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WIND AND EMERGENCY EROSION CONTROL

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Unprotected soil is subject to wind erosion. Any occurrence that leaves the soil bare sets the stage for soil erosion. Unprotected fields result from the after harvest removal of plant residue for feed, by burning or by tillage operations.

The best way to control wind and water erosion is to maintain a cover on the soil surface throughout the year. This can be done by establishing windbreaks, strip-cropping, or maintaining a cover of plant residue and/or growing crops on the entire soil surface.

The need for weed control sometimes causes farmers to overfill the field until most of the surface residues are gone. Each tillage operation causes some loss of soil moisture and residue, the amount of loss depending on the type of tillage implement used. The use of subsurface tillage tools and/or chemicals will control many of the weeds with a minimum loss of surface residue.

If no cover exists and erosion is occurring, emergency control measures using tillage or mulching are the only practical choice. Choosing the specific emergency measure depends on the seriousness of the erosion, susceptibility of the particular soil to erosion, and the duration of the needed protection.

Wind erosion can be controlled by mulching with manure or plant material such as straw, hay, corn, or sorghum stalks. About 2500 pounds of plant residue per acre is needed to control areas which have considerable wind erosion. These residues can be spread with a manure spreader or power box. Using a mulch treader or rotary hoe on the field will also help to spread and anchor the residue. Using a chisel plow with the chisels set about 30 in. apart will also help anchor the residue. The residue should be anchored at right angles to the prevailing wind.

Emergency tillage is a last resort, but can be effective if carried out properly. Emergency tillage should leave a cloddy roughened surface that will resist wind erosion. This surface roughness will reduce the surface wind velocity and trap windblown particles.

Chisels are a good tool to use as they will roughen the soil and bring clods to the surface. In growing wheat, 2-in chisels spaced 3 feet apart and operated 4 to 6 inches deep will usually bring sufficient clods to the surface to reduce wind erosion. This operation frequently saves the wheat. If the wheat is destroyed and the ground is bare, chisels 4 to 6 inches wide, spaced 30 inches apart and operated at a depth of 4 to 5 inches are more effective in stopping erosion. If the erosion persists, then a second chiseling operation may be needed. Discs are a poor erosion control tool as they can pulverize the soil too much.

Loose sandy soils need a different type of tillage. More drastic tillage measures are needed to roughen the surface but the result is short lived. A moldboard lister spaced 40 to 50 inches apart and operated 4 to 5 inches deep may be needed to obtain sufficient clods and surface roughness. Do not use a disk lister as it will pulverize the soil.

Some other pointers that can help control erosion are: 1) A disc is not a good emergency tillage tool to control erosion as it can break the soil up into erodible size particles; 2) A sufficient area upwind should be tilled, not just the area presently blowing; 3) The direction of the emergency tillage should always be at right angles to the erosive winds for maximum protection; 4) For row crops, it may be necessary to compromise by following the row pattern instead of the prevailing winds. If some old residue remains, the tillage should be between the rows to leave as much residue as possible; and 5) The tractor speed and depth of tillage should be varied as needed to leave the most clods of soil on the surface.

Wind erosion can occur when the wind at a height of one foot above the ground surface reaches a speed of 12 miles per hour. Large fields and fall plowing increase the potential for winter and spring wind erosion.

There are generally three basic things that can be done to control wind erosion. The first is to reduce the wind velocity at the soil surface. This can be done with windbreaks, crop residues, cover

crops, surface roughness and wind stripcropping. The second thing that can be done is to trap soil particles. This can also be done by ridging or roughening up the soil surface to catch the moving soil particles. Thirdly, the size of the soil aggregates can be increased. This is done by using crop rotations that include grasses and legumes, by growing high-residue crops and returning crop residues to the soil, and by emergency tillage which creates clods on the soil surface. Increasing the size of the aggregate means it takes a stronger wind to move it.

Factors that effect the quantity of wind erosion that takes place includes soil erodibility, soil ridge roughness, climate and weather, the unsheltered distance across a field along the prevailing wind erosion direction and residue or vegetative cover. Soil texture and cloddiness are primary properties in determining soil erodibility. The bigger an aggregate the less chance of blowing. Early melting of snow or lack of snow cover exposes the soil surface to alternate night time freezing and day time thawing. This can occur daily in late winter and early spring and it reduces the size of soil aggregates and increases the chance of wind erosion.

A wind erosion factor that can be changed by man is the unsheltered distance across a field. Soil flow across a field is directly related to the width of the unprotected area. Soil flow or erosion

increases with the distance until the wind becomes saturated or is carrying it's maximum load. The more erodible the soil surface, the shorter the distance at which maximum flow occurs.

To control erosion one should consider a cropping and management plan that will:

1. Result in large soil aggregates.
2. Include ridging.
3. Establish narrow fields, with strip cropping, and if feasible, windbreaks that are as nearly perpendicular as practical to the prevailing winds during the critical wind erosion periods.
4. Leave large amounts of residue on the surface, standing if possible - during the critical erosion periods.

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