Measurement of Tree Diameter

DBH(diameter at breast height) is defined as the tree diameter mesured at 1.37 m (4.5 ft) above groundline on the uphill side of the tree. Diagrams on the backside of this page demonstrate how to measure trees with irregularities:

Examples 1 and 2 show DBH being measured using standard procedures.

Example 3 shows how to measure a leaning tree.

Example 4 shows how to measure a tree forked at or above DBH (1.37 m / 4.5 ft).

> If the fork is at DBH, measure just below the fork. If above DBH, measure at normal DBH. Although this is the official definition of DBH, for determination of volume when the fork is close to DBH, the two forks are sometimes considered as two separate trees and DBH and height are estimated for each fork.

Example 5 shows how to measure a tree forked below DBH (1.37 m / 4.5 ft)- as two separate trees.

> DBH is measured on each fork, 1 m above the base of the fork.

Example 6 shows how to measure DBH of a tree with a deformed bole at DBH (1.37 m / 4.5 ft).

> A deformity may be caused by knots, turpentine scars, fire scars, etc. If the deformity is large and extends beyond your reach, estimate DBH at the nearest point above the deformity.

Example 7 shows how to measure a bottleneck tree - for example, a tupelo or cypress that is growing in a wet area.

How to use a caliper

Tree calipers directly measure tree diameter. Calipers are held at **DBH** (1.37 m / 4.5 ft) on the uphill side of the tree. The arms of the caliper are placed on either side of the tree trunk, perpendicular to the sides of the tree, and the diameter between the two arms can be read from the scale (either in centimeters and $1/10^{th}$ of centimeters, or inches and $1/10^{th}$ of inches). The calipers must be held at the same angle of lean of the tree, if lean is present.

Two measurements, at right angles to each other, should be observed on each tree. The first measurement is usually the largest diameter for non-circular trees, followed by the measurement made at right angles to the first. The arithmetic or geometric mean is taken of the two measurements and recorded as DBH.

How to use a diameter tape (D-tape)

The D-tape indirectly measures DBH. It measures the circumference of the tree, and has gradations in units of diameter (cm or in), obtained by dividing the circumference by 3.14 (pi). *(If you do not have a diameter tape you can measure the circumference of the tree with an ordinary measuring tape and convert it to diameter by dividing by pi.)*

The loose end of the D-tape is "slung" around the tree by the right hand and caught by the left hand. The tape is pulled straight and taut around the tree. *(Make certain that the tape is pulled straight and level, and does not angle or "wander" around the stem.)* The right end of the tape is crossed over the left end, and the DBH of the tree is read along the bottom edge of the tape where they cross at the 0-line.

Some D-tapes have a curved hook attached to the end, which can be fastened to the tree. This is especially helpful for VERY LARGE trees that are too big to easily wrap the tape around the stem.
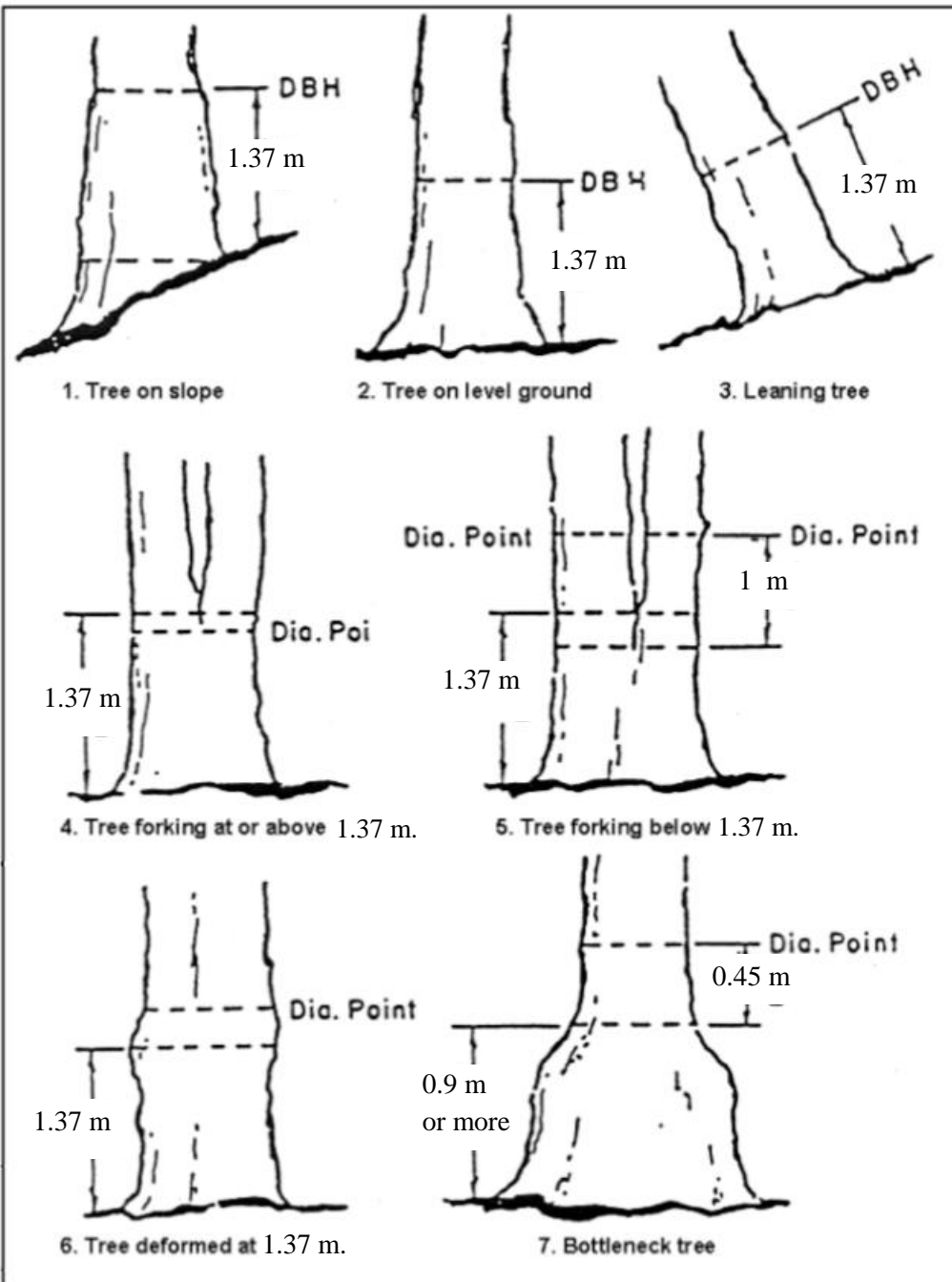
Figure 1: Measuring dbh on irregular trees. 1.37 m = 4.5 ft; (Modified from U.S. Forest Service)

Note: It is very important for biomass and carbon sequestration estimates that DBH is measured at a consistent height on the stem. Accurate height measurement may be facilitated by marking DBH on the stem with lead free paint or survey crayons, or by using a physical guide. See "EREN PFPP Complete Protocol" for some methods of ensuring repeatable DBH measurements.