmitted or scattered gamma radiation is measured; and, with suitable calibration, the density of the combined liquid-solid components of a soil mass is determined. Correction is then necessary to remove the component of density attributable to liquid that is present. The radiation method is an in situ method.

Clod and core methods have been used for many years. Excavation methods were developed in recent years, chiefly by soil engineers. Radiation methods are relatively new, having been developed since 1950.

In most agricultural soils work, bulk density is expressed in grams per cubic centimeter (g. cm.$^{-3}$). In these units volume weight is equal, and bulk specific gravity (or apparent specific gravity) is nearly equal, numerically, to bulk density. The term bulk density is preferred over the terms