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Soil conservation land use

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MANY things are blamed for soil erosion—including storms, fires, cost-price squeezes, ploughing downhill and rabbits. But the basic factor is the risk involved in the way the land is used. It is therefore vital that everyone—not only farmers—should begin their thinking about soil conservation from the land use aspect (of which special practices such as contouring, are a small though spectacular part.)

Fundamentally, land use must be such that the aims of the agricultural industry chosen for an area can be achieved without soil deterioration and erosion. For instance if regular cropping for cereals is causing deterioration, it should be replaced by a land use with the main emphasis on pastures and grazing.

Within the main land use chosen for an area are many management factors to be considered in relation to soil conservation. Arable land can be divided into three main classes on a capability/management basis:

- Land requiring normal care in applying the ordinary practices considered to be good farming methods for maintaining fertility and production. For instance, normal care in most wheatbelt land is a clover ley rotation with cropping frequency adjusted to the capability of the soil.
- Land which, although still coming within the accepted category of land use, has limitations so that its use must be restricted in some ways to avoid creating an erosion hazard. For example, potential sand drift land should not be fallowed, and must not be stocked heavily in the summer months.
- Land suffering from a disability which prevents it from being used in the same way as the surrounding land. A case which comes to mind immediately is, salt-affected land in the cereal growing areas, which cannot be used for normal cropping.

**Contouring**

In any of the above three categories there can be a need to incorporate special practices to enable the land to be used in accordance with its capabilities. An example is using contour banks to reduce erosion risks on cropped sloping land. Contouring, however does not put land into a different soil management class.

Contouring is a modification to the surface drainage system used to control surface water run-off. The soil management class is concerned with what is needed to maintain overall soil fertility and physical condition. In fact, it must be stated emphatically that contouring should not be used to bolster an unsatisfactory soil management system.

**Some examples of erosion caused by wrong land use**

*Avon Valley hay-growing:*

In the first half of this century large areas of the Yorkgum and jam soils of the Avon Valley were used intensively for growing cereal hay for sale as chaff for horses.

On a short rotation basis this meant excessive cultivation, over-summer fallows and the removal of most of the above ground plant growth, with very little being
Badly gullied slope in the Avon Valley

put back into the soil except superphosphate. This land use was much too intensive and very serious erosion (sheet and gully erosion) occurred, particularly in the 1940’s.

Saline morrel soils in the south-eastern wheatbelt:

When first cleared these soils were considered suitable for first class cropping land use. Having friable structure they were easily cultivated for crop preparation and on many farms were cropped more intensively than other first class cropping land.

Because of their inherent salinity the morrel soils could not withstand this intensive use for cropping. Redistribution of salts in the soil profile led to the formation of bare patches. Severe wind erosion and topsoil removal often followed.

Cropping of natural watercourses in the cereal growing areas:

Under original vegetation in the wheatbelt many of the natural watercourses carrying surface run-off were ill-defined, shallow depressions. These surface drainage depressions were easily crossed by cultivation and cropping machinery and so were included in the general programme of cropping every acre which could be ploughed.

Concentrated surface run-off over loose cultivated soil soon caused soil wash, but until the wash became a gully deep enough to stop the plough there was usually no thought of leaving it out of the cropping programme. This practice has caused widespread and severe gully erosion in the agricultural areas.

This is a direct result of failing to appreciate the need for conservation land use of natural watercourses, which should have been set aside from the cropping area and treated as permanent grassed waterways, used only for grazing.

In 1958-59 soil conservation officers made a survey of erosion control needs, by detailed investigation of a two per
cent. sample of an area covering 4.38 million acres between Moora and Wagin in the 15-20 in. rainfall zone. From this survey it was estimated that in the whole area there were 9,000 miles of erodible depression (not including creeks and rivers) which should have been classified as watercourse land not used for cropping. Because of the common practice of cropping such depressions however about half of the total length was already gullied, the remainder being likely to erode in future if cultivated and cropped.

**Cropping of flood-prone land:**

The wet winters of 1963 and 1964 damaged extensive areas of flood-prone land in the cereal growing districts. Unfortunately much of this land has been considered by farmers as regular cropping land because “it can grow a good crop in the right season.”

In many cases the flood-prone areas are on heavy valley soils which become waterlogged easily in an above-average rainfall season even if no water flows on to them from higher land. Inundation by flood waters makes the situation worse.

Trying to prepare the land for cropping resulted in cultivation in “puggy” conditions and often leaving the ploughed soil bare the whole year because it became too wet to get the crop in. This attempted non-conservation land use of flood-prone land has in many cases resulted in serious physical deterioration of the heavy soils so that they now become more easily waterlogged and are a watershed hazard to lower land.

**Changing land use solves problems**

In each of the examples given above improved land use has required the restriction or elimination of cereal cropping and a greater emphasis on pastures and grazing. For instance, the Avon Valley soils which were deteriorating and eroding under a hay growing regime, are now used for clover ley farming. They can carry high stocking rates in the ley years and then produce high yields of grain when cropped.

The flood-prone areas need careful consideration and more investigations are needed into management methods. Depending on the frequency of flood hazard, and how well the soil fertility and physical condition can be preserved, the flood-prone soils could either be classified as regular cropping land (with some flood hazard risk), grazing land with occasional opportunistic cropping, permanent grazing land, or grazing land with restricted use.

**Always some risk**

Even with the best land use it is necessary to accept some risk of erosion damage from natural phenomena—from wind, rain, running water or flood. However, the land use must not make the risk excessive. Damage occurring from the acceptance of normal risk may necessitate altered land use or special measures for restoring a conservation condition.
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