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Five-Point Program

Restricted Summer Fallow for Soil Erosion Control Under Dryland Crop Production

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Summer fallowing is frequently used in conjunction with dryland crop production. In summer fallowing, the land is kept bare through a growing season. This is done to store more than one year's precipitation, and includes only enough cultivation to prevent growth of unwanted vegetation. At the end of the fallow season, the field is planted to winter wheat.

Cultivation during fallowing and planting operations generally results in a finely pulverized surface with little or no crop residue remaining on the surface. The following winter wheat crop, often planted late to reduce disease problems, usually does not obtain enough vegetative growth to protect the soil against winter and spring erosion. For these reasons the practice of summer fallowing is one of the greatest contributors to water and wind erosion in dryland crop production areas. This practice results in severe erosion problems (Fig. 1.).

Because soil eroded from dryland crop areas accumulates as sediments in streams, restricted summer fallow has been selected as one of the best management practices (BMP) in the Idaho Agricultural Pollution Abatement Plan. This plan was developed as part of the Rural Clean Water Program (Section 208 of Public Law 92-500).

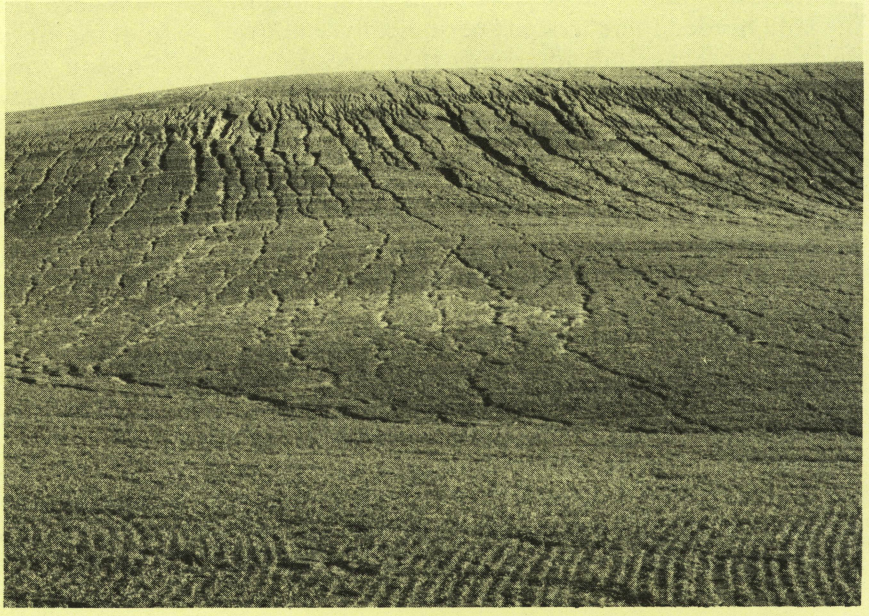

Fig. 1. Severe water erosion on summer fallow land in northern Idaho.

Fig. 2. Summer fallow land just before seeding, where fallow operations began in spring after overwintering as standing stubble.

Need for Summer Fallow

Summer fallowing is necessary in some dryland crop production areas. When one year's precipitation is not sufficient to produce a crop, additional moisture can be stored in the profile by the summer fallow operation. This conservation of moisture is only necessary where the annual precipitation is less than 16 inches. Fallowing may also be needed where weed infestations are a severe problem and where chemical weed control is impractical.

Resting the Land A Fallacy

Summer fallow use in the past was based partly on the assumption that to obtain maximum yields, the land needed to be "rested" periodically. Fallowing probably was advantageous then because we did not use fertilizers or fully understand fertility needs for dryland crop production. With fallowing, fertilizer nutrients were released through a breakdown of organic materials. Thus, resting the land did help obtain high yields. With present fertilizer programs, we are able to supply the nutrient needs of the crop with fertilizer materials so resting the land is no longer necessary.

