

Soil Conservation

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Iowa farmers turning to conservation tillage to control soil erosion losses

By Lynn Betts, information officer,
Soil Conservation Service

If you've been reading about or listening to news reports of soil erosion problems in Iowa, you should be concerned. Maybe even frightened. Why? Because soil erosion in this leading agricultural state is the worst in the country.

A national resource inventory just released by the USDA Soil Conservation Service (SCS) shows that the average yearly soil erosion on Iowa cropland is 9.9 tons an acre. That's more than two times the national average of 4.8 tons an acre each year.

"The inventory showed our cropland is producing 261 million tons of sediment a year, the most of any state," says William Brune, state conservationist for the SCS. Soil conservation districts in Iowa have set "allowable" soil loss rates of 3 to 5 tons an acre each year. At that rate of loss, topsoil can replenish itself, researchers believe.

Brune says soil loss is one of a number of circumstances leading Iowa farmers to reduced tillage.

"Farmers are in a dilemma. Many are trying to produce more corn and soybeans than they did 10 years ago but are finding they need to do it with less fuel, less time, and, in many instances, not as much topsoil. Tilling the soil less, making fewer trips across the field, is their answer," Brune says.

Soil erosion

Soil erosion has been a concern in Iowa since the early 1900s, and organized efforts to care for the land have been going on since the 1930s.

"There's more public concern for the land now than at any time in the past 30 years," Brune says. He conceded that soil erosion is not as dramatic as a flood, tornado, or fire, but maintains the cumulative effect over the years can be just as disastrous.

According to SCS, half the topsoil has been lost on unprotected sloping soils in the past 100 years of farming. There is generally 6 to 8 inches of topsoil remaining, and that is being lost at about an inch every 12 years.

In other terms, 2 bushels of topsoil are being eroded for every bushel of corn being produced on unprotected land. Only a third of the land in Iowa is adequately protected against soil erosion.

Southern Iowa study

A soil depletion study conducted on 2.1 million acres of unprotected cropland in

Southern Iowa last year shows similar results. Conducted by SCS and the USDA Economics, Statistics and Cooperative Service, the study concluded that 40 percent of the 2.1 million acres will be severely eroded by the year 2020 if erosion continues at present rates.

"Right now, about 10 percent of that land is severely eroded," Brune says, "and that's why much of it is in pasture or meadow. It's not easy to grow corn and soybeans on subsoil."

That same study also showed reduced tillage and contouring are the most economical ways of reducing soil losses to tolerable levels. Costs of soil conservation were projected over the 2.1 million acres for the next 40 years.

The study showed crop residues and contour farming, used in conjunction with other methods, could cut costs of conservation by as much as two-thirds.

Crop rotations and terraces were the most expensive methods of erosion control at \$41.35 per acre per year. By contouring and leaving crop residues on the ground, not as many terraces would be needed and more land could safely be planted to corn and soybeans. The cost would be \$14.35 per acre per year.

Two basic ways

"Really, there are two basic ways to stop sheet erosion," says SCS state resource conservationist Mervin Danielson. "The first is to get a protective cover on the land so raindrops don't dislodge the soil. The second is to reduce the length or steepness of a slope so water doesn't get up a head of steam to carry topsoil off the land."

Danielson says crop residues do both. The residues on the surface protect the soil, and they also serve as miniature barriers on a hillside to pond water up. Contouring serves to reduce the length of a slope, by having each corn or bean row act as a barrier to hold water on the hillside. It's most effective when used with crop residues on the soil surface.

"Conservation tillage and contouring could reduce erosion to acceptable rates on 6 million acres of cropland in Iowa," Danielson says. He also says crop residues could effectively control wind erosion on 4 million acres of land.

Reduced tillage inevitable

"You take a look at the pressures the Iowa farmer is facing today, and you have to conclude he'll be tilling the soil less in the future," Brune says.

The farmer saves fuel with less tillage — no-till planting uses a gallon an acre where traditional plowing, disking and planting operations take five times that much. The time savings is also important, as the size of farms increases. "You'll notice a good percentage of the farmers who are taking on more land are using minimum or conservation tillage," Brune says.

From a soil conservation standpoint, conservation tillage is seen as the key practice to protect cropland. Although SCS has historically offered numerous "alternative" methods in helping farmers control erosion, Brune says the agency is

actively focusing on crop residue as a primary method.

"SCS has been promoting crop residue use, because we just don't see a more logical way to control sheet erosion and continue to raise corn and beans," Brune says.

He cited a recent inventory by the state's soil conservation district of total conservation needs in Iowa. "The inventory showed the total cost for the practices needed to protect our land to be \$6 billion," Brune says. More than half of the cost was for terraces.

"We know conservation tillage won't control soil erosion completely on steep land, and that terraces or rotations are needed along with tillage.

"But we just don't see where \$3 billion will come from in the next 20 years to build all the terraces that are needed. And we don't see a mass return to rotation farming, even though that would be excellent for erosion control," Brune adds.

Residue use growing

Because of advantages like fuel and time savings, and the low cost of converting to conservation tillage farming, thousands of Iowa farmers have cut back on tillage operations in the past 10 years. Last year, less than half of Iowa's 20.6 million acres of corn and soybean land was prepared for planting with a moldboard plow.

When a bill was introduced in the Iowa Legislature this year to ban fall plowing of soybean ground, the general reaction was that few farmers fall plow soybean ground now. That would not have been the case 10 years ago, when fall plowing of both corn and soybean land was common.

"Researchers have told us there is no

advantage to plowing soybean ground, and I think we'll be getting more reports that say the same is true for corn ground," Brune says.

The use of conservation tillage has been the fastest growing soil conservation practice in Iowa. "To go from 440,000 acres in 1968 to 10.8 million acres in 1978 (land planted without use of a moldboard plow) is phenomenal," Brune says.

"Ten years ago, I'll bet 95 out of 100 farmers would have cringed to think about switching from their clean plowed fields to leaving residues on top. Now, even the farmers who haven't yet switched are open-minded about the advantages."

Holdover attitudes

There are some holdover attitudes about clean plowing among those who have switched to disking or chiseling their land. There is still a tendency to till the land more than is necessary to get a good crop.

"Our 1978 tillage survey indicates that only 40 percent of the 10.8 million acres of conservation-tilled land had more than 2,000 pounds of residue an acre after planting. The other 60 percent may not be doing an effective job of erosion control," Brune says.

The Soil Conservation Service would like to see more widespread use of no-till farming. The agency is actively promoting what they call the "cadillac" of conservation tillage methods. Last year, only 68,700 acres of no-till was reported, but SCS expects that to change this year.

"We expect there has been less tilling with this year's late spring, and hope we'll continue to see more acceptance of conservation tillage in Iowa," Brune says.



Ridge planting

Iowa farmers increasingly are turning to various forms of minimum or conservation tillage in an effort to control soil erosion. Over the past 13 years one farmer had adapted planting practices used in the cotton fields of Arizona for planting corn and soybeans in Iowa. See story and pictures on page 4A and 5A.

This special section on soil conservation was prepared by Dale Johnson, associate director of publications, communications division, Iowa Farm Bureau.

Iowans concerned about soil conservation

By Dean Kleckner, president
Iowa Farm Bureau

Soil erosion is approaching the crisis stage, and a crisis prompts action. Tillable soil is our most important natural resource.

We are losing an average of 9 tons of soil per tillable acre per year, and during some years the loss is many times greater. We cannot afford to allow this level of loss to continue.

Because of the crisis in the 1930s, we learned and began to apply practices to protect the soil. Terracing, contour plowing, strips farming, crop rotation, farm ponds and shelter belts reduced soil erosion. And we established

the Soil Conservation Service which provides a structure for federal, state and local cooperation with emphasis on local control of the program through elected soil district commissioners.

The effectiveness of this structure is recognized by federal and state officials who are now relying on soil districts for help in implementing water quality plans.

The combination of resources which make Iowa such a highly productive agricultural state also are conducive to soil erosion and water siltation. Heavy rainfall during preparation for planting and throughout the growing

season make soil erosion difficult to control, and our rolling topography, when subjected to heavy rainfall, causes siltation of our many rivers and lakes. These conditions make it imperative that more effective conservation practices be used.

Strong demand for farm products to meet foreign and domestic requirements in recent years has relegated soil conservation to a low priority. Farmers are using heavier equipment, applying more fertilizer and pesticides, and have replaced crop rotation with continuous cropping in an effort to meet this demand.

The high cost of modern farming along with inflation has also limited funds for conservation. There is overwhelming evidence that Iowa is losing the battle with soil erosion. Soil losses in Iowa have been greater during the 1970s than in any decade in this century.

However, there is a growing awareness among farmers that a crisis is near. At the Iowa Farm Bureau Federation annual meeting last December the following resolution was adopted.

"We believe that additional soil conservation practices and structures are necessary to effectively control nonpoint

source pollution. These long-term practices and structures are increasingly costly. We believe cost-sharing provisions will be necessary to effectively carry out voluntary conservation programs.

"We also recommend the use of tax incentives or credits as a procedure for encouraging soil conservation.

"Farmers are becoming increasingly aware of the need to conserve soil and water resources. To assist them in this goal, we favor an accelerated educational program in soil and water conservation.

"We urge all landowners to have a soil conservation plan for their farm and a schedule to implement such a plan."

Iowans, other than farmers, are also showing a greater awareness of the need for soil conservation and water pollution control. The State Land Preservation Commission, following the recommendations of a large majority of county land preservation commissions, recommended that soil conservation be given a high priority in a state land preservation plan.

Iowa was the first state to appropriate funds for cost-sharing soil conservation practices and the legislature increased those appropriations to over \$5 million annually during the last session.

During the past 2 years committees have been meeting in all counties and in all conservancy districts to develop best management practices to control erosion and improve water quality. Soil conservationists working with individual farmers to implement these practices would be a major conservation achievement.

An increasing number of farmers are using minimum and no tillage practices with good results. In addition to controlling erosion, these practices also conserve energy.

Reducing soil erosion to tolerable and practical limits in Iowa will require a large investment over a long period. The federal government recognized the inability of farmers to bear the total cost when it established the cost-sharing program.

Every soil district has a waiting list of farmers who are ready to pay their share to implement the soil conservation plan for their farms. However, federal funds have not been sufficient to finance the present voluntary program.

Until soil conservation is given high priority by the federal government and supported by federal appropriations, excessive erosion will continue. Programs developed by locally elected district commissioners are limited by the availability of federal funds.

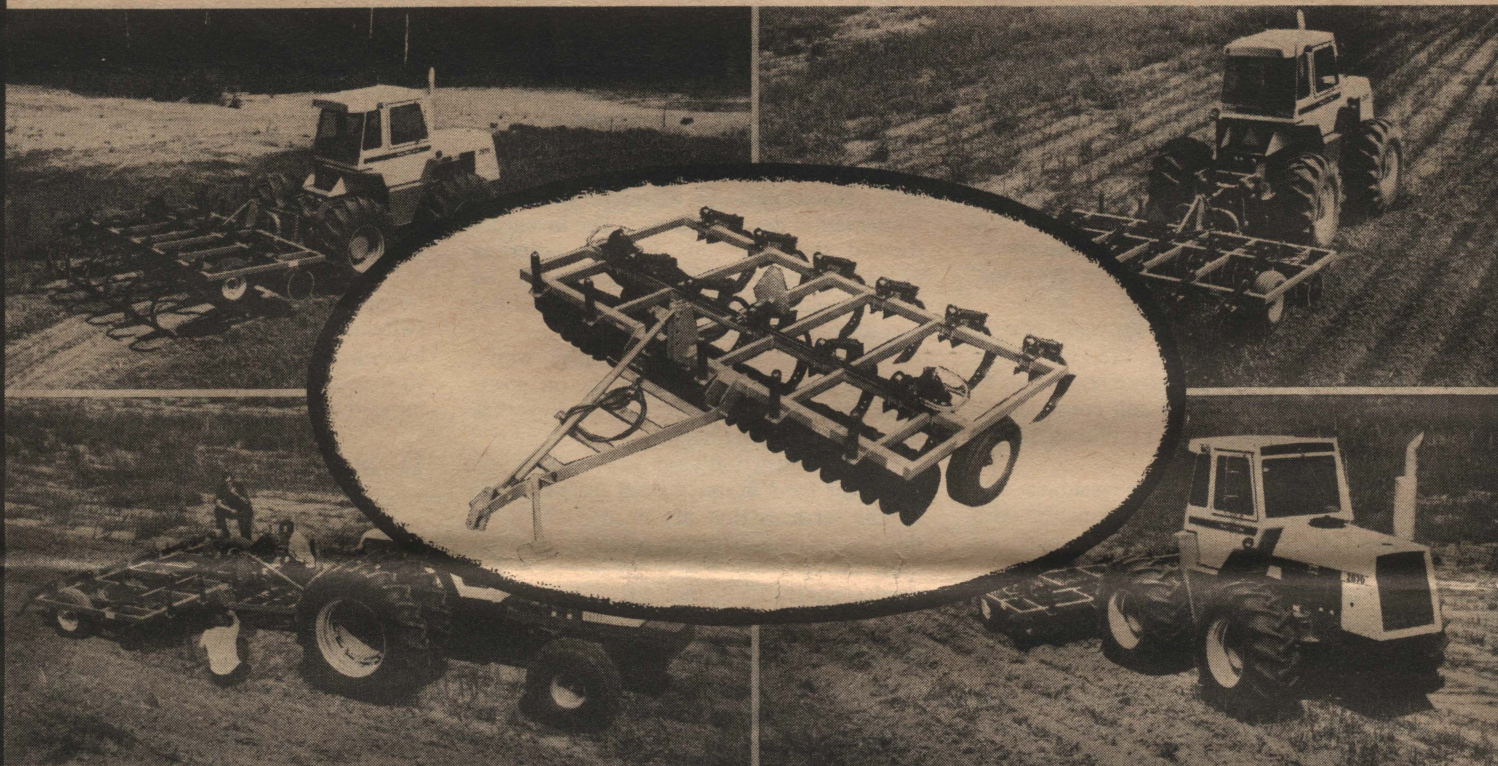
The administration has recommended that conservation cost-sharing programs be held at \$208 million, the same as last year and that 1,000 positions at the Soil Conservation Service be eliminated. Most of these people are technical soil conservationists who help farmers develop erosion control plans.

