HOW TO

Harvest Water With Microcatchments

By Dan Howell

Some form of microcatchments (net and pan) have been in use for several thousands of years. Today, they are used in numerous countries to produce fruit, grain and fodder. Using microcatchment designs and other water harvesting techniques assists the reforestation of arid and semi-arid lands, holds great potential to increase biomass and productivity, and enhances wildlife habitat.

The operating principles at work in microcatchments are a refinement of runoff agriculture in general. Instead of several acres, the catchment size is only several hundred square feet and can be left unaltered, altered (vegetation removed, ground packed), or chemically treated (plastic, asphalt or other). Presently, our catchment areas are unaltered.

In determining the optimum size of catchment in relation to the cultivated area, there are many variables to consider. The formulas we have worked with assume an unaltered catchment which would yield 10% of rain as runoff, but it does depend on vegetation and soil characteristics. To provide water for a tree which requires 30" minimum precipitation in an area of 15" average precipitation, the deficit of 15" must be met. At a 10% yield (or 1.5" runoff) per 100 square feet of catchment size, it would require a catchment of 1,000 square feet to yield adequate water. Ours average 1,200 square feet per tree. (See diagram.)

To correct problems noted in The Negev: The Challenge of a Desert, I excavated dirt and transported it by wheelbarrow a short distance and laid it down in lines, these divisions (berms) being built up on top of undisturbed earth instead of using trenches. The growing area is located at the lowest point of each catchment.

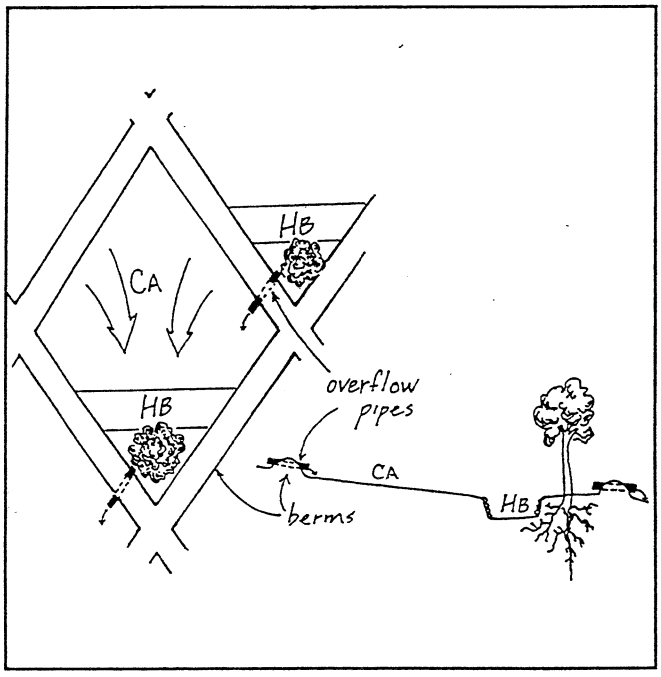
Overflow pipes (rock spillways could be used) were installed to allow excess water to escape and bring additional water to lower catchment areas. It is important to facilitate the exit of excess runoff to protect the berms. Spillways or pipes would be placed two or three inches higher than the growing plot.

Immediately up slope from the growing area, a holding basin is dug. It should be large enough to contain the runoff expected from an average flood event and water sufficient to wet the entire root area. Use this dirt to build up the berm around the planting area or to fill the garden plot.

As yet, we have used microcatchments only for fruit trees and grape vines. When first planted, we gave them two gallons of water a week until the first flood and have not watered them since. The trees show normal growth after seven years and have produced fruit. The grapes failed for an unknown reason and will be replanted next spring.

A few advantages of microcatchments:

1. They yield more water per square foot of catchment size than larger watersheds.
2. They do not need channels, conduits or terrace walls.
3. They can be built on almost any slope, including nearly flat terrain.
4. They help control erosion.
5. They allow runoff to be stored in the ground safe from evaporation.
6. They help flush salts from the soil.



Formula for Microcatchment Design:

$$CA = \frac{R - P}{P\ (E)}\ T$$

CA = catchment area

R = water requirement - This can be determined by the average annual precipitation at the plant's center of origin or where this plant can be grown without irrigation.

P = average annual precipitation - Use on-site records, 10 year average.

E = efficiency of water runoff - (I feel it's best to stay on the conservative side here. The Negev reports values as high as 62%. Our unaltered catchment areas yielded 14%. On-site observation is the best rule to follow.)

T = plant type - use 50 for small plants, vines, shrubs; 100 for medium plants, apricots, almonds; 150 for large plants, walnuts, apples.

HB = holding basin - For size, convert value to T to cubic feet.