Texas Water Resources Institute

April 1981
Volume 7
No. 3

Keeping Soil and Water in Their Place

By Lou Ellen Ruesink, Editor, Texas Water Resources

Soil and water are two of Texas' most valuable natural resources. Man could not live without the food and shelter provided by fertile soil and adequate moisture.

Soil out of place, however, is a menace--a pollutant causing dust storms and muddy water. "Wayward" soil begins its journey in a process called soil erosion as it is shattered into particles by raindrops, then carried off by wind or runoff.

Soil erosion is especially costly because it removes the most fertile part of the soil, thus reducing land values and increasing food production costs. Perhaps even costlier is the damage the soil particles cause as water pollutants. Sediment, in fact, is the largest pollutant--by weight and volume--in Texas waters.

- Sediment levels streambeds and increases flood damage.
- Sediment fills reservoirs and reduces storage capacity.
- Sediment increases costs to treat water for municipal use.
- Sediment damages turbines and pumps in power plants.
- Sediment reduces fish and shellfish by blanketing their nests and spawning areas.
- Sediment carries plant nutrients, other chemicals, and bacteria which contaminate water.

As long as rain has fallen on earth, there has been soil erosion. Naturally occurring soil erosion shaped the earth as we know it today. Flood waters, for example, eroded canyons and also deposited fertile soil in the valleys.

Man's activities have, however, greatly increased soil erosion, especially since the age of power-driven machines. In a short period of only 150 years, according to a bulletin distributed by the Soil Conservation Service, U.S. farmers have done more damage to the earth's surface than six centuries of farming affected other parts of the world. The bulletin

explains that good soil stewardship can mean the difference between a nation's demise and survival.

Soil and water conservation are so interrelated that they can only be accomplished together. Soil conservation is basically "keeping the soil where it belongs," while water conservation involves controlling water for beneficial uses.

Water out of place or out of control is destructive and a force to be feared. Excessive water means soggy fields and ruined crops. Rainfall not held by the soil runs off fields, ranges, and forests carrying fertile soil as well as fertilizers and pesticides. Uncontrolled water cuts gullies and erodes stream banks, while flood water can mean death and destruction.

Water conservation means holding as much beneficial rainfall as possible on land where it falls or in reservoirs for later use. Water conservation also includes directing runoff into channels with the least disturbance to soil, plants, or structures.

Soil and water conservation have traditionally been the business of the farmer or rancher trying to keep his land productive. Now, however, a Federal law called the Clean Water Act makes soil and water conservation everyone's business. The bill, passed in 1977, addresses the problem of sediment as a major water pollution concern. It refers to sediment as "nonpoint source pollution" because sediment does not enter a waterway from a specific discharge point.

The Clean Water Act requires states to control excessive discharges of sediment into surface water sources. Road builders, urban developers, strip mining operations, and timber industries are just a few of those who must practice soil conservation measures--not so much to retain soil as to reduce water pollution potential.

Reducing erosion keeps streams, ponds, and lakes from filling as rapidly with sediment. Keeping excessive sediment out of the water also avoids the buildup of plant nutrients in the water and thereby reduces unwanted growth of algae and other vegetation.

Conservation Practices

Conservation practices, which have been around for generations, can dramatically reduce soil erosion and runoff. These measures range from simply encouraging native plants and shrubs to building complicated concrete retaining walls. Some conservation techniques are expensive; others require only a change of habits. The "no-till" practice of leaving crop debris on top of the ground to protect the soil actually saves a farmer time and money.

One of the most effective, if not the most effective, soil conservation practice involves choosing the right use for each piece of land. Some land is suited for intensive cropping, especially where the soil is deep, level, fertile, and well drained. Other land is so steep, shallow, or stony that it is suitable only for wildlife or other uses which cause little or no disturbance to the soil and native vegetation. Some land is suitable for housing

development, while other land such as flood plain should be used only for park areas or other open space uses.

Other types of conservation techniques are generally divided into vegetative and mechanical categories.

Vegetative forms of conservation include planting specifically to reduce soil erosion. Plants help to protect the soil surface from raindrop impact. Plants also reduce standing water and runoff by making the surface more permeable. Prompt replanting after disturbing the soil is an effective soil conservation practice for road construction, timbering, or strip mining. Farmers often plant a cover crop to protect soil during winter months, and ranchers encourage native grass covers as an important range conservation practice.

Other vegetative conservation methods include (1) windbreaks to direct the wind stream away from erodible land, (2) strip cropping to reduce water and wind erosion, and (3) planting in odd corners and on steep slopes to provide food and cover for wildlife as well as for erosion control.

"Mechanical" forms of conservation include dams, concrete walls, and river channel improvements.

Contouring, contour strip cropping, and terracing all increase water intake by holding water on the land longer. These measures also reduce the potential for flooding because streams fed by slow runoff and seepage water have longer-lasting flow and lower flood peaks than they would have if their watersheds were unprotected.

Landowners also organize to build flood retarding dams on small watersheds. These dams reduce downstream flooding, provide irrigation water, and harbor waterfowl and fish.

