WATER CONSERVATION IN COCONUT AND RUBBER CROPS

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EVEN in the driest parts of Ceylon, there is very little wind erosion and it is only around Mannar that one sees sand dunes forming. This does not mean that the wind does no damage. On the contrary the desiccation of exposed soil by wind action is one of the main factors in bringing about drought conditions in a land with a minimum annual rainfall of 70 inches This emphasises the need for preserving and encouraging a suitable ground cover, particularly in the north country which has a single monsoon and a long period of summer drought which seriously affects the output of all plantation crops. The aim of planters should be to catch as much as possible of the rainfall and store it underground where the tree roots can reach it after the surface supplies have dried up.

Where old crops of trees or palms already exist on the ground this water catching can best be done for each individual tree by digging a short length of pit or trench immediately uphill from the tree and a good 10 feet away from it. The trench need not be a long one but should be as deep as the soil allows and should be kept dead on the contour, the earth dug out being used to pack the lower rim of the pit or to build up a saucer-shaped platform around the tree itself. Shallow leader drains should be run slightly uphill from the pit ends far enough out to ensure that each pit system overlaps with its neighbours, and giving no free passage for down hill run-off between the rows of trees.

Where the problem is of replanting, the opportunity of bare ground should be taken to dig continuous contour shelves. These need only be 3-4 feet wide but should be truly on the contour. The distance apart of shelves should be the smaller dimension for planting, not the larger one. For instance, spacing rubber at 15 × 20 or 18 × 24, the plants on a shelf should be 20 or 24 feet apart and the distance down hill to the next shelf should be 15 or 18 feet. The shelf should be back-sloped into the hill.

The northern half of the Island has a rainfall of two kinds, namely a north-east monsoon bringing rain October to January, and a much less reliable scattering of showers in the remaining eight months due to what the climatologists call "instability rainfall" depending upon local storms outside the north-east monsoon period. The monsoon cannot be much affected by what type of land it passes over, but "instability rainfall" can be altered and interfered with by change

in the plant cover. Indications are that desiccation will be hastened by any reduction in the tree cover. This has already happened in a number of tropical and semi-tropical countries, and I see no reason why Ceylon should escape the same fate. The south-western quarter which receives two monsoons is probably exempt, but if our growing population is ever to be redistributed by means of dry zone development, something more constructive than mere destruction of the existing jungle is called for. Each planter should consider carefully just how far he can act independently in dealing with his own water conservation problems.

The dry farming technique now being worked out experimentally by the Department of Agriculture is by no means standardised and a great deal more experience is needed in water catching and water conservation before we can say we have mastered this problem. We need a new viewpoint amongst planters as well as amongst chena cultivators if we are ever to make a good job of dry zone agriculture.

The main factors contributing to the disappearance of jungle and the exposure of the soil are :—

(*a*) roadside burning to keep down weeds and ensure clear vision for motorists. This kills all the individual roadside trees and inevitably the open space fills up with rank weeds which if the tall tree crowns had been preserved would have been kept in check by overhead shade ;

(*b*) chena cultivation which obviously cannot be done away with until the cultivators have been taught how to adopt a permanent agriculture which needs ploughs and plough bullocks ;

(*c*) land development clearances in which the need for very early soil conservation practices such as ridging must be introduced between the burning of the jungle and the first monsoon storm if the newly burnt ash is to be saved and held on the new fields ;

(*d*) in the coconut plantations uncontrolled grazing scuffles up the soil and leaves it exposed to sheet-wash and the loss of the valuable colloidal clay fraction from the top soil.

On the other hand, the main factors contributing to a better water conservation on coconut and rubber estates are :—

(*a*) cover crops and grazing control ;

(*b*) water conservation by tanks and diversion schemes.

Soil losses occur not only in steep land and under tea and chena, but also to a quite serious extent on flat land and even in paddy cultivation. The colloidal clay portion of Ceylon's paddy fields is constantly being swept away by the quite unnecessary stream of running water which the paddy grower considers is essential but which, in actual fact, is very harmful. Figures from Texas show that water pumped from wells to give irrigation of 3.11 acre feet per acre yielded a paddy crop of 97 bushels as compared with a bigger supply of water of 4.20 acre feet which only yielded 70 bushels. Too much water reduces the crop, and robs the soil of its clay fraction.

The type of rainstorm which does most damage is the one which falls upon ground already saturated by previous rain. Data from Florida show that for three separate storms lasting 24 hours in a catchment of 50 square miles of sandy land, the results were :-

8.84 inches of rain on previously dry ground gave . . . 1.7 cusecs per sq. mile.

7.74 inches of rain on fairly wet ground gave . . . . . 53.0 cusecs per sq. mile.

7.63 inches of rain on saturated ground gave . . . . . 80.5 cusecs per sq. mile.

Cusec = cubic feet per second.

A parallel is seen between these figures and the storm of August, 1947, which brought disaster to many Ceylon villages by landslips on the second of two days' phenomenally heavy rain.

In addition to contouring, strip crops make a good ground cover in belts between more erosive crops ; green manure crops provide cut mulch and thus build up the humus content of agricultural and plantation soils. Planters should keep a close watch on the Peradeniya Experiment Station's work with plants likely to be useful for ground cover. The thornless mimosa is the latest promising one.

A new type of work for Ceylon is " gully plugging " by building stone or brushwood check-dams in the beds of small branch torrents or hillside drainage channels. The value of these is to spread the flood run-off over a longer period and allow more of the rain to penetrate into the ground instead of rushing off into the river. There is also a great potential value in a series of small water tanks on the lines of the old Kandyan village ponds. If these are used (in conjunction with checkdams in the steeper branches of the feeder streams and hillside drainage channels), the bogey of drought could be banished from many estates.

(Further articles on other aspects of this subject will be published in succeeding issues of the *Coconut Quarterly*. These will be written by students who attended the recent course on " Soil and Moisture Conservation " at Peradeniya).