There is a very real need to control federal spending, but soil erosion is approaching a crisis point. Secretary of Agriculture Bob Bergland has warned that failure to deal with soil erosion and related environmental problems can only put the country on a collision course with disaster.

We hope a repeat of the dust bowl of the 1930s will not be necessary to alert our national leaders to the seriousness of the problem.



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Iowa Legislature continues \$5 million soil conservation cost-share funding

By Ken Tow
Iowa Department of
Soil Conservation

The 68th Iowa General Assembly has continued funding for the soil conservation cost-share program administered by the Iowa Department of Soil Conservation with \$5 million for each of the next 2 years. Appropriations made since the program was initiated in 1973 now total \$29.45 million.

The department will make initial allocations to the state's 100 soil conservation districts on July 1, 1979, when the first \$5 million of the 2-year appropriation becomes available. The state agency has 4 years to expend the funds from the date they are first received.

Allocations to the individual districts are made on the basis of need and the district's ongoing program. They must be approved by the state soil conservation

committee, the policy-making arm of the Department of Soil Conservation.

The state cost-share funds have traditionally been used to cost share on the installation of permanent soil conservation practices. Those practices have included terraces, sediment control basins, grade stabilization structures, grass waterways, hay and pasture land establishment, critical area plantings and field windbreaks.

publicly-owned lakes.

Fifty percent is the standard cost-share rate for permanent soil conservation practices installed under the auspices of the program. Mandatory conservation work and construction in priority watersheds above publicly-owned lakes are exceptions to the rule and are allowed a 75 percent cost-share rate.

Offering the higher level of cost-share assistance above certain publicly-owned lakes was initiated by the legislature last year at the urging of the Iowa Conservation Commission. Requests from soil conservation districts for these watersheds are funded on the basis of a priority list developed annually by the commission.

The additional incentive will hopefully induce greater landowner participation resulting in more complete upland treatment where potential for damage to a publicly-owned lake is high.

The 75 percent cost-share rate for mandatory soil conservation work was specified in the law when enacted by the General Assembly in 1971. Even so, the actual cost to individual landowners has often been higher in enforcement situations. Practices necessary to bring the

land into compliance had to be installed within 1 year of the date the district mandated that the work be done.

The 68th General Assembly modified the impact of that requirement somewhat by amending that section of Iowa's soil conservation laws dealing with erosion control. Effective next Jan. 1, a landowner cannot be required to incur a cost for mandatory soil conservation work in a calendar year that exceeds \$10 per acre for each acre he or she owns.

Landowner cost

Cost to landowners could still be significant. For example, a person who owns 400 acres of land could be required to expend \$4,000 in a given year. A mandatory soil conservation project that required a \$12,000 landowner expenditure on the same farm would now be allowed 3 years for completion.

During the first 5 years of the cost-share program, soil conservation districts received 18,888 requests for assistance. Help was provided to 11,622 landowners and district cooperators.

Last year alone, some 758 miles of terraces were constructed in conjunction with the state-funded program. Other practices included 514 sediment control basins; 163 grade stabilization structures; 237,132 lineal feet of waterways; 185 acres of pasture and hay planting; and 2,640 lineal feet of field windbreaks.

'77-'78 Program Year 50 Percent Cost-Share Rate

Backbone	Big Creek	Black Hawk
Bob White	Miami Lake	Clear Lake
Green Valley	Pleasant Creek	Crystal
Lake Anita	Lacey-Keosauqua	Five Island
Lake Keomah	Mill Creek	East Okoboji
Three Fires	Swan Lake	West Okoboji
Nine Eagles	Thayer Lake	Spirit Lake
Prairie Rose	Williamson Lake	Silver Lake (Dickinson)
Red Haw	Lake Pahoja	Storm Lake
Union Grove	Rathbun	Ingham Lake
Viking	Lake Icaria	Silver Lake (Palo Alto)

'78-'79 Program Year 75 Percent Cost-Share Rate

Red Haw	Darling	Pine Lake
Macbride	Beeds Lake	Silver (Palo Alto)

'79-'80 Program Year 75 Percent Cost-Share Rate

Beeds Lake	Macbride	Lake Wapello
Geode	Pine Lake	Springbrook
Ahquabi	Rock Creek	Don Williams
Lake Darling		

This listing of priority lakes in Iowa shows those which received 50 percent cost-share funding in 1977-78. In the 1978-79 program year, the funding was increased to 75 percent. This funding level will be continued in 1979-80 for 12 lakes which are eligible to receive the funds.

Iowa counties helping cost-share on erosion controls

Twenty-seven Iowa counties have done something innovative this year in that they have appropriated \$550,000 to aid soil conservation efforts.

The funds are being used to cost-share on soil conservation practices, to assist in providing technical assistance and for special programs, according to Bill Brune, director of the Soil Conservation Service in Iowa.

He said the funds are being appropriated by county boards of supervisors using federal revenue sharing funds or state rural development funds.

"To me, it's a total cooperative effort between federal and state agencies and now the counties," Brune said of the emphasis on soil conservation.

Counties were asked to appropriate the funds following an inventory of conservation and water resources in each soil conservation district under the Soil and Water Resources Conservation Act of 1977. The act's purpose is to develop statewide plans for conserving water and soil resources.

The district inventories showed the soil conservation needs in each county and prioritized which practices should be completed first. Brune said these reports were then shown to county supervisors who decided to take action.

Although many counties did not appropriate soil conservation

funds this year, Brune said many district commissioners were urged to request funds next year.

Polk was the first county in the state to appropriate soil conservation funds. Polk officials authorized \$131,200 per year for a 2-year period beginning in 1978 to cost-share on conservation practices.

Since then, seven other counties have appropriated \$262,000 in cost-share funds. The counties and the funds appropriated are: Henry — \$125,000; Lee — \$15,000; Scott — \$30,000; Boone — \$20,000; Story — \$52,000; Keokuk — \$10,000; and Appanoose — \$20,000.

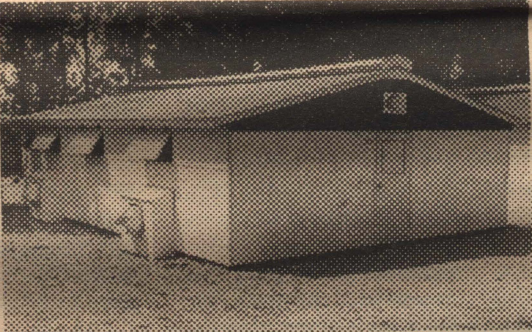
In addition, 14 counties have appropriated \$138,300 this year to provide technical assistance in soil conservation planning efforts. They are: Floyd, Allamakee, Winneshiek, East and West Pottawattamie, Butler, Hardin, Palo Alto, Calhoun, Marshall, Marion, Polk, Page and Cerro Gordo.

And six counties have authorized \$23,300 for newsletters and conservation education programs. They are Winnebago, Grundy, Pocahontas, Polk, Winneshiek and Hancock.

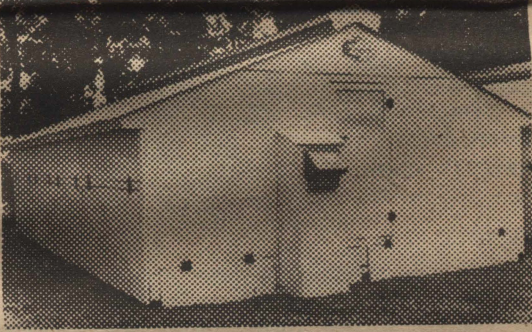
Brune also noted that Mitchell county has authorized \$8,000 for the purchase of special conservation tillage equipment.

He added that he expects more counties to authorize soil conservation funds next year.

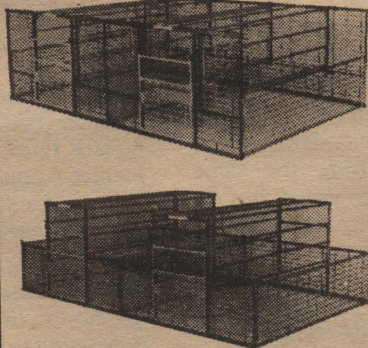
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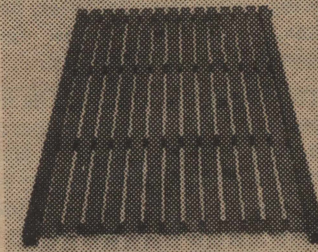
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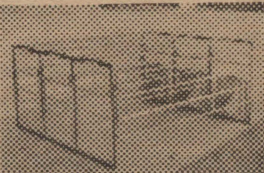


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No-till planting in ridges saves time, money, soil

A Central Iowa farmer has found a way to control soil erosion and is telling other farmers about it.

Ernest Behn of Boone and his son, Jerry, plant corn and soybeans in crop residues on most of their 1,400 acres of farmland. In fact, Ernest has been doing this for the past 13 years and says it works with crop yields matching those from conventionally-tilled fields.

Behn was even written a book, *More Profit with Less Tillage*, describing the evolution of his system and how it works. He's also the subject of a slide-tape presentation produced by the Soil Conservation Service.

Behn's system is called till-planting whereby he leaves last year's crop residues on top of the ground and plants in the ridges. To clean the seedbed area of residues, the planter pushes the residues into the valleys between the ridges.



Behn

Rat race

There are no other trips involved outside of chopping cornstalks, applying fertilizer and cultivation two times during the summer. Gone are tillage practices which Behn says constitute the "rat race".

He describes the rat race, which he says most farmers are caught up in, as the race to chop stalks, apply fertilizer, disk the ground and to plow in the fall. In the spring the race continues as farmers do further disking, apply more fertilizer, harrow their fields, plant their crops, rotary hoe, cultivate and spray for weeds.

The race involves making as many as 14 trips over a field just to get a crop planted and the weeds controlled. It also requires numerous pieces of expensive machinery, time and endurance on the part of the farmer. And soil erosion largely continues unchecked.

Like most farmers, Behn was an active participant in the rat race until one day he decided there had to be an easier method, one which would save time, money and control erosion.

So in 1963, he tried chisel plowing part of his farmland to solve some of his problems. Instead, he encountered other problems such as crop residues keeping the soil cold in the spring and wet in the spring. This delayed planting resulting in poor crop stands and weeds.

Despite the problems, Behn raised 126 bushel per acre corn off the chiseled ground, 20 percent higher than previous yields. Still dissatisfied, he looked for yet a better method.

And he found it in the cotton fields of Arizona where farmers were using special equipment to make ridges in their fields. The valleys, however, were kept clean and used for irrigation.

The principle looked good, Behn thought, but instead of leaving the valleys clean he wanted to retain the crop residues to catch falling rain and to control soil erosion.

Observers scoffed at Behn's first attempt at till-planting with casual comments such as "It's planted but it will never come up" and "It's up but it will never have ears on."

One observer even said "If I have to farm like that, I'll quit farming. It looks terrible."

But Behn continued developing his system, mostly through trial and error. He knew the remaining crop residues held the water, controlling erosion.

