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Five-Point Program:

Divided Slope Farming For Soil Erosion Control Under Dryland Crop Production

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The greater a slope's length and steepness, the greater the erosion hazard, a problem documented through research and demonstrated by experience. When a slope's length exceeds 300 to 400 feet and its steepness exceeds 15 to 25 percent, excessive erosion can be expected unless precautions are taken to protect the soil.

Soil condition, soil type and climate or weather will affect the erosion rate. For example in northern Idaho, cutover timber area soils, such as Helmer series or Santa series, may have more severe erosion problems on gentle slopes than do well-managed grassland soils, such as the Palouse series, on steeper slopes.

Each inch of lost topsoil represents an estimated 1 to 3 bushel per acre decrease in potential wheat yields. This is an annual loss from all **future** production because eroded topsoil cannot be replaced.

Divided slope and strip crop farming are two simple practices being used to better manage land to reduce erosion on long, steep slopes. Divided slopes or strip crop farming can reduce soil losses 50 to 75 percent depending on slope length and steepness. Both practices are considered best management practices (BMPs) under Idaho's Agricultural Pollution Abatement Plan developed as part of the rural Clean Water Program (Section 208 of PL 92-500).



Fig. 1. Divided slope farming has steep slopes in the upper portion protected by heavy residue from winter wheat while the lower portion is less protected by residue from a pea crop.



Divided Slope Farming

Divided slope farming implies that long, steep slopes are divided into two parts. The upper and lower halves are planted into different crops (Fig. 1). At least one of the crops must be a high residue crop, such as wheat, which is managed to furnish maximum surface protection. The other half of the slope may be planted to low residue crops having low surface protection or be left for summer fallow in lower rainfall areas (See University of Idaho CIS 522, *Five-Point Program — Restricted Summer Fallow for Soil Erosion Control Under Dryland Crop Production*). In effect, the erosion hazard of the entire slope is reduced because the high residue half of slope reduces the length of the slope subject to high erosion hazard.

Strip Crop Farming

When slope lengths exceed 400 feet, a more desirable practice is to divide the slopes into more than 2 parts. This practice is strip crop farming or strip cropping (Fig. 2). Although strip cropping may be the ultimate in soil erosion control on long, steep slopes, dividing the slope into two parts is better than an undivided long, steep slope.

Dividing Slopes

Divided slopes should be laid out across the slope or on the contour. This makes it easier for across

slope or contour tillage operations and seeding, thus making maximum use of erosion controlling practices. Divisions of the slope should be set up to accommodate the width of the machinery to be used in tilling and planting the field. Divided slopes should be designed to give convenient access to the fields for cultivating and harvesting operations.

Advantages of Divided Slope Farming

Divided slope farming can result in a 50 to 75 percent reduction in topsoil loss from erosion. Although placing a value on lost topsoil is difficult, it can never be replaced for all practical purposes, and lost topsoil results in reduced yields.

Dividing slopes can also improve management and yields. For example, hilltops, low wet areas or portions of a slope needing special attention can be managed separately from the better-producing portions. These areas can be tilled, seeded, fertilized and harvested differently from more productive, better-drained portions of the field. This results in better overall management and higher yields.

Also, operating equipment on the contour or across slope consumes less fuel per hour of operation. However, odd-shaped fields may increase operation time and may offset savings.

Problems with Divided Slope Farming

Use of divided slope farming requires some new management techniques. The location of the

ing may be most desirable on extremely long, steep slopes. Strips 100 to 200 feet wide with high residue crops reduce erosion.



location of boundary between divided slopes each year to prevent weed infestations and form a berm or ridge similar to boundary.

borders between the two divisions of the divided slope should be changed each year. Changing the border location will prevent the buildup of weed infestation and a "berm" or ridge between the two portions (Fig. 3).

Divided slope farming may mean smaller or odd-shaped fields. Disadvantages of these include:

1. More time may be involved in moving and turning equipment.
2. Higher costs in fuel consumption may result because of increased operating time.
3. Some farming operations such as aerial spraying may not be feasible or may be more costly.
4. Machinery for two crops will be needed in each field every year rather than one set of equipment each year.
5. The option of cross working the field may be eliminated with a divided slope cropping system.

Economics of Divided Slope Farming

A study of the economics of divided slope farming showed an average increase in production costs of 9.1 percent or \$2.50 per acre per year.¹ These costs varied with the size of the farming operation. On

large, gently rolling fields, divided slope farming increased production costs by only 2.5 percent. On smaller, irregular hillsides, production costs were much higher than the average.

These estimates do not take into account extra costs of changing the cropping system to establish divided slopes. Farming widely scattered lands may also create additional costs.

Conclusions

Loss of topsoil results in a permanent loss in potential yield. This yield reduction has been estimated at 1 to 3 bushels of wheat every year for each inch of topsoil lost. The eroded soil material, along with chemicals from fertilizers, herbicides, insecticides and other pesticides, may contaminate surface and ground waters.

The divided slope practice, by itself or used in conjunction with other conservation practices (See University of Idaho CIS 483, *Five-Point Program — Soil Erosion Control Under Dryland Crop Production*), will result in up to a 75 percent reduction in soil erosion commonly seen on long steep slopes.

Thus, even with the disadvantages incurred with divided slope farming, it is worthwhile to the landowner or operator to use divided slope practices to conserve our valuable soils resources and production potential.

¹Berglund, S. H., and E. L. Michalson. 1978. An economic evaluation of the Latah County Conservation District Five-Point Program. Ag. Econ. Res. Series No. 217.

This College of Agriculture publication is one in a series on erosion control methods for soil under dryland crop production. Other titles you will want to get are:

- CIS 483 Five-Point Program: Soil Erosion Control
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