Soil Conservation Service

Soil erosion was identified by Congress as a "national menace" in the 1930's. Since that time the Soil Conservation Service in the U.S. Department of Agriculture has encouraged voluntary conservation efforts throughout the nation. This agency works through local conservation districts established by private citizens to carry out its national program.

The mission of the SCS was originally to "persuade, assist, and guide" farmers and ranchers in soil conservation efforts. SCS assistance has now expanded to include all landowners or operators and ail land uses. Individuals, groups, organizations, cities, towns, churches, schools, as well as county and state governments, all seek the advice of SCS specialists on soil and water problems.

The following types of assistance are available through local SCS offices:

1. Soil and crop specialists develop cropping and pasture management systems to reduce erosion and sediment transport.

2. Engineers design conservation structures such as terraces, diversions, waterways, ponds, irrigation systems, drainage systems, and waste disposal systems.

3. Range conservationists assist ranchers with grazing management techniques for maximum production with minimum erosion.

4. Foresters recommend tree species and planting and harvesting techniques for woodlands and windbreaks.

5. Plant materials specialists recommend special plant species for use in unusual sites such as surface mining reclamation.

6. Engineers design subsurface drainage systems to alleviate high water table and soil salinity problems.

SCS technical assistance is available free of charge to any Texas landowner or operator who requests it. Nearly 1,000 SCS specialists are available statewide to help with anything to do with soil or water. Advice must be sought by the landowner and is in no way mandatory.

Since there is no law in Texas requiring a landowner to properly manage his land, he can over-cultivate, over-graze, over-develop, or neglect his land so long as he does not affect someone else's property or surface water.

Special Assistance

Landowners in recent years have received helpful information on land use from SCS soil surveys by county. Information presented in the surveys helps in planning use and management of lands for crops and pasture and as preliminary site information for buildings, highways, sanitary landfills, parks, and wildlife habitats. Presently, surveys have been completed for 150 Texas counties representing 84 percent of the geographical area of the state. The publications are available from local SCS offices or from the state headquarters in Temple.

SCS administers several cost-sharing programs for flood control in small watersheds. Projects must have local sponsors, but Federal financing is available for as much as 80 percent of many projects. Other financial assistance programs administered by SCS include one for landowners in drought-prone areas of the state. These programs pay for conservation projects completed on private lands.

A new program is underway by SCS in cooperation with underground water conservation districts. Using a mobile field laboratory, SCS technicians analyze irrigation methods and systems on individual farms. They then recommend to the farmer ways to save water and energy and increase crop yields.

No Choice

Increasing pressure on land because of higher population densities and greater demand for food and other resources makes the conservation task both more important and more difficult.

Past generations have had an alternative to soil conservation. As soil was depleted, they could move on to more fertile land. George Washington warned about this practice and observed the need for soil conservation even in his day:
How miserably defective we are in the management of our lands. A few years more of increased sterility will drive the inhabitants of the Atlantic States westward for support. If they were taught to improve the old, instead of going in pursuit of new and productive soils, they would make those acres which now scarcely yield them anything, turn out beneficial to themselves and the community.

Modern day Texans have no place to pursue new and productive soils. We have no more continents to discover, explore, or exploit. We have no choice, therefore, but to care for the land and water we now have.

Henry Turney, Conservationist

"Soil conservation doesn't cost. . it pays," says Henry Turney, a rancher near Dublin. He should know. He has practiced--and preached--the wise use of land and water for almost a half a century.

Turney was one of the first employees of the Soil Conservation Service (SCS) in Texas. He joined the agency as soon as he graduated from Texas A&M in 1935 and spent the next 16 years in various Texas SCS offices. Turney "set up many a demonstration plot" to show farmers the advantages of building terraces, establishing grassed waterways, and cultivating on the contour. He says it was easy to spot soil erosion back when he started working. Fields were literally washing down the bar ditches and blowing away in dust storms.

He returned to his native Erath County and to his first love--ranching--in 1951. Turney did not, however, give up his devotion and dedication to soil and water conservation. Not only did he practice conservation on his own land, but he continued to preach it as a director of the local soil and water conservation district for 10 years. He donated many a day to encourage other ranchers to improve rangeland in order to hold soil and rainfall on their land. He believed then, and believes now, that four basic management practices will improve most any rangeland. These practices are (1) limit the number of cattle, (2) rotate herds to protect vegetation and reduce soil compaction, (3) reseed worn-out pastures, and (4) control undesirable brush.

As a district director, Turney's interests broadened to include flood control projects. His district constructed the first SCS upstream flood control project in Texas while he was a director.

Turney's voluntary conservation activities eventually took him from one end of the state to the other. This year marks his fifteenth year as a state director for the Texas Soil and Water Conservation Board. His most recent activities as state director include developing an agricultural nonpoint source pollution management plan for the state.

Still actively ranching, raising peanuts, and practicing soil conservation, Turney says he will retire as a state Board director in May of this year. Does that mean he will stop encouraging others in conservation? Hardly. He will continue to drive to Stephenville twice a week to teach future soil conservationists, now students at Tarleton State University. He will also continue to "show and tell about" his own well-managed range and fields.

Without question, the professional and voluntary efforts of Henry Turney, conservationist, have paid off in terms of more usable water and more productive land on his own land, in his district, and in his state.