Comparable corn yields

To check yields with the ridge planting system, he compared corn yields between till-planting and conventional tillage from 1966 to 1969. He did this by using both systems in the same field plowing three strips each 20 rows wide to be conventionally tilled.

Both systems were planted the same day and in the fall the corn was harvested and hauled to town where it was weighed.

The first year his till-planted corn outyielded the conventional-planted corn 16 bushels per acre. Using the same procedure, his till-planted yields topped conventional-tilled yields by 4 bushels in 1967, 5 bushels in 1968 and 9 bushels in 1969.

Averaged together, the yield increase was more than 8 bushels per acre. "Statisticians

say I should be cautious about talking too loudly since I do not really have enough samples and replications to be completely sure of the results," he says. "I guess this is true but I'm certain in my mind that I did not get a yield reduction.

"If I can maintain my yield, I'm way ahead."

Way ahead in yields is exactly what Behn was in the drought conditions of 1977. While other farmers in the area were getting from zero to 25 bushels of corn per acre, Behn harvested 75 bushels per acre.

"It was only about half a crop, but when you compare it with zero it was pretty good."

Last year, his corn yields ranged from 128 bushels to 165 bushels per acre. Soybean yields ranged from 47 to 60 bushels per acre.

With his till-ridge planting system, Behn says he has solved all of the problems cited as reasons for lower yields when planting in crop residues. Also, he says he's found other benefits, including a 50 percent savings in fuel.

American farmers together could save 250,000 barrels of oil per day, or almost 100 million barrels a year by using ridge planting he estimates.

Till-planting

Behn today uses a John Deere Max-Emerge planter to plant his corn and soybeans in the ridges in addition to a Buffalo planter. The John Deere planter has furrow openers for each row to cut and remove residues and stabilizers to keep it on the row. The seedbed is then cut by another coulter, the seed dropped about 1½ inches into the ground and covered by two rollers.

While he likes the plateless planter and the uniform emergence, he says that the cutting coulters are not designed to cut through residues. This year, he has had to replace 12 of the 16 coulters on the 8-row planter because of breakage. He attributes this to metal fatigue and says they should be made stronger.

Behn notes that when he plants he tries not to cut the ridges too low. If the ridges are cut too low he says water will then run down the seedbed instead of into the valley

where it is held by the residues.

In the spring, he applies nitrogen and then uses Bladex and Lasso on his corn to control weeds. On his soybeans, Lasso and Sencor are used. He applies 150 pounds of nitrogen, 70 pounds phosphorous and 100 pounds of potash on his corn. On his soybeans, he adds only 50 pounds of phosphorous and 60 pounds of potash.

The fertilizer rates vary depending on soil tests taken every 2 years.

Soil temperature

Behn says the ridges warm up just as fast as fall-plowed fields, he says. Also the seed temperature and found them comparable. But between the ridges and the valleys there can be a 16 degree temperature difference.

And after the trash is removed and the seed planted, the ridge warms up as fast as fall-plowed fields, he says. Also the seed germinates quickly in the warm, moist soil which he says is ideal for a seed because of the thawing and freezing during the winter months.

Removing the trash from the seedbed has a couple of benefits, according to Behn. First, the process removes weed seeds which he says can live in the soil for years. Through cultivation, the weeds are gradually eliminated.

"I know fields that have been kept positively clean of weeds through handpulling and cultivation for 30 years. But still there are weeds such as velvetleaf and sunflower coming up."

Secondly, volunteer corn is pushed into the valleys and eliminated through cultivation in soybean fields.

The cultivation process is important in the till-planting system, especially the second time through the field when the ridges are built 7 to 8 inches high for next year's crop.

Conventional tillage is costly with fields subject to wind and water erosion, soil compaction and poor moisture conservation, he points out. Till-planting, however, has proved to be ideal.

As Behn sees the future, the bottom line reads, "Farmers can and must farm with residues on the surface. We can do it of our own volition or by order of environmental agencies."



Ernest Behn of Boone plants his corn and soybeans in the ridges from last year's crops. He uses a John Deere Max-Emerge planter (top photo) to cut through the crop residues, plant the seed, and firm up the soil around the seed. Behn planted this 40-acre field to soybeans on May 22 and reported that by May 29 the young seedlings were just starting to emerge. With the trash pushed off to the side during planting, the soybeans had all emerged by June 4 (right photo), 13 days after being planted. Behn says the ridges are as warm as a fall-plowed field and ideal for planting because the soil is moist and mellow (photo lower left). He says there can be a 16 degree difference in temperature readings between the top of the ridge and the valley between the rows.



Iowa officials will seek \$2 million under federal Rural Clean Water Program

Iowa officials will ask the federal government for \$2 million under the Rural Clean Water Program to halt nonpoint source water pollution in three state lakes.

Dan Lindquist, with the Iowa Department of Soil Conservation, says excessive soil erosion is causing damage, chiefly siltation, in the three lakes, one of which is a backup water supply for a nearby city.

The three lakes are Prairie Rose in Shelby county, Green Valley in Union county and Lake Wapello in Davis county. They were selected from a list of high priority water bodies in the state.

\$75 million

The Rural Clean Water Program resulted from an amendment sponsored by Iowa Sen. John Culver to the 1977 Clean Water Act. Congress approved the amendment and authorized \$200 million in fiscal year 1979 and \$400 million in fiscal year 1980.

While the program received no funds last year, President Carter has recommended that \$75 million be appropriated for the 1980 fiscal year.

However, the U.S. House appropriations committee last week did not include any funds for the program in fiscal 1980.

Cost of correcting the problem nationwide is estimated at \$10 billion.

The \$2 million price tag to clean up the three lakes in Iowa "is conservative" and may in fact be higher, says Lindquist.

Under the Rural Clean Water Program, farmers can receive 50 percent of the cost of a soil conservation measure aimed at halting soil erosion, the nation's

primary nonpoint source pollutant.

But because of the magnitude of the projected costs, Lindquist says Iowa will ask for cost-share funds to cover 75 percent of the corrective measures needed in Prairie Rose and Green Valley and 80 percent in Lake Wapello.

It would be cost prohibitive to expect the adjoining landowners of the three lakes to cost-share at the 50 percent level outlined under the program, Lindquist says.

"We feel that there are some definite off-site benefits to the public and that the amount of federal funds should be higher than 50 percent.

"However, Iowa will have to compete against other states for the cost-share funds. Funding at levels higher than 50 percent may not be possible," he adds. There are several requirements that proposal projects must meet before the federal funds can be spent. For example, identified project areas could be in blocks up to 100,000 acres.

And in the first 3 years after funds are appropriated, 50 percent of the landowners must agree to participate in the watershed project. Within 5 years, 75 percent of the landowners must sign agreements.

Approved measures

The agreements call for the landowners to install approved soil erosion control measures over a 5 to 10 year period and to maintain the measures after completion.

These approved measures, which include practices such as terracing, grassed waterways and water diversion structures, are outlined in Iowa's plan to control nonpoint pollution under Section 208. The measures, called best management practices, are required to meet the guidelines of Section 208 of the Clean Water



Iowa officials will seek \$2 million under the Rural Clean Water Program to clean up and prevent future soil erosion into three Iowa lakes. The lakes are Prairie Rose in Shelby county, Green Valley in Union county and Lake Wapello in Davis county. All three lakes are widely used for fishing and recreation activities with Green Valley also serving as the backup water supply for the city of Creston.

Act to have fishable and swimmable waters by 1983.

This portion of Iowa's 208 plan received conditional approval from the regional Environmental Protection Agency in Kansas City, Mo., in mid-March.

Lindquist said local countywide meetings are scheduled with landowners surrounding the three lakes to explain the program and to obtain participation. Dates of

the countywide meetings, with sites not yet confirmed, are: June 19 — Davis county; June 21 — Shelby county; and June 26 — Union county.

Following is a description of the three lakes and their problems.

Prairie Rose in Shelby county covers 4,450 acres. The lake, which also serves as the water supply for the park, has excessive sediment with its tributaries filling in with soil.

Green Valley in Union county covers 5,100 acres and serves as the backup water supply for the city of Creston and the primary water supply for the park. It's being affected by excessive sedimentation.

Lake Wapello in Davis county covers 5,000 acres. It suffers from severe gully erosion and the suspension of fine soil particles in the water. It also serves as the park's water supply.

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Iowa farmers complying with soil loss limits law

Since Iowa established its soil loss limits law, there have been 500 complaints filed against landowners, with all but 56 settled voluntarily out of court.

Leon Fodderberg, resource conservationist with the Iowa Department of Soil Conservation, says of the 56 requiring administrative orders directing landowners to halt soil erosion, 43 applied for state cost-share funds, 9 complied without cost-sharing assistance and 4 are pending court action.

Iowa's soil erosion law was first funded in 1973 and applies to both agricultural and non-agricultural land. However, cost-share funds are made available by the department on only agricultural land.

Under the law, each of Iowa's 100 soil conservation districts was directed to establish reasonable soil loss limits for its county or district. The soil loss limits established vary from 2 to 5 tons per acre annually depending on the class of land.

Under current policy, only a landowner whose land or property is being damaged by sediment coming from the land of another property owner may file a

complaint with the soil conservation district.

District commissioners investigate complaints to determine if damage has occurred and if the soil loss limits are being violated. If the limits are being violated, notice is given to the landowner and a voluntary solution is sought.

An administrative order, which can be enforced with court action if necessary, is issued when the landowner will not voluntarily

correct a problem. Before legal action can be taken the landowner must have access to at least 75 percent cost-share funds for permanent erosion control practices such as terraces, waterways, and grade stabilization structures.

While the state cost-share funds are intended primarily for use by voluntary cooperators, 5 percent of the appropriation made to each district is set aside for use in correcting valid complaints.

National soil erosion laboratory to be built

Construction of a \$3.6 million National Soil Erosion Laboratory should be underway by this summer, according to Earl R. Glover, acting regional administrator for agricultural research of USDA's Science and Education Administration (SEA).

The laboratory will be built on the Purdue University campus in West Lafayette, Ind., and should be ready for occupancy by late

1980 or early 1981. The two-story building will provide space for about 15 SEA agricultural research scientists and a support staff of 22.

"There also will be space for cooperating Purdue research and teaching staff as well as graduate students and visiting scientists," Glover said. "We will give special attention to erosion problems on disturbed lands, such as strip mine and construction sites."



Floyd Cornelius of Maquoketa has been experimenting with crownvetch to control soil erosion in fields planted to corn for the past 4 years. On first-year corn he plants two 20-inch rows and then skips the next two to enable the crownvetch to become established. The crownvetch completely controls soil erosion, he says, but because of the legume's growth pattern it is difficult to suppress and it poses problems when harvesting corn in the fall.

Crownvetch controls soil erosion in corn but there are problems, says Iowa farmer

Remember the Northeast Iowa farmer who 4 years ago seeded crownvetch in his corn to help control soil erosion and to put nitrogen in the soil?

Floyd Cornelius of Maquoketa seeded the legume in a 100 acre field. The Jackson county farmer began experimenting with crownvetch because of soil erosion losses of 50 to 100 tons per acre in the area. Most of the land is class six and seven in the county.

Cornelius says the crownvetch worked — it completely controlled soil erosion and it put nitrogen into the soil. However, there are a couple of drawbacks when using crownvetch.

First, he has lost three head of cattle from what appeared to be bloat. The cattle foraged on the crownvetch after harvest and were not supposed to bloat from the legume. At least that's what Iowa State University told him.

Cornelius admits though he's not sure the crownvetch was the exact cause.

The second drawback to crownvetch is that it can be troublesome during harvest unless it is suppressed during the growing season. If it is not suppressed, he says it will grow about 2 feet high. Because of its characteristics, the plant is very viny.

The vines then become entangled on the corn picker's snouts. He says if the snouts were raised too high, ears of corn on the lower portion of the stalk were missed. So he "plowed" his way through until he learned how to suppress the legume.

"I've seen it only a couple of inches high at lay-by time but at harvest it would be 2 feet high, which is too high," Cornelius says. "You have to suppress it with banvil or 2,4-D. It almost takes a weed control expert to handle it right."

Good for soil

However, he points out that the legume is good at putting nitrogen into the soil and in

conditioning the soil. He says its deep roots easily absorb nutrients in the soil and provide avenues for water to filtrate the soil. And there is no washing of soil in the field.

Crownvetch seed is also difficult to harvest, he says. The problem is that the plant will have green seeds, flowers and ripe seed at the same time. Frequently the ripe seed falls on the ground.

