the slopes. These tests were made on plats 6×50 feet and 3×200 feet, with a uniform slope of about 4 per cent. in only one direction. Terraces similar in shape and cross-sectional dimensions to the usual broad base terraces were built crosswise of these narrow plats. Outlets were provided in the channel above the terraces so that the run-off and eroded material could be collected and measured. The plats were clean cultivated and were kept in good tilth. Water was applied by means of sprinkling cans in a manner to simulate rainfall. In a few cases the run-off from natural rainfall was collected. This checked closely with the results obtained from the artificial applications.

RESULTS

The run-off from these plats with short terraces slightly exceeded the run-off from the plats having no terraces to obstruct the flow. The increase in run-off was about 1 to 3 per cent. over the unterraced land.

The amount of soil lost in the run-off water was increased on both sets of plats where the terraces were used. The soil washed down into the terrace channels was also collected and weighed. If this is added to the amount lost from the terrace outlets, the total amount is approximately 2.5 times as much as that lost from the unterraced land when plats 200 feet long were used.

The reasons for an increase in erosion on the terraced plats are that in the construction of terraces, the degree of slope on about one fourth of the land is decidedly increased. This increase in slope increases the erosion very greatly since the erosion loss is not directly proportional to the slope, but is much more rapid as the slope is increased appreciably above 6 or 8 per cent. The greatest increase in erosion on the terraced plat comes just above the terrace where the slope breaks off into the terrace channel. All the water from the land above the terrace moves over this portion where the slope has been greatly increased. Gullies start at this point and cut out very rapidly on account of the increased slope. The large losses of soil from the terraced plats therefore can be accounted for through the increase in the degree of slope over much of the land and because the steep slope above the terrace channel is subject not only to erosion from the water that falls on it but also to the water that runs down from above and still further increases the cutting of gullies.

A NEW TYPE OF TERRACE

In order to eliminate the effect of this increase in slope, a new type of terrace has been constructed and tested. In this type all the soil is moved up from the lower side of the terrace and there is no channel cut out above the terrace ridges, hence there is no increase in slope on the upper side of the terrace. A depression or broad trench is made on the downhill side of the terrace, where the soil is obtained for making the ridge. Water falling on the lower side of the terrace ridge is caught in this depression and is not lost from the field as run-off. This shortens by about 15 feet the distance over which water flows to the next terrace. Water running from the lower rim of this shallow channel down to the next terrace encounters no increased slope and since the distance is not great enough to allow much water to accumulate, little erosion takes place above the terrace. The water above the terrace is allowed to spread out in a broad belt, thus increasing the opportunity for absorption. This is particularly the case with land of less than about 6 per cent. slope.

The results of the determinations to date show that the losses from this type of terrace have been decidedly less than from unterraced land. Direct comparisons on adjoining plats of the two types of terraces illustrated in Fig. 1 have shown that the amount of water lost from the terrace built from the upper side exceeded that from the new type terrace by 2 to 5 per cent. of the total water applied. The soil lost was 3 to 6 times as much as that lost from the new type terrace. With the terraces built from the lower side there was little tendency to start gullies above the terraces except in the case of exceptionally heavy applications of water. In all cases gullying was much more severe in the case of terraces having a channel cut on the upper side. The differences were so great as to leave little doubt as to the advantages of the new type terrace (B).

Further tests are needed to prove the practicability of this type of terrace in the field, but the results so far indicate for it a great superiority over the so-called Mangum or broad-base terrace that has been used so widely in the past.

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