How to Construct a Half-Moon Berm

WHAT IS IT?

Half-moons are berms in the shape of a semi-circle used to capture and retain water and nutrients so they can be used by newly planted trees or existing trees.

Half-moons are also known as 'boomerang' or 'smile' berms because of their shape, while in Francophone areas they are known as demi-lunes. Half-moons are generally 1–3 m in width when used in the household. The end tips of the half-moon are located along the contour of the slope, pointing uphill to receive the water flowing downhill. The area within the half-moon, and the berm itself, is often amended with compost, manure, or another soil amendment and the berm can be planted with annual or perennial crops. Half-moons can be placed in a 'net' or 'triangle' pattern across the landscape to catch overflow water as it continues down the slope.

WHY DO WE DO IT?

Half-moon berms catch water and nutrients as they move down a landscape and boost the health of the trees they surround. Healthy trees can provide fruit, building materials, fodder, green manure, and shade to a household, in addition to stabilizing the soil for a healthier landscape. Half-moon berms also provide additional growing areas for annual or perennial crops.

TERMS USED

A-frame: A tool used to identify the contour of the land. Often used by smallholder farmers from materials found within their local community.

Contour: The contour of the land refers to the points within the landscape that are all at an equal elevation. An A-frame can be used to mark these points and join them into a line, which can be used to dig a water harvesting structure that is "on contour". By being on contour, the water is encouraged to infiltrate into the soils rather than running downslope.

Half-moon berm: A half-moon berm is a curved berm that is placed on the downslope side of a tree, or other plant, to trap water and nutrients as they move downslope. Also called a smile berm or demi-lune in French.

Peg: To mark the points of the land that form a contour line with an object, such as a stick or flag.

Waterline: The waterline is the maximum height within the berm that water will reach before it overflows through its designated spillway. The waterline is found by marking the contour that is at the height of the spillway on the inside of the berm. Measuring the waterline ensures that the water will flow through the spillway as intended rather than through a depression in the berm or an uncapped end.

HOW TO

Construct a Half-Moon Berm

METHOD

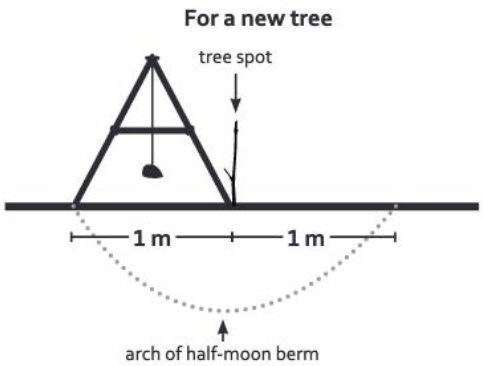
STEP 1
Determine where to locate the half-moon. Half-moons can be used to support existing trees or newly planted trees. Check to make sure there is enough space around an existing tree to construct a half-moon that follows the existing crown of the tree. For new trees, half-moons are approximately 2-3 m from tip to tip and 0.5 to 1.5 m from the tree hole to the lowest downslope part of the berm.

STEP 2
Use an A-frame to find the tips of the half-moon.

For a new tree: Mark the spot where the tree hole will be. Use an A-frame to find a contour line. Measure one meter out from the tree hole on either side to determine where the two tips of the half-moon should be.

For an existing tree: The tips of the half-moon are located at the outer point of the tree crown. Identify a point on one side of the tree crown that is approximately in line with the tree. Use the A-frame to find another point on the opposite side of the crown and mark that place as the other tip of the half-moon.

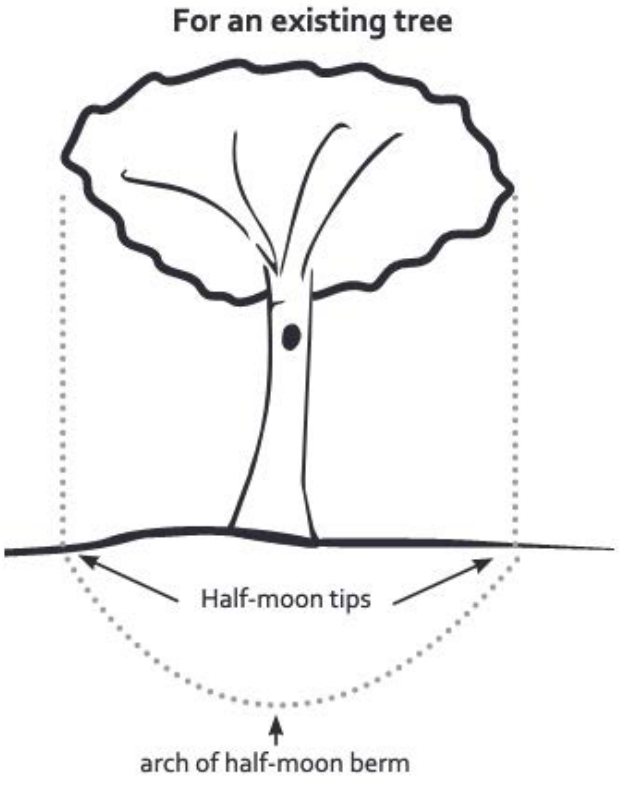
MARKING THE HALF-MOON BERM



STEP 3
Mark the arch of the half-moon.