Cornelius figures he's lost between \$10,000 and \$15,000 worth of seed because of this problem. The price of crownvetch seed has also increased in the past 4 years from \$3 per pound to a reported \$12 per pound today.

Cornelius farms 900 acres, raising corn, winter wheat, soybeans and hay. What he did to help hold his Fayette-Muscatine soil in place was sow the crownvetch in a 100 acre field. Most of his land has a slope of 2 to 3 percent.

He chose crownvetch because it is a deep rooted perennial which has been widely used as a bank stabilizing and erosion control plant for roadsides in Pennsylvania.

The idea to try crownvetch originated from studies conducted by Pennsylvania State University (PSU) weed scientist Dr. Nathan L. Hartwig. Hartwig has conducted numerous studies on crownvetch and soil erosion.

"Hartwig said planting crownvetch in crops would work anywhere there is a humid climate. So I figured it should work here in Iowa," Cornelius explains.

No-till planter

Cornelius tried various methods of establishing the crownvetch but found that sowing the legume before corn planting worked the best. He uses a no-till planter sowing the seed at 5 pounds per acre. On first-year corn he plants two 20-inch rows and then skips the next two. He plants 19,000 seeds per acre the first year and then increases the rate to 28,000 per acre.

Crownvetch was selected for the experiment for three reasons. Cornelius says it eliminates the need for plowing, it

cuts down on fertilizer needs and it does not seem to be affected by insects.

Crownvetch fixes nitrogen from the air when inoculated with the right bacteria and can put 65 to 100 pounds of nitrogen into the soil each year.

How has crownvetch worked for Cornelius?

He says the first 2 years he tried the legume he had problems because of dry weather. But last year, everything worked as planned with corn yields averaging 110 bushels per acre — without additional fertilizer.

He has also learned that after the legume is established it will take up to 4 pounds of atrazine without dying.

Still problems

But still there are problems with the legume. "I think the system will work but we'll have to find a different legume," Cornelius states.

Dr. Hartwig at Pennsylvania thinks cowpeas may be the solution. The cowpea is native to Central Africa and was first grown in North Carolina in 1714. Since then it spread throughout the southern states where it was the leading legume until soybeans became popular.

The legume is a short-day, warm-weather crop grown primarily under humid conditions. But it has been grown as far north as Southern Illinois, Indiana, Ohio and New Jersey. It is similar to corn in climate adaptability except it has a greater heat requirement.

It has been grown in corn and cotton rotations in the south to supply nitrogen and organic matter. It is also viny but is considered desirable when planted in mixtures with corn or sorghum. The legume can be fed to livestock.

Cornelius is convinced that planting a legume in corn checks soil erosion. "I'm sure we're on the right track. It's just a matter of getting the right technique," he says.

There is another positive aspect to crownvetch. And that is it can be grown on

steep hillsides which normally have the poorer soils. But there are hazards involved when planting on steep hillsides as was aptly demonstrated at PSU.

One PSU researcher sowed the legume with corn on one hillside so steep the planter upset. Cornelius, who traveled to Pennsylvania to visit with Hartwig, saw pictures of the incident.

So how was the corn harvested if the hill was so steep? It was accomplished with an old-fashioned one-row picker, according to Cornelius.



Cornelius plants the corn in rows 20 inches wide to enable the legume to establish itself.

Soil and Water Conservation Week Sept. 9-15

Soil and Water Conservation Week in Iowa will be Sept. 9-15, reports Min Amemiya, extension agronomist at Iowa State University. The observance will highlight the special efforts being made to conserve soil and water, two of Iowa's precious resources.

Soil erosion continues to be a serious problem in Iowa, the specialist warns.

A recent USDA report shows that the rate of soil erosion in Iowa is among the highest in the nation. The continued demand for farm products is expected to maintain pressure for high levels of intensive crop and animal production on Iowa farms, adding to the urgency for greater conservation effort, he said.



Amemiya

Amemiya encourages farmers to use practices that reduce soil and water losses and minimize the entry of sediment, plant nutrients and other organic and inorganic materials into streams and lakes.

On row crop land, he advocates contour farming, strip cropping, grassed waterways, terraces and conservation tillage systems that leave soil surfaces rough and protected with plant residue.

On land too steep for continuous row crops, the agronomist encourages crop rotation, permanent grass or grass-legume cover.

Wind erosion can also be a problem. Amemiya suggests cropping and tillage systems that leave the surface rough and protected with a mulch of plant residue to reduce soil movement by wind.

Land disturbed for nonagricultural uses is also vulnerable to soil erosion by water and wind. The same principles of controlling erosion on farmland also apply to these areas.

Rain simulator used to study soil erosion

There are some plots of agricultural land in Iowa that have had several years of rainfall and the accompanying erosion in 1 year.

John Laflen, associate professor of agricultural engineering at Iowa State University and researcher with the USDA Science and Education Administration, uses a rainfall simulator to "rain" on the land for his studies of soil erosion at several locations in Iowa.

Now in its second year, the rainfall simulator can cause the equivalent of a year's erosion in a 3-hour rain, Laflen said, so it's faster and more efficient than collecting data from runoff plots during and after natural rains.

The simulator, a small, 4-wheel vehicle with 10 sprayer booms that look like wheel spokes overhead, is used to study soil and water losses under different tillage systems and different crop rotations.

Laflen and other ISU researchers are also looking at chemical losses in agricultural runoff and studying the effect of different row spacings on soil losses from rains.

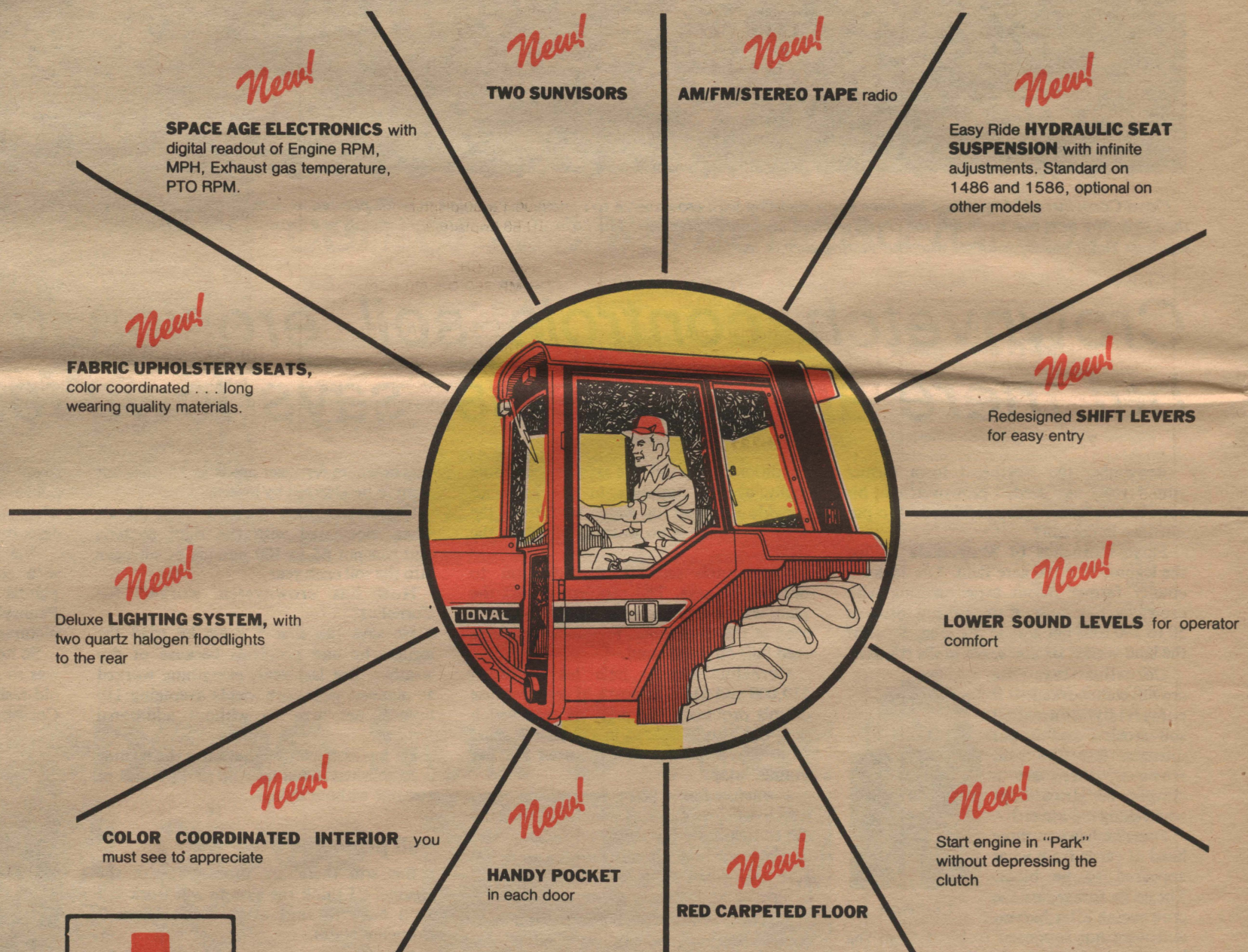


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Brady chisel plow, 11 ft. \$700
JD 1240 plateless planter \$1,500
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bine, 13 ft. plat., 2r CH \$8,500

SCS helping farmers prevent soil erosion

In fiscal year 1978, the Soil Conservation Service (SCS) of the U.S. Department of Agriculture (USDA) helped farmers and ranchers apply minimum tillage on more than 4 million acres, use planned grazing systems on almost 9 million acres, and manage and conserve irrigation water on more than 2 million acres.

SCS helped landowners install 23,000 miles of terraces and nearly 500,000 acres of stripcropping during the year.

Critical area plantings were made on 409,000 acres to stabilize the soil, reduce sediment damage to downstream areas, and improve wildlife habitat.

SCS provided technical assistance to landowners with the installation and care of 7,266 acres of commercial fish ponds.

The number of agricultural waste management systems and the acreage of farmstead and feedlot windbreaks, grassed waterways, and tree planting also increased during the year.

Following is a brief description of a few conservation activities in the U.S. last year.

Resources Conservation Act

The Soil and Water Resources Conservation Act (RCA) which became law on Nov. 18, 1977, will guide the future of USDA's conservation programs. In fiscal year 1978, work was begun to complete the appraisal of the nation's soil, water and related resources. SCS conducted nearly 8,500 state and local level meetings attended by 155,500 people to obtain public views.

Rural Clean Water Program

Final rules and regulations for the Rural Clean Water Program (RCWP), prepared by SCS cooperatively with the Environmental Protection Agency, and the final environmental impact statement for the program were developed in fiscal year 1978. The Clean Water Act of 1977 authorized cost sharing through the RCWP to farmers and ranchers to establish and maintain best management practices for reducing agricultural related pollution of streams and lakes.

Pasture, range conservation

SCS helped farmers and ranchers with more than 2 million acres of pasture and hayland plantings. The agency also helped ranchers reseed more than 280,000 acres of range and use brush management on 2.3 million acres.

Woodlands and windbreaks

SCS provided technical assistance to landowners in planting nearly 413,000 acres of trees, nearly 22,000 acres of farmstead and feedlot windbreaks, and more than 2,500 miles of field windbreaks. SCS helped landowners prepare 278,515 acres for planting or seeding forest crops and practice improved harvesting on an additional 915,700 acres in fiscal year 1978.

ACP

During the year, SCS provided technical assistance to 191,930 farmers and ranchers participating in the Agricultural Conservation Program (ACP).

Great Plains Conservation

In the 10 Great Plains states, 1,702 farmers and ranchers signed long-term contracts to apply permanent conservation measures on 4.1 million acres.

Soil surveys

In fiscal year 1978, 92 soil

survey reports were published and an additional 80 survey manuscripts with accompanying maps were sent to be printed. More than 57 million acres were mapped during the year.

Plant materials

SCS plant materials centers released 17 new conservation grasses, legumes, wildflowers, shrubs, and trees to seed growers in fiscal year 1978. The plants will be used to stabilize critical areas, reclaim surface mined lands, control wind erosion, improve range and pasture and wildlife habitat, and prevent nonpoint source water pollution.

Recreation and wildlife

SCS provided technical and financial assistance for establishing or expanding 602 public recreation developments during the year. SCS also assisted more than 11,000 private landowners in developing commercial and noncommercial recreation facilities.

SCS helped landowners convert more than 200,000 acres from other uses to wildlife and recreation areas and improve 14.7 million acres of land and water for wildlife. The nearly 40,000 ponds installed also benefit wildlife.

Small watershed projects

During fiscal year 1978, 24 more small watershed projects were completed, bringing to 474 the number completed since the program began in 1954. These Public Law 566 projects combine conservation measures and structural and nonstructural measures to reduce flood damage and provide agricultural water management, municipal and industrial water, recreation and wildlife habitat.

