

CRESCENT BUNDS

Husk Platforms for Palms on Steep Hillides

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WHEN travelling through the coconut areas of Ceylon, it is noticeable that little attention is paid to the cultivation of coconuts in hilly country. This may be due to fear of disturbing the ground so leading to loss of valuable top soil by erosion during torrential storms. It is noticeable also that the palms on steep hillsides are generally less vigorous; the nuts are smaller and fewer, and the leaf fronds are yellowish and much shorter, and so, instead of meeting those of adjoining palms, wide avenues of daylight can be seen between the rows with normal planting.

The main difficulty confronting the coconut planter in hilly country is that the top soil is frequently raw, dry and infertile, due to an almost total lack of humus, and the depth of soil is generally insufficient, varying from only a few inches to say, 5 ft. or 6 ft. in the pockets of rock. The sub-soil is generally either impervious slab rock or hard laterite (cabook) and under these conditions the palms will suffer severely from lack of water during periods of drought when the thin layer of top soil dries out. Even where the rainfall is well-distributed, the run-off of surface waters (reaching as much as 90 per cent. where the slopes are severe) is so great that very little actually penetrates down into the soil. As water is the most important requirement of the coconut palm, this alone is sufficient to explain the poor yields and small nuts obtained under these conditions even where the rainfall is heavy and apparently more than adequate (Perkins, C.C.Q., 1950, Vol. 1, No. 4, page 23).

Maintenance of Soil Moisture

The maintenance of soil moisture is therefore the secret of successful cultivation in hilly country. There are a number of ways in which soil moisture can be conserved (see C.R.I. Planting Leaflets, No. 5 and No. 16). The method of bunding palms with half-circles of husk, now to be described, is by no means original, but it is not often practised probably because of its cost. There is little doubt however that the cost can be more than covered by the increased crops which will result.

Before starting work, the features and lay of the land need to be carefully studied. Where the slopes are very steep (*i.e.*, 1 in 1) and of considerable height (200 feet or over) one or two contour drains will need to be cut at fairly wide intervals (say 100 feet apart). This is necessary to prevent a devastating build up of swift-moving surface storm waters and also to retain this water in the drains and allow it to seep gradually into the ground instead of losing it by run-off. The bunds of the contour drains must, of course, be placed on the lower side in order to increase their capacity.

In districts liable to very heavy rainfall, it is not possible to hold up all the rainfall with such wide-spaced contour drains ; in such places, one drain could be cut on the contour and the next could be given a 1 : 120 slope to allow some run-off through a lock and spill system.

Construction of Husk Bunds

Soil and water conservation works should always be started at the top of the hill ; then, after the drains have been cut, half-moon, crescent-shaped walls of husk should be built on the lower

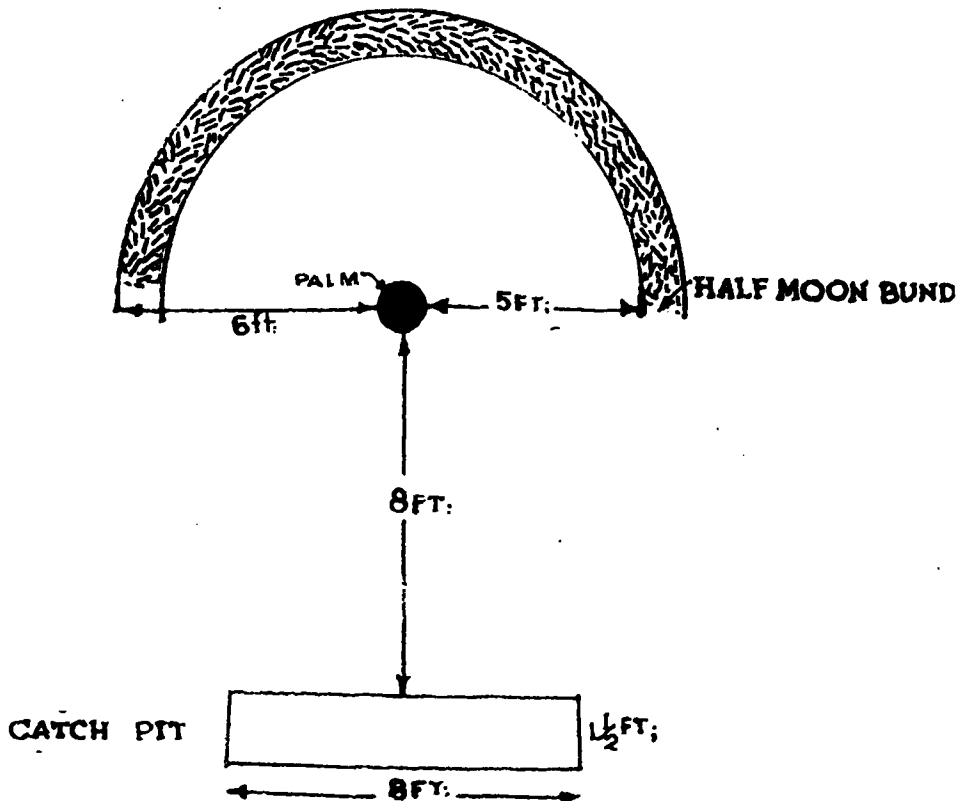


FIG. 1.
Plan of Crescent Bund.

