Overgrazing and wind erosion

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OVERGRAZING AND WIND EROSION

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OVER the last few years wind erosion during the autumn in the wheatbelt districts has become increasingly evident. This has occurred under normal seasonal conditions and observations in this article are not related to unusual conditions such as the extremely low rainfall during the current season.*

The wind erosion has resulted from a series of practices, including repeated early stubble burning, heavy stocking rates, and in some instances, repeated clover harvesting. In the main wheatbelt areas stubble burning and heavy stocking are the main causes.

Soil is our basic asset and unnecessary losses are unacceptable in our long term interest. The basic cause of excessive losses is the management imposed on the soil. Some people claim that economic conditions necessitate certain practices which accentuate wind erosion. However, these practices should be viewed in terms of long term depletion rather than short term benefits. Rapid short-term economic benefits may not be worth the long-term costs.

How much soil is lost?

Following a severe dust storm during the 1969 autumn it was calculated that from a 300 acre heavy land paddock near Westonia, 1,200 tons of top soil had accumulated against one fence line. This 1,200 tons did not include the large quantities of finer material blown away as dust.

During autumn there are many instances of bare paddocks caused by heavy grazing, from which dust rises with only moderate winds. When one bears in mind that we are dealing with shallow soils and new soil formation is a very slow process (about 0.2 tons per acre per year) it can be seen that many farmers are producing an unstable land system.

High levels of stocking which leave the ground bare by February or early March accelerate losses of soil by wind. This erosion will take place even though the sheep may be in a reasonable condition as a result of eating clover burr.

Results of wind erosion

Without looking at all the disadvantages of soil losses, let us look at two serious effects.

Loss of organic matter

By world standards our soil organic matter levels are already low. The highest concentrations are at or near the surface.

Grass stubble, clover burr and sand partly bury this netting fence. The over-grazed paddock behind has been left windswept and bare

* Soil conservation articles in this issue were prepared for publication before the severity of the present drought situation became apparent.
A bad sand drift on to the Great Eastern Highway in the Eastern Wheatbelt

With clover ley pastures we are able to raise this somewhat, and at the same time, raise the fertility of our soils. If we allow excessive wind erosion, many of the benefits of the improved organic matter levels are lost, as it is the finer particles which are most easily removed by wind.

In the autumn of this year it was very noticeable that large quantities of Cyprus barrel medic burr had been blown from paddocks. This movement can affect re-establishment the following year.

The importance of maintaining good stands of leguminous pastures is well known and amply illustrated in the figure. This figure, taken from experiments in the Hyden district conducted by officers of the Wheat and Sheep Division, illustrates the fertility build up provided by clover. One cannot maintain a high level of fertility if the fertile top soil is removed by wind.

Phosphate losses

Over the years most farmers have applied considerable amounts of phosphate to the soil. In fact, many of the soils which initially would grow little without applied phosphate have now reached the stage where reasonable crops can be grown with only light dressings. This considerably reduces production costs.

Effect of nitrogen on clover and non-clover land

Loss of top-soil from old clover land means loss of build-up of fertility which cannot be replaced easily by fertiliser supplements. This graph shows how crop on old clover land even with no nitrogen fertiliser yields much higher than non-clover land with up to 150 lb. per acre of urea.
Most of the phosphate applied is retained in the top few inches of soil and it is only on deeper grey sands that any degree of leaching occurs. Even on yellow sandy soils at Wongan Hills it has been shown that 70 per cent. of the phosphate applied over a 30 year period is still in the top 4 inches of soil. This phosphate bank is of considerable value as 1,000 lb. of superphosphate may have cost a total of $13 per acre over the years, and represents an outlay of $26,000 on a 2,000 acre farm. Excessive soil loss entails a partial loss of this phosphate and so represents an erosion of the capital investment.

Stubble burning

Many farmers who use successive cropping find it convenient to burn stubble to allow better seed bed preparation. If this practice is necessary (although carried to excess it is certainly depleting) burning should be delayed until as late as possible in the autumn to minimise losses by wind.

Stocking rates

Wind erosion may not appear significant, but there is a cumulative effect. The mounds against fence lines bear witness to this. Harmful long-term economic effects may be expected, and will decrease the value of the farm. A stocking rate which appears to be the most profitable on paper is not the most economic in the long term if it depletes the basic asset—the soil.

The best stocking rate should be assessed by examining the ground cover in March. If there is not enough ground cover to prevent erosion under reasonably normal weather conditions, stocking rates are too high. Stocking rates should not be assessed by noting the conditions of the sheep, as in almost all cases the sheep will not start to lose weight significantly on a clover pasture until excessive ground cover has been removed.
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