Emergency assistance

Under Section 216 of the Flood Control Act of 1950, about \$42 million was obligated for emergency restoration work to protect life and property in 30 states.

Environmental services

In addition to preparing its own environmental impact statements, SCS commented on 471 environmental impact statements for other agencies and cooperated in numerous environmental assessments.

Flood plain management

SCS completed 76 flood hazard studies in 28 states during fiscal year 1978. Through the studies, SCS provides information on managing flood plains to local governments and provides information needed by the U.S. Department of Housing and Urban Development in determining flood insurance rates. SCS issued draft rules and regulations which emphasize the agency's role in providing leadership in the wise use of flood plains and revised flood hazard studies to identify the value of flood plains in their natural state.

River basin studies

Through the River Basin Program, SCS has USDA leadership for water and related land resource planning assistance to Federal, State, and local governments. SCS also leads USDA participation in Water Resources Council interagency studies.

RC&D

During fiscal year 1978, work continued in the 178 areas authorized for assistance under the Resource Conservation and Development (RC&D) program. No new areas were authorized.

1978 Revenue Act changes treatment of federal and state cost-share funds

By Les Friedrichsen, manager
IFBF farm records

The Revenue Act of 1978 provides for a new tax treatment of cost-sharing payments for soil and water conservation programs.

Effective after Sept. 30, 1979, the legislation provides that farmers will no longer have to

include in gross income payments received for federal and state cost-sharing soil and water conservation programs.

However, this is not "free" income to the farmer for he can no longer deduct the cost of the conservation program as ordinary expense. The net effect of this new

legislation will probably not change the tax situation for a great majority of the farmers taking part in the program.

For example, suppose a farmer receives \$2,500 for a cost-sharing program and spends \$2,500 for soil and water conservation work. Under the old program, he would report the \$2,500 as income and then claim it as soil and water conservation expenses on his tax actually paid out. Under the new law, neither is reported on the tax return.

If a farmer has expenses in excess of the federal payments, then that excess can be claimed as soil and water conservation expenses consistent with the rules that have always been in effect (limit of 25 percent gross income from farming).

For example, if a farmer received \$2,500 and spent \$4,000, the \$1,500 spent in excess of the cost-sharing funds received could be claimed as soil and water conservation expenses on his tax

return.

Tax liability

Where this new law will make a real difference in a farmer's tax liability will be for soil and water conservation expenses that are of a depreciable nature. For example, if a farmer received \$5,000 in cost-sharing payments and spent \$5,000 in putting a new tiling system in, the tiling must be depreciated.

This puts the farmer in a situation of paying tax on the \$5,000 in income in the current year (30 percent tax bracket would be mean \$1,500 tax payment) but he would be getting the benefit of the deductions over the next 15 to 25 years. While the net taxes paid out could be the same this could cost a considerable amount of interest money.



Friedrichsen

Under the new law, the \$5,000 would not be reported as income but neither would the tile be set up for depreciation. Nor can the basis of the property be increased by the amount of the cost-sharing payments received.

Recapture

There is a provision that if the land is sold within 10 years after receiving a cost-sharing payment that has not been reported as income, then the entire amount is recaptured as additional tax. The amount of recapture is reduced by 10 percent each year after the first 10 years until after 20 years there is no recapture.

The legislation also provides that the Secretary of the Treasury must determine that the government payment does not substantially increase the income of the recipient in order for the income not to be reported. Final clarification of this provision will probably have to come through an IRS ruling in the future.



After next September, farmers will no longer have to include in gross income payments received for federal and state cost-sharing soil conservation practices to control erosion such as this.

Location of national soil tilth center recommended for Iowa

Soil tilth is a term used to describe soil conditions as they relate to plant growth and water movement. Soils in good tilth are granular with stable soil aggregates, resist compaction, absorb water readily and store it for later plant use.

On the other hand, soils in poor tilth crust and compact easily, resist water intake and induce runoff and erosion. Poor soil tilth will frequently reduce crop yields since it inhibits plants from using

nutrients and soil moisture present.

The quality of soil tilth affects our nation's crop production capacity and influences the quality of our water. Perhaps just as important, good soil tilth results in lower energy inputs for crop production practices.

Improved soil tilth helps to increase fertilizer efficiency, reduces power used for field operations and eliminates some of

the need for soil and water conservation structures.

Long-term effects

There is a great need for better and more complete understanding of the long-term effects of current intensive farming practices on soil tilth and crop yields.

This need for study was first recognized by the 86th Congress in 1959. At that time, as authorized by Senate Document 59, a federally funded Soil Tilth Research Center was recommended as one in a series of regional and national centers for study of specific problems.

Senate Document 59 recommended that the Soil Tilth Center be located at or near a land-grant college or university in the humid section of the country where supporting research facilities are available. Particular emphasis was assigned to study the Midwest corn and soybean soils.

As with many proposals, the Soil Tilth Center has yet to be funded by the federal government. Various concerned parties and organizations consisting of commodity groups, governmental agencies, university staff members, soil conservationists, and members of Iowa's congressional delegation have been working to have this facility located at Iowa State University.

The university has excellent research facilities and resources which would complement those of the Soil Tilth Center. Also, an Iowa location would make available a wide range of soils typical of those found in the Corn Belt.

The land currently suited for crop production must be preserved and improved so that our future food and fiber can be produced efficiently and economically. Research at the proposed Soil Tilth Center would result in new technology which would be available immediately for application on farms.

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1979 Iowa ACP funding totals \$7 million

Iowa farmers who want to protect farmland against soil erosion can obtain cost-share funds through the Agricultural Conservation Program (ACP).

The program is administered in Iowa by the Agricultural Stabilization and Conservation Service (ASCS). State funds for ACP this year totaled slightly more than \$7 million.

The funds can be used for a number of conservation practices such as vegetative cover, strip-cropping systems, terraces, diversions, conservation tillage systems, windbreaks, and sediment control structures, among a few.

In past years, ACP funds were allowed for items such as lime, fertilizer and tiling. Funds for these items are still allowable but strict guidelines limit them to practices which prevent and control soil erosion.

Previously, farmers were able to obtain ACP funds to lime cropland, for example, or to purchase and install tile which drained wetlands. These practices helped improve production.

Roy Fagen, ASCS program specialist, says ACP cost-share funds are still being allowed for such things as tile but adds the tile must be used in connection with a soil erosion control structure, such as terraces.

The ASCS allows the use of lime and fertilizer but only where vegetative cover is being established.

Cost-share funds

Farmers can obtain cost-share funds for 50 to 75 percent of the cost of a project, depending on whether or not state funds are also being used.

The limit per farmer was increased by congressional action this year from \$2,500 to \$3,500. However, if two or more farmers get together in a "pooling agreement" to correct a primary problem, up to \$10,000 per farmer can be obtained.

The ACP also provides long-term agreements (LTA) to farmers to carry out enduring soil conservation practices over a period of 3 to 10 years.

However, farmers must have a conservation plan for their farm prepared by the U.S. Soil Conservation Service (SCS). "A lot of farmers already have a plan but it may not have practices planned in sequence," says Fagen.

Under an LTA, funds for a project are set aside the year it is approved and then appropriated on a year-by-year basis as particular practices are completed.

The practice of long-term agreements was started in 1974 but apparently is not that well received by farmers. Only 178 LTAs have been signed in Iowa through 1978.

The ASCS also has available what it calls mini-LTAs, which cover 3 to 5 years. This program is more flexible and recognizes the fact that a farmer's cropping plans as well as his financial status may change over 10 years.

Practices

The state ASCS office has outlined a number of practices which are eligible for ACP cost-share funds. However, county ASCS committees select only those practices from the state handbook for use in their individual counties.

Here is a rundown of the soil

conservation practices approved for ACP funds in the state handbook. Some counties may offer only a few of them. Check with your county ASCS office.

— Permanent vegetative cover establishment, aimed at protecting the soil and preventing or reducing the pollution of water, air, or land from agricultural or silvicultural nonpoint sources. Cost-sharing is authorized for minerals, seed, seedbed preparation and seeding. The cover must be maintained for a minimum of 5 years. Cost-share funds must be refunded if the farmer destroys the cover during its lifespan.

— Permanent vegetative cover improvement. Cost-sharing is limited to measures that extend the life of existing permanent cover. Includes the cost of controlling competitive shrubs, fencing, applying approved chemicals, etc.

— Stripcropping systems. Its purpose is to establish a contour or field stripcropping system to protect the soil and is applicable to cropland subject to erosion or soil movement. Crop stubble or residue must be left on the land during the winter or a substitute winter crop must be established. The system shall be maintained for a minimum of 5 years. The maximum cost-share limit is \$4 per acre to establish the system.

Terraces

— Terraces. Cost-share funds can be used for terraces and the necessary leveling and filling to permit installation of an effective system. The system is to be maintained for 10 years.

— Diversions. Cost-sharing is authorized for diversions, ditches, dikes, or subsurface drains where necessary for the diversion to function properly. Does not include water impoundment structures which hold water for later use. Must be maintained for a minimum of 10 years.

— Windbreak restoration or establishment for soils needing

protection against serious wind erosion. Cost-sharing is authorized for planting trees or shrubs as needed for restoring or establishing field or farmstead windbreaks. Cost-sharing is not authorized for planting orchards. Wildlife and environmental considerations must be given when designing this practice. Windbreaks must be maintained for 10 years.

Conservation tillage

— Conservation tillage systems. Funds can be obtained to demonstrate minimum tillage and residue management systems which prevent or reduce pollution from sediment and chemically-contaminated runoff. Funds will not be approved for a person more than once.

Eligible tillage operations may consist of chisel plowing with other limited operations, plow-plank, light tillage without plowing, slot or strip tillage operations ahead of planter, planting on chemically killed sods or other similar methods. The maximum cost-share level is \$7.50 per acre for minimum tillage operations and \$10 per acre for carrying out a no-tillage operation.

— Permanent vegetative cover on critical areas. Applies to critical areas such as gullies, banks, roadsides, field borders and similar problem areas. Cost-sharing is authorized for measures needed to stabilize a source of sediment only if the measures will significantly reduce erosion and maintain or improve water quality. The acreage must be maintained for 5 years.

— Vegetative row barriers aimed at controlling and retarding wind and water erosion. Funds are used to establish herbaceous vegetative barriers on a permanent basis. Weeds must be controlled within the barriers and the system must be maintained for 5 years.

Contour farming

— Contour farming on nonterraced cropland subject to

wind or water erosion. Funding is limited to the establishment of a contour farming system with residue or winter crops left standing over the winter. The maximum cost-share level is \$4 per acre.

— Water impoundment reservoirs to control soil erosion. These structures may also provide water for agricultural uses, including livestock, irrigation of permanent vegetative cover, fire protection and wildlife. The structure must be maintained for 10 years.

— Sediment retention, erosion, or water control structures for farm areas where substantial amounts of sediment or runoff containing pesticides or fertilizers constitute a significant pollution hazard. Maintenance required for a minimum of 10 years.

Stream protection

— Stream protection on small streams or lakes on or adjacent to farmland where banks are subject to damage from livestock and erosion. Funds are authorized for permanent fencing to protect banks from livestock damage, for planting trees, shrubs, etc.; to provide access to water for livestock; and to install livestock crossings that will retard sedimentation and pollution. Maintenance required for 10 years.

— Sod waterways. Funds can be obtained to treat farmland needing permanent sod waterways to convey excess surface runoff water. Must be maintained for 10 years.

— Animal waste control facilities. ACP will provide funds to treat farmland areas where animal wastes from the farm constitute a significant pollution hazard. This practice is designed to provide animal waste storage facilities and to control surface runoff. Cost-sharing is not authorized for measures primarily aimed at preventing or abating air pollution unless the measures also have soil and water conserving benefits. Maintenance required for 10 years.

Tree plantings

— Forest tree plantations. This applies to farmland suitable for growing shrubs or tree species which will provide multi-purpose forest benefits. Maintenance required for 10 years.

— Forest tree stand improvement. Cost-share funds are available to improve stands of forest trees either through thinning, pruning, or setting out young seedlings. Maintenance required for 10 years.

— Permanent wildlife habitat. Funds are authorized for establishing or improving vegetative cover or trees which will provide permanent habitat, food or cover for wildlife and for erosion control. Cost-sharing is limited to one time person on the same acreage. Maintenance required for 5 years.

— Shallow water areas for wildlife. Funds are authorized to restore shallow water areas for wildlife. Maintenance required for 10 years.