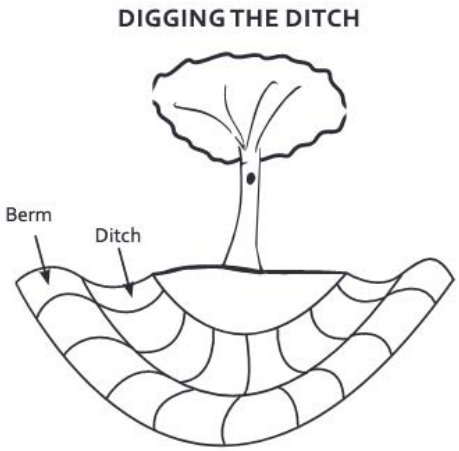
For a new tree: Once the tips are located, use the A-frame to mark the arch by placing one leg of the A-frame at the tree hole then scratch an arch in the soil from one marked tip to the other.

For an existing tree: Scratch the arch between the two tips along the approximate edge of the crown. For trees that have been pruned, extend the berm beyond the crown as needed to create an adequate catchment.



STEP 4
Dig a ditch on the upslope side of the marked arch, using the marked line as a guide. Use the excavated soil to create a berm. Dig deeper at the lowest downslope part of the excavation to ensure the berm is higher than the waterline.

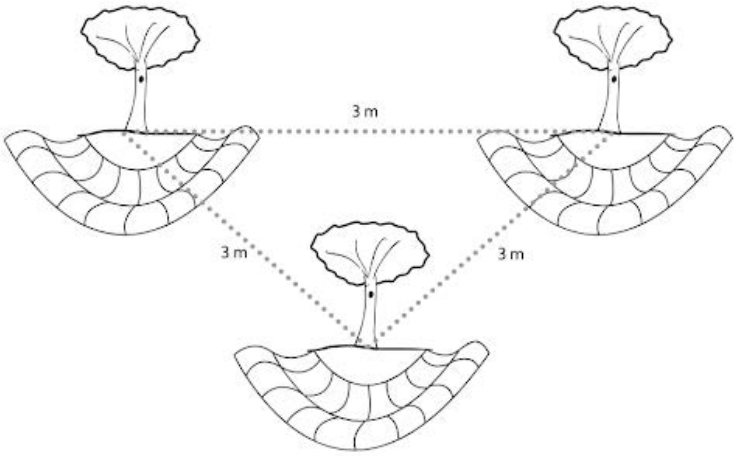
STEP 5
Ensure the sides of the berm are well rounded. Use a small A-frame to find the waterline to make sure the berm is high enough to retain water. Start by placing a peg at the upslope point where the tip of the half-moon meets the native soil. This is the place where water will "spill" when the structure is full of water. Create the waterline by marking the contour along the inner side of the berm, pegging as you go. Ensure the berm has a minimum of 15 cm height above the waterline. Since the tips of the half-moon berm are on the same contour, they should both spill evenly in high water events. If you desire to have the spilling of water only from one side, add more to the berm on one edge to bring the tip higher than the contour of the desired spillway.



STEP 6
Dig the tree hole. In dry climates, place the tree hole below the contour line between the tips. In wet climates, place the tree hole above the contour line. Dig the tree hole at least 30 cm in diameter and 30 cm deep. Place the excavated soil downslope to create a small half-moon berm right at the edge of the tree hole to support the tree's early growth. Leave the upslope area open to allow for water and nutrients to flow into the half-moon berm. Loosen the next 30 cm of soil in the hole for a total of 60 cm depth of un-compacted soil.

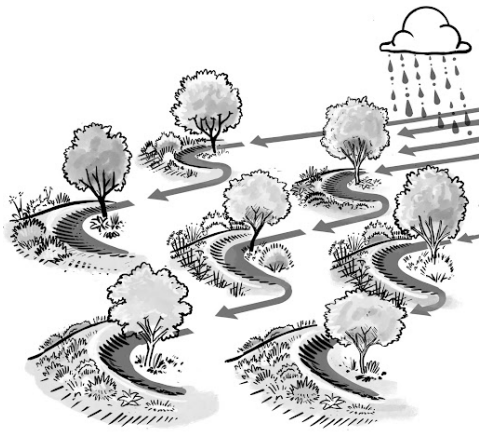
STEP 7

Amend, plant, and mulch the half-moon. Add a diversity of soil amendments (at least several large handfuls) to the lower 30 cm of loosened soil. These amendments can include diverse animal manures, leaves, charcoal dust, crushed bone, and other chopped organic plant matter. Make sure the soil is sufficiently moist, then seed and/or plant seedlings on the berm. The berm can be planted with a variety of fodder or vegetables. Pumpkins are a good ground cover that can be integrated by planting along the inner waterline of the berm. It is important that the berm is planted to ensure its long-term structural integrity. Mulch the berm and around the tree, taking care to not place mulch directly on the tree trunk as mulching materials may rot the tree base. Mulch materials can include animal manures, cut branches, leaves, grasses, sticks, other organic matter, or stones.



STEP 8

When doing multiple half-moon berm structures, pattern them in a net or triangle pattern. For a 1.5 m wide half-moon, space the tree holes 3 m apart. Tie three pieces of string together to make a triangle. Have three people each hold a knot and stretch the string into a triangle to determine the approximate location of each tree hole. Mark each hole. This works well for marking out larger numbers of structures over a broad area, however it is also possible to pace out the triangle by foot.



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