WATER CONSERVATION ON STEEP SLOPES

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MY problem was to underplant a field of 60-year old palms, planted on the square 41 to the acre, on a steep and irregular hillside. The slopes range from about 1 in 3 near the top down to 1 in 12 at the bottom of the hill.

On such steep slopes, the run-off of rain water can be considerable sometimes reaching as much as 90 per cent. where the slope is greatest and I am informed that, with an annual rainfall of about 100 inches, probably much less than 30 inches actually penetrates down into the subsoil. As water is the most important requirement of the coconut palm, this alone could be sufficient to explain the poor yields and small nuts, and the yellow and desiccated appearance of palms, growing on uncontoured hillsides even where the rainfall is quite heavy and apparently more than adequate. There is also the associated factor of soil erosion. Near the top of a hill, this is mostly sheet erosion, but lower down the surface waters carrying away any loose topsoil gather first into rivulets and then into swift-running streams which cut deep into the hillsides, carve out gullies, ravines, and gorges, and in doing so under-mine the palms and destroy the layout and orderly appearance of an estate.

Under such conditions, it seemed to me that the retention on the land of the whole of the rain was the most important factor to be considered. I accordingly decided to adopt the system of lock and spill drains and to plant my young seedlings on reverse-slope platforms. Furthermore, in view of the intricate system of drains and the previous wide-planting and in order to obtain a stand of 65 palms per acre, planting on the contour and regardless of the position of the existing palms was indicated. These old palms will be removed in due course when the new palms are sufficiently developed.

First of all, a base line, following the contour, was marked out with pegs inserted at 26-foot intervals, using a road tracer. Then pegs were inserted in lines at right angles to these base line pegs, so giving a succession of parallel lines of pegs, at intervals of 26 feet up the slope and the same distance along each contour.

Planting holes, each $3\frac{1}{2}$ ft. $\times 3\frac{1}{2}$ ft. $\times 3\frac{1}{2}$ ft., were dug at each peg and filled with husk and topsoil; a selected seedling was planted in each hole and surface-mulched with husks in the approved manner. In addition, a reverse-slope platform was constructed by cutting into the hillside and using the excavated subsoil to form the outer-edge of the platform. The resulting platforms each measured 11 ft. $\times$ 7 ft. and were sloped back into the hillside about 1 in 12.

Lock and spill drains, with an average slope of about 1 in 80 were spaced at intervals of 52 feet and the excavated earth was made into a level bund *on the lower side* of each drain.

This system of parallel horizontal or cross-drains (Marrapakarns) delivers into a number of parallel vertical drains or leaders (Nettykarns) which mostly follow the course of natural channels straight down the hillside. These are intended to take off any surplus storm water which the lock and spill drains might be unable to hold back. Check-dams and rock steps are to be fitted, if they are later found to be necessary, to prevent gullying.

After planting 1,777 seedlings in this fashion at 65 to the acre, the work was completed at a cost of approximately Rs. 225 per acre (Mid 1950 wage levels).

Three weeks later, a very heavy downpour—4.87 inches of rain in one afternoon,—tested the system. There was no spill from any plant platform or a break-through of any bund; there was also practically no overflow from the cross-drains into the leaders.

This field had thus received the whole benefit of the rainfall for the first time in its history.

CONTOUR PLANTING

LOCK AND SPILL DRAIN

REVERSE-SLOPE PLATFORM