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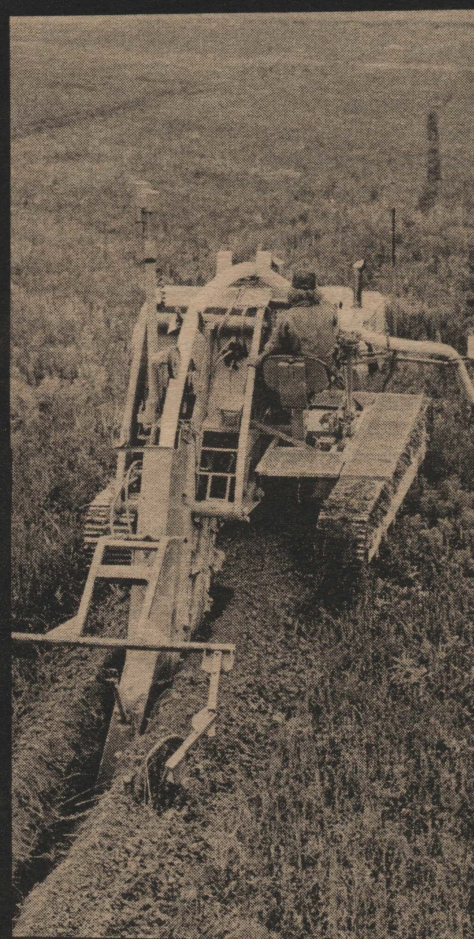
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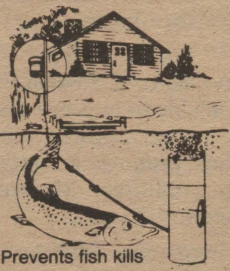
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Studies at Iowa State University (ISU) indicate that of the problems involved with conservation tillage such as cold soils, poor seed placement and emergence, continue to be the main deterrents of such systems. These factors contribute to lower grain yields.

But recent studies have also found a few surprises.

As everyone knows, as more crop residues are left on the ground following harvest and even during planting, the better the soil erosion control. Thus, the better the environment for man.

It had been learned that weeds can be controlled in conservation tillage systems using chemicals and that such systems conserve moisture. But management becomes a key element in such systems.

Corn yields

Also, a recent 5-year study showed that corn yields in conservation-tilled fields can nearly equal those achieved from fall-plowed fields. And when the average annual equipment and labor expense, materials expense and combined expenses (excluding land, transportation and drying charges) are figured in, some conservation tillage systems are lower in cost per acre than fall plowing.

Don Erbach, agricultural engineer with the USDA's Agricultural Research Service and associate professor of agriculture engineering at ISU, conducted the 5-year study of seven tillage systems (see table 1). Erbach is also involved in other studies on conservation tillage.

In the 5-year study, he found that till-planted corn yielded an average of 134 bushels per acre, the spring offset disk yielded 133 bushels per acre and fall plowing yielded 141 bushels per acre.

"The fall moldboard plow pretty consistently gives us our best yields," Erbach said. The studies were conducted on the ISU research farm near Ames.

Erbach says there would have to be a 12 bushel per acre yield differential before it can be said one system is more advantageous over another.

Erbach computed the cost per acre using the above costs excluding land charges. The cost of till-planting was \$72 per acre compared to \$80 per acre for fall plowing and was \$78 per acre for the spring offset disk (see table 2).

With the conservation tillage systems there were moisture problems that are normally eliminated by the numerous tillage operations involved in so-called conventional tillage. Conventional tillage also provided better weed control.

"It also appears uniform stand establishment enters into the problem of conservation tillage," he added. But on the other hand, he said moldboard plowing resulted in more wind and soil erosion.

Cold tolerance

Studies conducted by Erbach and Jim Mock, former associate professor of agronomy at ISU, point out the need for accelerated research toward developing cold-tolerant corn genotypes, especially if conservation tillage systems are to be adopted in the future.

Their studies show that early planting with conservation tillage systems results in significantly lower soil temperatures, lower emergence rates, slower plant growth, lower plant densities and lower grain yields.

Nonuniform depth of seed

placement, when planting through surface plant residues, evidently contributed significantly to reduced emergence rates and to reduced yields, they said.

They concluded that early planting in residues will be successful only if cold-tolerant corn genotypes are grown and are planted with planter capable of uniform seed placement.

Erbach is continuing studies in seed placement by attempting to develop a rolling coultter which will throw residues up and away from the seed zone. He is also working on a rolling coultter which will cut through and push residues aside.

Also, with funds provided by the Iowa Corn Promotion Board, Erbach is conducting a study on corn emergence, early plant growth and moisture uptake by the seed during germination.

Other findings

Erbach said that so far there have been no real major insect, weed or disease problems with conservation tillage systems. Two years ago, however, cutworms did infest till and no-till plots feeding on 90 percent of the corn plants. Other plots experienced feeding on only 1-2 percent of the plants.

Even in continuous corn plots

involving conservation tillage, there has never been a problem that couldn't be handled, he said.

Crop residues also provide a good environment for crop pests. But Erbach said the same environment also was good for pest predators. He is not sure why this occurs or if it occurs year after year.

"It's (crop residues) a different kind of environment and we can't necessarily say it's bad. If we plan ahead, we think we can control insects," he said.

Erbach plans to continue working on corn seed placement, emergence and early plant growth.

Table 1. Corn grain yields, adjusted to 15.5% moisture content, as affected by tillage system and year.

Tillage System	Year					Average
	1971	1972	1973	1974	1975	
	(bu/a)					
Fall moldboard plow	129	171	141 ^a	128	136	141
Fall chisel plow	121	153	138 ^a	109	87 ^d	122
No-tillage, planted on ridges	125	155	113 ^b	102	131	125
Spring moldboard plow	125	158	142	112	120	132
Spring offset disk	121	141	141	117	131	133
No-tillage	110	149	132	100	127	124
Till-plant	130	160	149	103 ^c	130	134
Average	123	158	137	110	123	

^aWet soil conditions in fall of 1972 caused moldboard plow and chisel plow tillage to be delayed until spring of 1973.

^bPlanted approximately one month earlier than other systems and nitrogen applied at same time as other systems. Delayed application may have contributed to low yield.

^cRidges had not been built the previous year and improper planting may have caused poorer than normal growth.

^dImproper planter adjustment, dry soil and lack of rain after planting resulted in poor stand establishment that probably caused the low yield.

Table 2. Average annual equipment and labor expense, materials expense, and combined expense for each tillage system.

Tillage system	Average annual equipment and labor expense	Average annual materials expense	Average annual combined expense
	(\$/acre)		
Fall moldboard plow	26	53	80
Fall chisel plow	21	59	80
No-tillage, planted on ridges	18	65	83
Spring moldboard plow	26	53	79
Spring offset disk	20	58	78
No-tillage	18	63	81
Till-plant	18	54	72

Definition of prime land varies

Definitions of prime agricultural land vary within states, communities and counties because it is such an intuitive definition, says Gerald Miller, extension agronomist at Iowa State University.

People are familiar with what surrounds them and what crops are grown in their area, whether it be corn, sugar beets or cotton, so everyone thinks their land is prime, he added.

To have a national definition of prime farmland, we would probably have as many definitions as there are congressmen, because each would have a definition that fits land in his district, Miller said.

Prime agricultural land can be defined by qualitative or quantitative means or by a combination of factors including physical properties, productivity potential and economic criteria.

Over 45 years ago a national classification system was devised that classified agricultural land into five grades based on the natural productivity of all land for crops. Physical conditions that influence productivity such as soil

type, slope, natural rainfall and temperature were taken into consideration when classifying.

This classification system identified 101,038,000 acres of land in the United States as Grade 1, or the best, of which 25,983,000 acres are in Iowa.

More recently, the U.S. Department of Agriculture devised a land classification method known as the Land Capability Classification system. Land is placed in one of eight classes and identified on the basis of its limitations and hazards for agricultural use. The system gives major consideration to the physical attributes of land — slope, wetness, the presence of rocks, stones and sand — and minimizes the natural productivity of the soil, temperature and rainfall, Miller noted.

Using this method, a recent ISU study shows that North Dakota has 21,754,000 acres of prime agricultural farmland and Iowa has 18,350,000 acres. "This system has fallacies because if you don't look at the productivity

units, you do not get the real picture," Miller said.

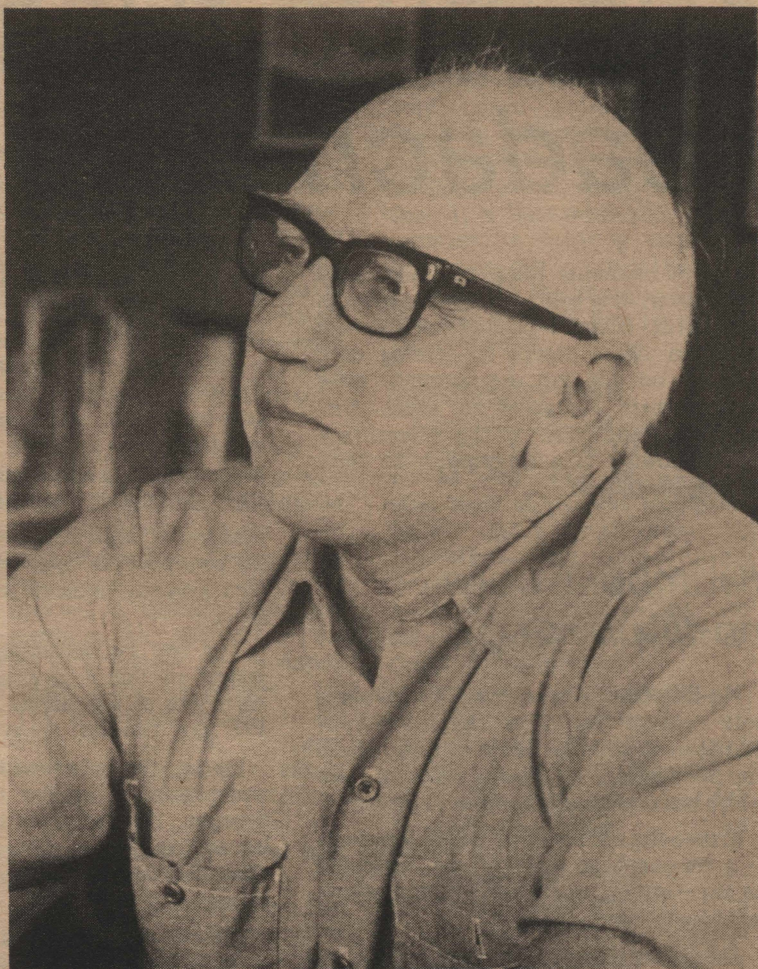
An Iowa-devised system identifies prime agricultural land based on the productivity potential of the soil resources, Miller said. The purpose is to identify and preserve the best land for row crop production.

This system is especially useful in urban areas where there is a need to make a decision on what land to use for urban growth and what land to keep as farmland.

Known as a numerical or productivity index and termed Corn Suitability Rating, this system gives major consideration to the natural productivity of the soil, slope, rainfall, temperature, available soil moisture and organic matter present in the surface horizon.

Even more important to the user of this system, the CSR assigns a numerical value to each soil mapping unit. This allows for a quantitative value of the productivity potential of the land rather than a less precise qualitative value, Miller said.

Britt man fears farmers on collision course with mandatory controls



CHARLES McLAUGHLIN

One Iowa farmer fears U.S. farmers may be on a collision course with mandatory soil erosion controls unless farmers continue to voluntarily control soil erosion.

Charles McLaughlin of Britt, president of the Iowa Association of Soil Conservation District Commissioners, says in the past the feeling was that a person could do whatever he wished with his land, including destroying it.

But with the land mass becoming smaller as the population increases not only in the United States but worldwide, McLaughlin fears there may be some mandatory controls in the future.

"I think it was a World Watch report which said that by the year 2000 there will be just one-half as much food-producing land per person as there is right now. That's not very far away," he says.

"With energy, population and a finite soil resource all rapidly converging, I see the possibility that we're going to have to change our attitude about what our most valuable resources are and how much right an individual really has to destroy a resource upon which everyone else is dependent."

McLaughlin, who served on the 18-member Temporary State Land Preservation Policy Commission this past year, says he would like to see erosion controlled with voluntary methods through education, peer pressure and incentives. This was the approach the commission favored in its report to the Iowa Legislature.

"I prefer the carrot to the stick and I think it can probably be done with the carrot up to a point. But people who resist voluntary controls for one reason or another may have to be dealt with on a mandatory basis. And this will cost everyone a little bit of freedom."

McLaughlin thinks that where farmers treat the ground adequately and maintain the treatment, they are controlling soil erosion. But maintenance of these practices is something a lot of people forget about, he adds.