Additional Moisture

The water used in producing a crop, called consumptive use, depends on yield, climate, variety and other factors. Generally about 16 inches of water is needed to produce a grain crop in the non-irrigated areas of Idaho. When annual precipitation exceeds 16 inches, one year's moisture is sufficient to fill the entire soil profile to a depth of several feet. For example, a silt loam soil holds about 2 to 3 inches of available water per foot of soil depth. Thus, 16 inches of precipitation would replenish the available soil moisture in a silt loam profile to a depth of about 8 feet. If summer fallowing is used, the extra year's moisture applied to the soil is more than the soil profile's water storage capacity. The extra year's moisture will result in excessive run-off which usually causes severe soil erosion because of the finely pulverized soil surface and low crop residue created by the fallowing operations.

Weed Control

Where fallow is necessary to control perennial noxious weeds, such as field bindweed or Canada thistle, limit fallow areas to less than 5 acres. This will minimize soil erosion losses. Where downy brome (cheatgrass) and other annual weeds are a problem, use rotations and special management or chemicals to control weeds. Information is available through University of Idaho County Agricultural Extension Agents, or through the District Conservationist for the Soil Conservation Service.

Proper Management of Fallow

Where fallow is necessary to store moisture or to control weeds, certain conservation practices should be followed. Leave as much residue as possible on the surface of the soil throughout the fallow period. A rod weeder can be used to control weeds

or form a mulch, but should be used sparingly (no more than 2 or 3 times). Avoid the use of implements that pulverize the surface, such as the drag harrow. In many areas it may be best to eliminate fall plowing if a good standing stubble is present. Standing stubble will trap snow which will reduce runoff and increase stored soil moisture. This means starting the summer fallowing in the spring. (Fig. 2)

Early planting of winter wheat helps answer the erosion problem by increasing vegetative growth. However, early planting on summer fallowed land may result in increased cereal diseases and increased heaving or frost damage.

Whenever possible, us chemicals to control growth of vegetation on fallowed ground (chemical fallow). Use minimum tillage operations to maintain maximum surface residue and rough soil surface. Residue amounts remaining on the soil surface after seeding should be approximately 1,500 pounds per acre.

Economics of Annual Cropping

Economic studies conducted by the University of Idaho demonstrate that annual cropping will produce higher incomes than a wheat-summer fallow rotation.* A wheat-pea rotation produces a higher return in dollars per acre than a wheat-fallow rotation even though the wheat-fallow rotation produces higher wheat yields. Income from the pea crop more than offsets the lower wheat yield. A 3-year wheat-pea-barley rotation also produced greater economic returns than wheat-fallow rotations.

Conditions on individual farms will determine economic advantages or disadvantages of annual cropping. Weed problems and drought are the major disadvantages to eliminating or restricting summer fallow.

*Bergland, Steven H., and E. L. Michalson. 1978. An economic evaluation of the Latah County Conservation District Five Point Program. Univ. of Idaho Econ. Res. Ser. No. 217.

Conclusions

Summer fallow is not necessary in dryland crop production areas where precipitation is over 16 inches per year. This is a difficult idea for some to accept. A critical look at erosion problems, where summer fallow is used, should convince growers that summer fallow is a major factor in soil erosion. To preserve our soils resource, fallow must be restricted to areas where it is absolutely necessary.

Since summer fallow is the major contributor to soil erosion under dryland crop production, this practice is a major concern of the Rural Clean Water Program (RCWP). To be successful, a voluntary RCWP program must eliminate unneeded fallow. If a voluntary RCWP is not successful, a mandatory program may be instigated. A mandatory program will undoubtedly include a restriction on summer fallowing.

Some federal farm programs, such as the "Set Aside" program, have encouraged summer fallow. Such programs are not compatible with best management of dryland crop production. If programs are necessary to curtail cereal production, they should encourage use of practices such as green manure crops or perennial vegetation rather than fallow.

Economic returns are generally greater with annual cropping than when fallow is included in the rotation. Economic returns from saving the top soil, which is lost to erosion due to unnecessary summer fallow, can be substantial. Studies have shown that each inch of topsoil lost means a 2.5 to 3 bushel-per-acre loss in yield. This yield loss is reflected far into the future since rebuilding an inch of topsoil takes many decades. A high yielding, highly fertile soil is changed into a low yielding, infertile soil. What is the economic impact of this on your farm operation?

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