Water Harvesting

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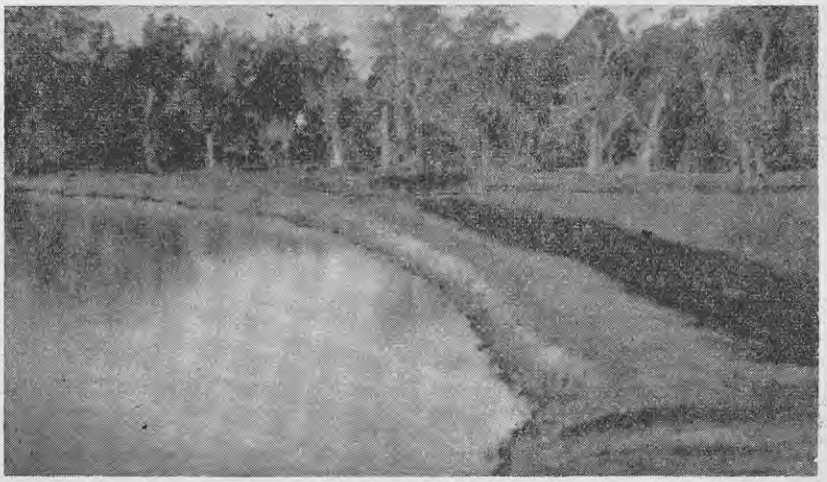
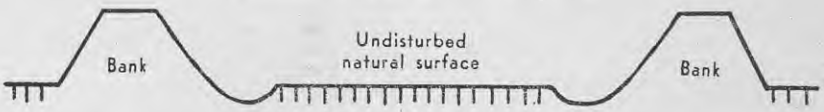
AT the McGarvie Smith Animal Husbandry Farm (University of Sydney), the officer in charge, Mr. H. J. Geddes, has developed a project which he terms "water harvesting". This is a method that could have wide application both in Australia and New Zealand in many districts where the seasonal distribution of rainfall is erratic and where droughts are a major factor limiting production. This article is based on data supplied by Mr. Geddes during an inspection of the farm by the author.



A "turkey nest tank" nearly filled at the McGarvie Smith Animal Husbandry Farm of the University of Sydney. The creek from which the water was pumped to fill the dam runs among the trees in the background.

Cross-section of a turkey nest tank.



THE animal husbandry farm at Badgery Creek is some 25 miles inland from Sydney and has an average yearly rainfall of 25in. However, the seasonal and yearly variation of this rainfall is very great. In 1954, for instance, there was a drought of 8 months. Normally two heavy falls of rain occur each year, but they may come at any time. Such erratic distribution of rainfall has meant that any temporary success with pasture improvement has been lost during dry spells, when the sward reverts to poor native species.

The soil type is a rather infertile heavy clay, derived from shale, which responds to phosphate and molybdenum. However, this type of soil, being rather impermeable to water, is ideal for the construction of water-holding dams.

It was clear in the early stages of this project that the key to improvement of the country was irrigation, but the difficulty was the supply of water. Bore water was far below the surface and was brackish. Two creeks on the property ran for only a few days during storms and then carried so much water that costly concrete weirs would be required to dam them.

Under these circumstances Mr. Geddes conceived the idea of using run-off water for irrigation. The first dam constructed had a capacity of 6 million gallons. It cost £A250, or £A11 5s. per acre-foot. Other dams have cost slightly more, but much depends on the natural contour of the country. Dams are constructed in natural catchments and are fed by surface run-off water from such catchments and by water collected from adjacent slopes by contour ditches. A series of dams is constructed at suitable sites down these catchments so that the overflow from each is collected by lower dams.

Water from a creek that runs about twice a year has been saved by so-called "turkey nest tanks". These are built on flat ground near the creek and are filled by water pumped from the creek when it is in flood. Each tank consists of a circular earth wall built above ground by spoil obtained from immediately within the tank. The centre is not disturbed. The diagram above shows the method of construction.

A clay subsoil is necessary for these tanks. The surface soil is removed both from the base of the bank and from the area used to form the bank. Clay is built on clay. The surface soil can be built to "face" the outside of the bank after construction. Shallow tanks store water cheaper than deep ones, but a certain minimum depth is needed. Mr. Geddes considers the minimum capacity to be 5 million gallons.

The larger these tanks are the cheaper is the cost of water storage. One of the dams at Badgery Creek holds 8½ million gallons of water for an excavation of only 8000 cubic yards.

Part of the animal husbandry farm, showing a dam which was recently constructed for harvesting water for irrigation. The only earthwork required was the bank in front of the trees.