Renewed interest

More and more farmers in Iowa are now utilizing minimum tillage leaving crop residues on the ground to protect the soil from wind and water erosion.

The U.S. Department of Agriculture estimates that in 1978 one-half (10.8 million acres) of Iowa's cropland was protected with residues. And since 1972, minimum tillage usage has increased from 2.9 million acres to about 9 million acres.

There is also renewed interest in tree plantings in Iowa, according to

McLaughlin. Hancock county alone in 1 year planted more than 160,000 trees and shrubs around farmsteads and as field windbreaks.

"Some of the farmers are more aware of what is happening (due to wind erosion) and are attempting to correct the problem," he says.

Contrary to what many people think, soil erosion does occur on flat farmland, according to McLaughlin who says there is more sloping ground in the so-called "flat-counties" than many people realize.

McLaughlin, 60, farms 360 acres of rich Northern Iowa farmland along the Algona morrain which is highly susceptible to soil

"I much prefer the carrot to the stick and I think it can probably be done with the carrot up to a point. But people who resist voluntary controls for one reason or another may have to be dealt with on a mandatory basis. And this will cost everyone a little bit of freedom."

erosion. He also has an 80-head registered Jersey dairy herd.

He has been involved in soil conservation efforts since 1946 when he helped get the Hancock soil conservation district approved. In 1972, he was elected a district commissioner, then a regional director and is currently president of the Iowa association.

A graduate of the University of Illinois in agricultural economics and farm management, McLaughlin knows what happens when soil erosion goes unchecked.

In his native Southern Illinois in the early 1900s the soil was thin, but it was easy to clear the timber and farm. The corn was then sold to persons living upstate where the rich soils had not yet been drained.

"But then they got the good soil in Northern Illinois drained and producing. The traffic (grain purchases) was then the other way because by this time that very thin timber soil had been depleted and it washed.

"As my father used to say, the topsoil (where it washed) came to about the second wire on a barbed wire fence. We soon found ourselves farming subsoil which was not a

very profitable operation during the 1930s."

Changes

Since 1949, there have been changes in Northern Iowa affecting the land.

He says there used to be more farmers and cows in the area along with vegetable production. But fences have been torn out, pastures plowed up, hayground planted to grain crops and windbreaks destroyed.

"Areas which sometimes amounted to one-fourth or one-third of a farm that was in pasture or hay are now exposed to annual cropping. It makes a drastic amount of difference in the amount of land subject to erosion."

It has been said that Iowa has lost half of its topsoil on sloping ground and could lose the rest of it in the next two generations. More intensive farming practices utilizing bigger machinery and tighter profit margins have resulted in increased soil losses.

McLaughlin says if farmers are forced to continue on the currently tight profit margin which requires intensive farming practices, bigger machinery will stay in the picture.

On the basis of maximizing profits, farmers can't justify spending large amounts of money to control erosion when there will be few, if any, benefits to them, he states.

"A farmer my age, for example, will not reap any benefits from putting in terraces which take 10 to 15 years before they begin paying off. There's enough topsoil left in my lifetime that I don't have to worry about erosion."

Farmers installing soil erosion control measures are saving the soil for future generations, McLaughlin says, making soil conservation a public service. This justifies the use of public funds to cost-share on soil conservation.

Iowa has been cost-sharing on soil conservation measures for the past 6 years. State officials have found that if funds are provided on a 50-50 basis, the farmer often will pay 50 percent or more of the cost to have the personal satisfaction of having his farm protected.

"Farmers do care about the soil — so much so that they more than use up the \$5 million that the state cost-shares each year."

Technical help

According to McLaughlin there is a serious problem existing today in soil conservation in that there is not enough technical aid available to farmers.

Recent cuts in U.S. Soil Conservation

Service (SCS) funding have resulted in a corresponding cut in technicians, thus limiting soil conservation planning assistance.

"The statement has been made that if we had all the soil erosion controls in place in Iowa that we really need, we don't have the staff or finances to maintain it," he says.

Much is needed in order to solve soil erosion, McLaughlin thinks. For example, minimum tillage is still a relatively new farming art. And farming is an art, he stresses, going beyond scientific studies.

"Most of us can go out, look at the soil, feel it and know what it's time to do next. But we don't have that technique developed for conservation tillage.

"We need more information. And we need it rather quickly."

For this reason, McLaughlin and other conservationists and state officials are urging that a national soil tilth center be located in Iowa.

One of the best mechanisms for improving soil conservation to come along in recent years is the Soil and Water Resources Conservation Act of 1977, he thinks. Purpose of the act is to develop plans in each state for conserving water and soil resources.

"A farmer my age, for example, will not reap any benefits from putting in terraces which take 10-15 years before they begin paying off. There's enough topsoil left in my lifetime that I don't have to worry about erosion."

But more importantly, it will include an inventory of conservation activities to date, accomplishments, effectiveness of current practices, their cost and benefit. This inventory will be taken every 5 years.

This summer each soil conservation district will be developing county plans to meet the needs of the concerns identified.

A state plan will also be developed based upon local concerns.

"I think this will give us a picture upon which we can base our requests for legislation, funds, tax incentives or any other method we can use to encourage conservation," McLaughlin explains.

Minimum tillage solves soil erosion headaches for three Iowa farmers

Use of minimum tillage to plant crops while controlling soil erosion has grown in recent years in Iowa. To find out how well minimum tillage works by leaving crop residues on top of the ground, three farmers were contacted to share their experiences and results of the systems they use. Following is a description of their farming operations.

Krumboltz uses no-till planting

No-till planting is completely controlling soil erosion for Tom Krumboltz of Fairfield. Krumboltz has been using no-till for the past 6 years on his 680 acre farm which has slopes ranging up to 15 percent.

Krumboltz utilizes three planting systems — a corn-soybean rotation; strip-cropping on the contour; and a corn-oats-meadow-meadow-meadow.

The latter system, he says, refers to pasture renovation, which is popular in Southern Iowa. He says he turns cows into the pastures in early spring and later removes them. For 2-3 weeks, he lets the grass covering renew itself and follows with corn planting using an AC no-till planter.

The second year, oats are sown followed by a couple years of alfalfa and then meadow. This rotation is used on his farmland which has a slope greater than 3 percent.

The corn-soybeans rotation is used only on his flatter ground and with good results. Last year, his corn yields averaged 115 to 125 bushels per acre with some fields averaging 140 bushels. His soybean yields averaged 30 to 40 bushels per acre.

Krumboltz has terraced a great deal of his farm. Without terraces and no-till, he doesn't believe the land can be farmed without suffering soil erosion.

Chemical control

On his corn, he uses Paraquat for burn-down and Lasso and Bladex pre-emergence. For his soybeans, he also uses Paraquat along with Lasso and Lorox. If he has a problem with broadleaf weeds, he will apply Basagran.

His most common weed problems include cocklebur, foxtail and sometimes

grass. This makes timely spraying important and "is where most guys fail with no-till," he says.

Krumboltz does notice a problem with the soil being colder in a no-till system, but only in the corn-oats-meadow rotation. "If you let it grow until the 20th of May, the soil won't warm up as much. I usually try to spray my fields in mid to late April."

However, cold soils are not a problem in the corn-soybean rotation, he states, if the seed is planted in the ridge left by last year's crop.

The two big advantages of the no-till system are that it saves soil and moisture, according to Krumboltz. The drought of 1977 gave him clear-cut evidence.

He says he fall-plowed one field which was next to a no-tilled field. During the drought, the fall-plowed field had corn leaves firing above the ears while the no-tilled field had firing only near the bottom leaves.

Krumboltz, who has discarded fall plowing, cites another advantage of no-till. "The last 2 years have been wet down here. But we've been able to go right through the no-tilled field at harvest while we would just mire down in the tilled field."

"You get in a situation like that it just makes you so mad you'd like to blow up the plow."

There are also dollar savings which result from the system in that less fuel is required and a large horsepower tractor is not needed. Krumboltz usually starts planting with no-till about the first of May adding that it's not too critical to get the corn in early.

"In July and August when we get those hot days, the leaves on conventionally-tilled fields will roll. The corn leaves don't do that in no-till. Also, the no-tilled corn will be just as dry at harvest as conventionally-tilled corn."

Wayne Fredricks also likes no-till

Wayne Fredricks also uses no-till planting on his 200-acre farm in Eastern Iowa near West Branch.

Fredricks, a former soils scientist with the Soil Conservation Service for 21 years, has



utilized no-till planting on his farm for the past 5 years. This year he planted 150 acres of corn with no-till on land with slopes from 2 to 15 percent.

The system has practically eliminated soil erosion while saving him money and time, he says.

His cropping system actually begins in the fall following harvest when beef cows are turned into the cornfields to clean them up. In the spring, he spreads dry fertilizer followed by an application of anhydrous ammonia. He then plants his corn with the only tillage being a 2-inch crack created by the planter which removes trash from the row.

Fredricks hasn't used a moldboard plow for 12 years. He did try a chisel plow before switching to no-till, however. About the chisel plow, he says, "It's a good machine. A lot of people could use it to good advantage because it loosens the compacted soil. If we rent additional ground, we like to chisel it two or three times before we start no-tilling to be sure it's loosened up and ready to work."

But it's the no-till planter which Fredricks is sold on. "I raise more bushels of corn this way than I do with a chisel," he says, pointing to a 3-year average yield of 154 bushels per acre.

He has also projected yields on Iowa's topsoils which have a suitability rating (CSR) of 100, to one of his fields which has a CSR of 64. If he had fields with a CSR of 100 and utilizing his present system, he figures he could achieve yields of 240-250 bushels per acre.

Time savings

Fredricks studied the chisel and no-till systems carefully before making a selection. Time savings was his No. 1 criteria. In fact, he figures he could raise 500 acres of corn with no-till using a 100 horsepower tractor. With a chisel-disk tillage system, he figures he could only raise about 390 acres of corn in the same amount of time. This translates into a 20 percent increase in corn plantings in the same amount of time.

What about trash, weeds, insects and cold soils? "Some people read too much," says Fredricks. "I have basically the same herbicide program with no-till as I do on my chiseled ground. If applied properly, I get good control."

"Trash does not accumulate to where I cannot use the system. And if I have crusted soil or a weed problem, I cultivate some."

Management is a key to the system in that farmers must pay attention to details, just as in a conventional tillage program, he says. His only insect problem is stock borers.

As for cold soils, Fredricks points out that the trash also acts like a blanket during the cool spring nights. While the ground may be cooler in the afternoon than conventionally tilled soils, it will be warmer at night.

"If I get more corn in the crib with the same fertility program, the same herbicide program, the same kind of corn and the same planting rates, I can't say the mulch reduces yields by keeping the ground cold and wet. I don't think that at the end of the growing season there is much difference."

Fredricks figures the cost of chisel plowing is \$15 higher per acre over no-till based upon custom rates. Also, based upon Iowa State University estimated fuel requirements, the no-till system takes 40 percent less fuel, he says.

Larry Kilcoin used for 14 years

Minimum tillage has been used for 14 years on the Larry I. Kilcoin farm near Adair. This involves a chisel plow and disk to prepare his corn ground and an AC fluted coulter no-till planter.

Kilcoin, who farms 560 acres, first saw the system in use near Davenport and thought it would be better than the conventional tillage system he was using on his rolling to hilly farmland.

"Soil erosion is a problem here if there isn't any protective cover on the ground. I don't have too much of a problem with it now though. It (minimum tillage) is something you have to learn how to manage."

By this, he means proper weed control. "I don't think you can control weeds without chemical controls in the early part of the season. And without chemicals, I'm not sure you could make enough trips across the field to keep up."

Kilcoin says he hasn't experienced any decrease in yields. In fact, he says his yields have gradually increased over the years to the point where he can harvest 100-120 bushels per acre in a good year.