side of and at a distance of about six feet from each palm. These half-circles need first to be pegged out on the ground in order to prevent careless construction of the walls of husk, otherwise they may be liable to subsequent collapse at the points of weakness. Great care must be taken to see that the layers of husk are laid horizontal and that they are well-packed and consolidated with the filling of soil applied after about every foot of construction.

This soil is obtained from a catch or silt pit, approximately 8 ft. × 1 1/2 ft. × 1 1/2 ft., dug about 8 feet from and above the palm. There is, of course, no fixed rule regarding the dimensions of husk walls or the size of the catch pit as the presence of boulders or of outcrops of rock and also the angle of slope will necessitate modifications. The normal measurements are shown in figure 1.

The expense of building half-moon husk walls might be considered to be too great but it is certainly far less than that of the "kottuwa" or complete wall of husk, often built to protect a young palm from cattle damage. The cost per palm varies according to the conditions, but the following is a rough estimate:—

<i>Item</i>					
Transporting 600 to 1,000 husks	...	...	...	...	Rs. 0.80
Building husk wall	...	...	...	...	" 0.37
($\frac{1}{4}$, female labourer at Rs. 1.50)					
Cutting silt pit 8 ft. \times 1 $\frac{1}{2}$ ft. \times 1 $\frac{1}{2}$ ft.	...	...	...	...	" 0.38
($\frac{1}{5}$, male labourer at Rs. 1.94)					
Total cost per palm				...	Rs. 1.55

This sum, when spread over three years, is not excessive. Furthermore, as the husks contain potash a saving of about 10 cents per annum can be made by omitting this ingredient from the manurial mixture.

