

The Overstory

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The Overstory

#17

Microcatchment

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Contents:

- ~~ Microcatchment: Making the Most of Limited Rainfall ~~
- ~~ Further Reading ~~
- ~~ Web Links for Microcatchment ~~
- ~~ How to Contact Us ~~

~~ Microcatchment: Making the Most of Limited Rainfall ~~

Establishing tree plantings in dry climates presents great challenges. Infrequent rains are often too little to soak deeply into the soil. On the other extreme, occasional rainstorms generate rapid run-off, with little water absorbed by the soil. This run-off can cause erosion and other problems downslope.

Rather than resorting to expensive irrigation systems or earthworks (which may not be economically feasible) we can use nature's own models for sheltering and establishing new vegetation in dry climates. In nature, new vegetation often first takes hold in pits, cracks, crevasses, and at the base of large rocks. These special areas act as small catchments, collecting rainfall and allowing it to soak into the ground. These are natural "microcatchments." Small amounts of rainfall which otherwise would not soak deeply enough into the ground to help plants, trickle to the bottom of microcatchments and can contribute significantly to soil

moisture.

By constructing low-cost microcatchments, each tree can be given an improved chance to survive--and hopefully thrive--in dry conditions. Through simple adaptation of natural models, your planting area can be designed to harvest the limited rainfall and store water in the ground right where the plants are growing.

Microcatchments benefit plants in other ways. First, they provide small seedlings with much needed shelter from sun, heat, and desiccating winds. Second, they "catch" more than just water—they also collect small particles of dust, soil and organic matter carried by wind or water. In so doing, the base of the microcatchment becomes a relatively fertile spot in an otherwise unfertile area.

The matter that collects in microcatchments works to increase the ability of the soil to hold onto water, like a sponge. As the soil holds more water, it can sustain plants longer between rains.

Based on nature's model of establishing vegetation in microcatchments, people have designed and constructed simple, low cost microcatchments for use in arid climates. There are many examples such as the "net and pan" (Kenya), Zai holes (Burkina Faso), and mulch pits (Pacific islands) all of which use the same basic concepts:

- 1) A physical structure made of soil or rocks such as furrows, ditches, pits or a combination of these, occupying an area of 0.25-3 square meters. This structure acts as a microcatchment, collecting water and sediments.
- 2) A small collection area where the microcatchment funnels rainfall, soil particles and organic matter to one plant.

There are many clever designs for microcatchments described in the references listed below. The technique is especially useful on sloping lands, where rapid run-off and erosion make plant establishment very challenging.

In an adaptation of the principle, mulch can be added to the base of the microcatchment which accelerates the process of soil improvement and helps retain soil moisture. Such systems can rapidly revegetate parched lands without large earthworks or irrigation systems. A sheet of roof iron or cardboard can also be used to cover the ground and funnel water to plants.

~~ Further Reading ~~

D. Rockeleau, et al. Agroforestry in Dryland Africa. 1988. ICRAF, P.O. Box 30677, Nairobi, Kenya.

R. Morrow, Earth User's Guide to Permaculture. 1993. Kangaroo Press.

B. Lancaster, "The Man Who Farms Water," Permaculture International Journal No. 60.

Meitzner and Price, AMARANTH TO ZAI HOLES: Ideas for growing Food Under Difficult Conditions ECHO, 17430 Durrance Road, North Fort Myers FL 33917-2239, USA, Telephone: (941) 543-3246, Fax: (941) 543-5317, Email: echo@echonet.org, Web site: [<http://www.echonet.org>](http://www.echonet.org)

~~ Web Links for Microcatchment ~~

ECHO: Amaranth to Zai Holes: Dryland techniques and mulches
<http://www.echonet.org/azillus/azch5dry.htm>

ECHO: Amaranth to Zai Holes: Arid region farming primer
<http://www.echonet.org/azillus/azch7ari.htm>

~~ Publisher Notes ~~

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