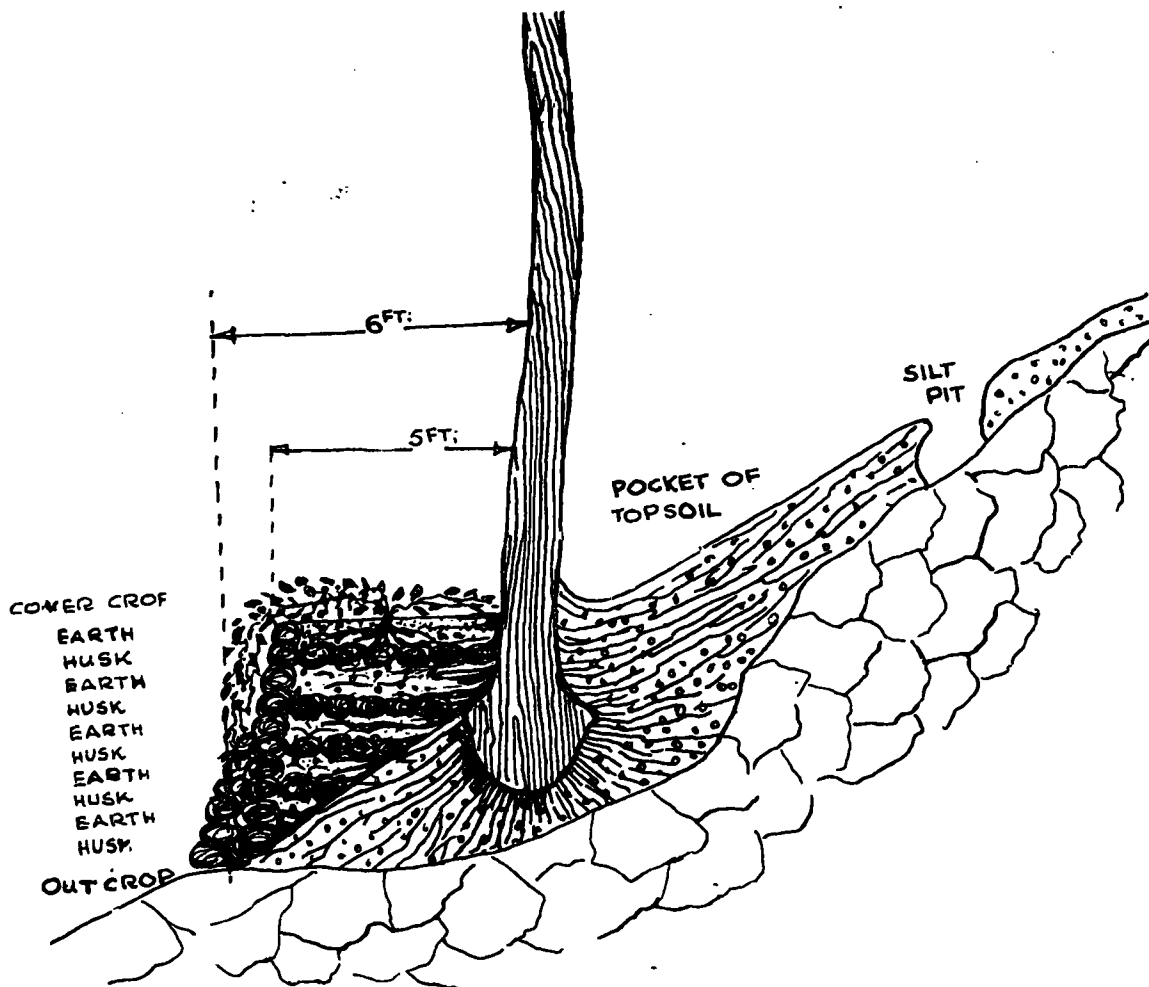


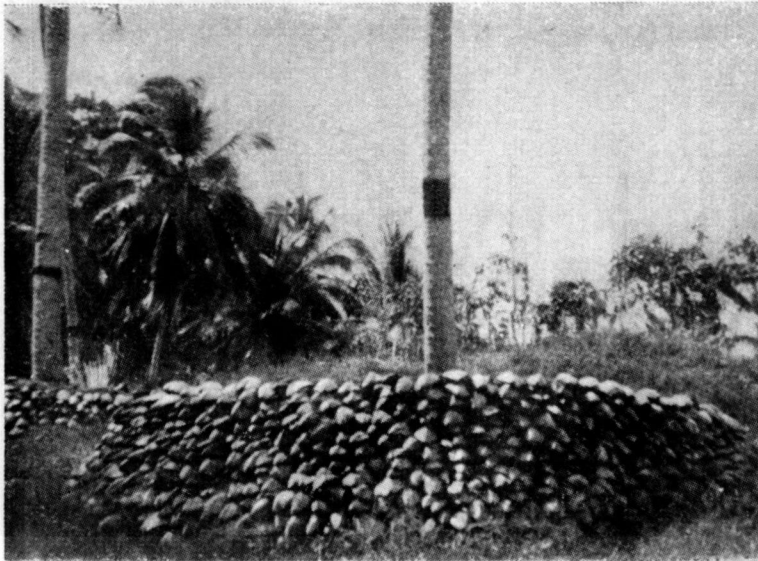
FIG. 2.
Vertical Section of Crescent Bund.

Maintenance of Husk Bunds

It is necessary to maintain the husk bunds in good condition just in the same way as roads and drains require periodical attention and repairs. Fallen leaves can be used as a thatch to protect the bunds. Cattle should not be allowed to enter the area as a single animal can do immense damage in a short space of time.

After every plucking, any damage caused by falling nuts, must be made good.

After a year the mound will commence to contract when the husks begin to shrink and at the end of two years the wall of decomposing husks, if built vertically, would tend to collapse outwards. It has been found necessary therefore to build the walls of husk to slope inwards towards the hill at an angle of, say 60° to the horizontal.



Two hill-top palms with Crescent Bunds.

After three years, it will be necessary to obtain more earth and renew the bunds. This can either be got by de-silting the catchpits or by cutting fresh pits and filling the original pits with husks.

Finally, when the area has been properly established, a suitable cover crop. *e.g.*, *Centrosema pubescens* or *Pueraria javanica*, whichever is easiest to grow, may be planted on top inside the bunds in order to bind the husks together and so make further maintenance of this area for a few years unnecessary (Fig. 2). Other hilly areas can be similarly treated in succeeding years so that the cost of these conservation works, by being spread over a number of years, does not become too severe a burden on the estate.

Effect of Husk Bunding

It will be seen that this arrangement of silt pits, husk walls, and contour drains will make it possible to retain the whole of the rainwater where it falls so that run-off can be entirely prevented and there is no gullying or surface erosion whatever.

The beneficial effect of husk bunding was apparent after only a few months when, during a long period of dry weather, palms in the treated area were quite unaffected by the drought, whereas in the adjoining area, untreated palms were suffering severely from leaf droop and were yellow due to desiccation. Under such adverse conditions the stomata or leaf pores close up in order to reduce evaporation and in consequence, the subsequent crop a year later is affected (see C.C.Q., Vol. 4, No. 2, page 91).

It is therefore confidently expected that the cost of the experiment now in progress will be more than covered by the increased crops which will be obtained, since at present prices it will require only an additional five nuts per palm per annum to cover the annual cost of a three-year cycle of operations.