Chisel plow

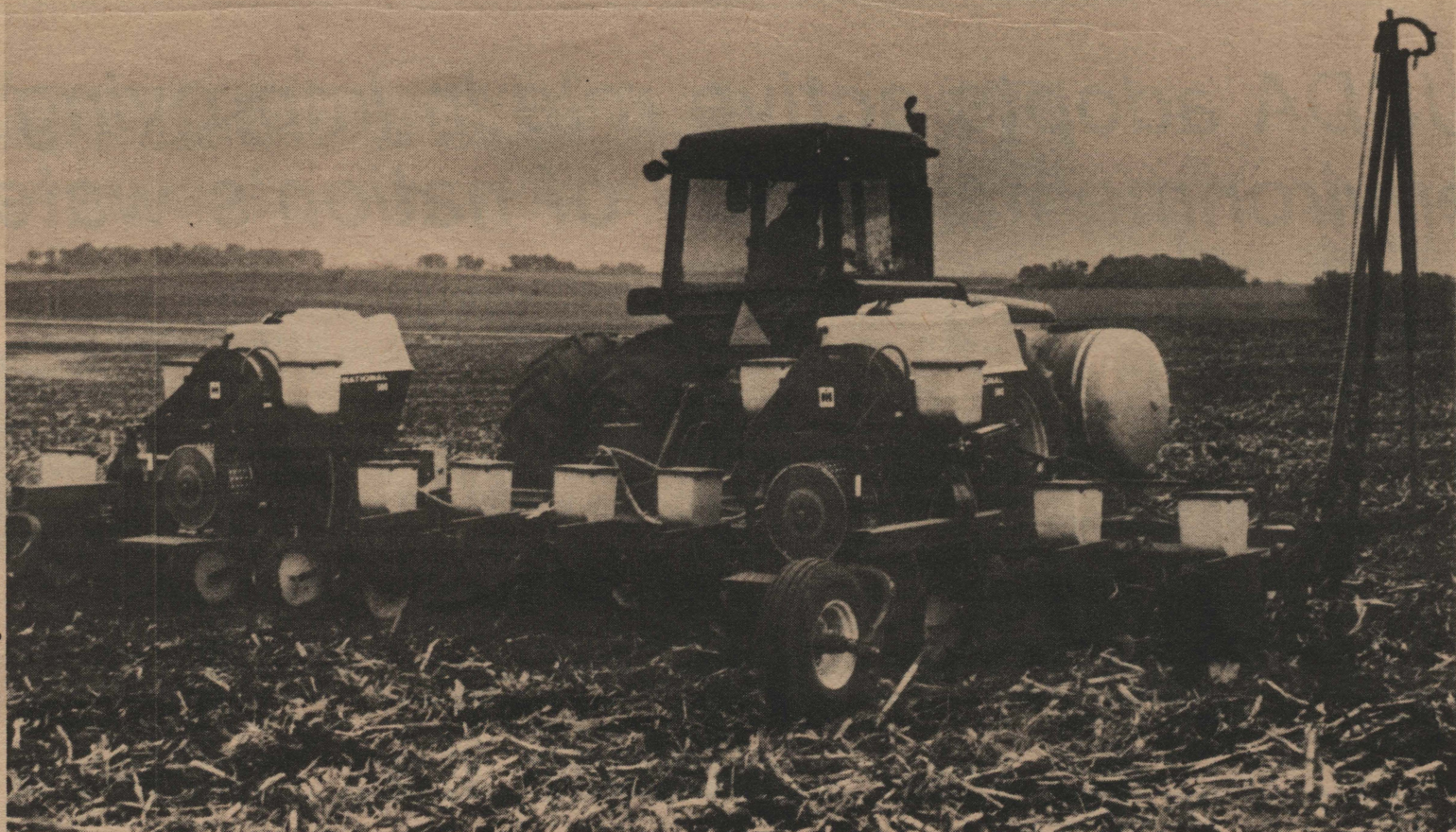
He attributes the yield increase to his chisel plow. On his clay soil, the plow breaks up the soil letting water and fertilizer penetrate deeper into the soil. This helps the corn grow down where the fertilizer and water are, he says.

He also says he has not had any real problems with insects. "We've had continuous corn on most of our ground and there doesn't seem to be any buildup. I've read articles that said you can't do that. But it doesn't seem to work out that way." Rootworms are a problem but he says that after the second or third year of continuous corn the pests aren't quite as bad.

Kilcoin also utilizes terraces to control soil erosion. Two years ago alone, he added nearly 4,000 feet. And he plans on adding more in the future.



Farmers who tried no-till planting in 1978 under a program sponsored by the Chevron Chemical Company liked the results so much that they said they would try the minimum tillage system again this year. In Iowa, 67 percent of the participating growers said they would try no-till again while 94 percent of the farmers in a nine-state area said they would plant using no-till.



Farmers who tried no-till planting in 1978 planned to use it in '79

Ninety-four percent of the growers participating in Chevron Chemical Company's no-till planter program in 1978 plan to devote acreage to no-till in 1979, and 17 percent of those growers have or will make a long-term investment in a no-till planter this season.

Those are just two statistics from a grower survey recently conducted by the Ortho Division of Chevron Chemical Company. Ortho spokesmen said this is the largest indication of no-till acceptance since they established this program in 1973.

At that time, Chevron began loaning new, brand name no-till planters and seeders to growers throughout the Midwest for demonstration purposes.

Their 196 planters were used to establish 1,726 no-till test plots throughout nine states in 1978. That represented 53,772 acres of no-till corn, doublecrop soybeans, full season soybeans, grain sorghum, ecofallow wheat, and renovated pastureland.

Chevron markets Ortho Paraquat CL herbicide, which is commonly used in no-till systems for control of grasses and broadleaf weeds.

Iowa results

In Iowa, a total of 200 plots were established, representing 5,125 acres. No-till corn was the favorite choice for these trials, with 167 plots of that crop (averaging 26 acres each) being

established by Iowa growers.

No-till full season soybeans were the second most popular choice. Twenty plots were devoted to that crop. Eight other growers experimented with no-till pasture renovation, and five farmers established no-till grain sorghum plots.

The level of no-till acceptance in Iowa was somewhat below the nine-state average. But more than half of the Iowa growers participating, 67 percent, said they were planning to try no-till again this season.

Nineteen of these growers, or 10 percent, said they had definite plans for buying a no-till planter, and an additional 17 farmers said they were considering this investment.

Chevron again conducted this planter program in 1979. No-till planters and seeders were moved to new locations so other growers could experiment with this cropping technique without first investing in a planter.

"We're very pleased with the response from last year's program," notes R. C. Yapp, Chevron Midwest manager, Pesticides.

"Of special significance is that after a trial demonstration 17 percent of these growers are willing to buy their own no-till planters — representing an approximate \$1 million investment in these implements. That, more than anything else, signifies definite acceptance of this farming technique."

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Conservation treatment needed on half of nation's cropland, USDA study finds

More than half of the nation's cropland, forests, pastures and rangeland need increased conservation treatment to reduce soil erosion and improve water quality, according to Assistant Secretary of Agriculture M. Rupert Cutler.

Announcing recently the first results of a 1977 national inventory of land resources by the department's Soil Conservation Service (SCS), Cutler said nearly 900 million acres of nonfederal land need conservation work, about the same as a decade ago.

"But there have been significant changes in the kinds of land needing treatment," he said.

Cropland acres that need conservation treatment declined from 64 percent in 1967 to 58 percent in 1977, he said. But forest lands needing treatment climbed from 62 to 67 percent in the same period, and the pasture and range land needing treatment rose from 71 to 75 percent, Cutler said.

The SCS National Resource Inventories, which cover all nonfederal land in Puerto Rico, the Virgin Islands and the United States except Alaska, are being

conducted in three phases. Phase 1 is now complete, phase 2 will be completed later this year, and phase 3 in 1980.

Data were collected by SCS field employees at more than 200,000 sample points.

Highlights

Other highlights of phase 1:

— The amount of rural land available for farming, ranching, and forestry declined nearly 37 million acres between 1967 and 1977, while the proportion of good, fair and poor agricultural land remained about the same.

Of the total rural nonfederal land, 414 million acres are fairly level, while 1 billion acres have gentle to very steep slopes. Nearly 270 million acres are wet, while about 402 million acres are droughty or lack enough water to grow agricultural crops or trees. Many of these conditions, singly or in combination, limit the use of land.

— Land available for grazing has increased sharply since 1967, rising to 541 million acres in 1977. Today more than half the nonfederal agricultural land is

used for native pasture, pastureland or rangeland. There has been a corresponding decline in nonfederal forestland.

— Homes, businesses, roads and ponds are swallowing rural land at the rate of about 3 million acres a year. Most of this irreversible change is related to urban expansion. Nearly one-third of the rural land lost to development is cropland. Small water areas increased by more than 1 million acres in the 1967-77 decade.

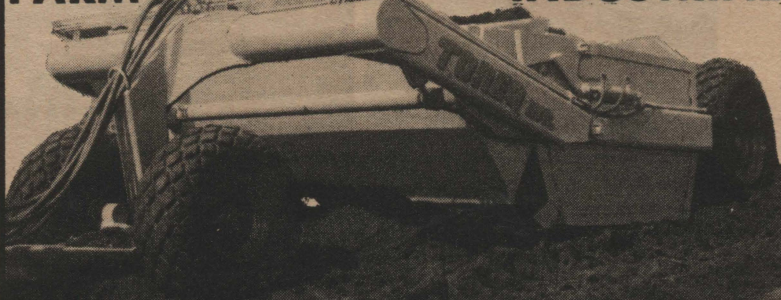
— Flood prone areas in the nonfederal land area of the United States total 175 million acres. Nearly half this land is farmland of good quality for crops.

— There are 42 million acres of wetlands in the United States, of which 97 percent are in uses other than cropland. Forested wetlands account for half the total acreage.

— Average rates of soil erosion on cropland range from less than 1 ton per acre per year in some states to more than 41 tons per acre in the Caribbean area. Twenty-two states, mainly in the Midwest and East, have average annual cropland erosion of 4 tons or more per acre.

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USDA adopts active role in improving environmental quality of nation's waters

The U.S. Department of Agriculture, through policy statements and agreements with other governmental agencies, is abandoning its passive attitude on environmental quality, according to M. Rupert Cutler, assistant secretary for conservation, research and education, USDA.

Speaking at a recent water quality planning seminar at Michigan State University, Cutler said the USDA has taken a number of initiatives and is involved in programs aimed at improving the nation's water quality.

Perhaps the most important

initiative was a new land use policy signed by Secretary Bob Bergland last fall putting the USDA on record as an advocate for retention of important agricultural and forest lands and the protection of floodplains.

Cutler said the USDA is now preparing procedures to help assure that federal agency decisions consider impacts on farm and forest lands.

According to Cutler, the USDA will take a strong, positive stand on the following issues:

— The USDA will advocate the retention of wetlands for all wildlife, flood control, water

supply and other identified values.

—USDA will advocate the retention of important farmlands, forest lands, and rangelands in the interest of sustained economical food and fiber production.

—USDA will advocate actions that reduce the risk of flood loss.

—USDA will advocate other practical land use and management actions that can improve the quality of water that reaches wetlands and floodplains.

Practices

Cutler said another concern was the slow rate which planned land treatment practices have been

applied above structures in watershed projects. Now the Soil Conservation Service is required to have at least 50 percent of the planned land treatments in place before the construction of a reservoir begins.

Cutler also noted that federal agencies must now determine if their activities are "major federal actions significantly affecting the human environment" when preparing environmental impact statements. These regulations are being implemented with the USDA, he said.

More importantly, he said, the USDA is insisting that the

environmental impact statements be readable and understandable.

Another major effort which has already been initiated is the Soil and Water Resources Conservation Act of 1977. Its goal is to assess the nation's soil and water resources and to formulate a soil and water conservation program for the nation.

"Secretary Bergland laid out the conservation challenge with his admonition that nothing is sacred," Cutler said. "Soil and water conservation programs could be in for some major changes. Non-traditional approaches that work are being sought."

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Clean water program

Cutler said the USDA is now implementing the rural clean water program (RCWP) which is aimed at reducing agricultural nonpoint source water pollutants.

The rural clean water program is a voluntary program authorized in 1977 by Congress to apply best management practices on privately owned land. Landowners in eligible project areas may enter into 5 to 10-year contracts to receive cost-share and technical assistance.

The 1980 budget for the Soil Conservation Service includes \$75 million for RCWP while the Agricultural Stabilization and Conservation Service budget has \$25 million earmarked for water quality efforts. Congress is expected to act soon on the proposed budgets.

The need for the rural clean water program and increased soil conservation efforts definitely exists, according to Cutler.

Nonpoint pollution

He said agricultural pollutants are the main source of nonpoint water pollution with cropland runoff contributing about 50 percent of the total sediment entering the nation's waterways.

"Annually, over 400 million acres of cropland contribute 2 billion tons of sediment to streams, lakes and rivers," he said. "More than 50 million tons of plant nutrients and over 750,000 tons of pesticides are applied to agricultural land each year. And animal wastes from 200,000 feedlots contain organic waste material that is contributing to pollution problems."

Solving the nonpoint source pollution problems nationwide will cost billions of dollars, he said. Congress decided to make the program available only in high-priority areas, he explained.

Cutler also noted that the USDA and the Environmental Protection Agency have signed a joint memorandum of understanding emphasizing their mutual commitment to achieving the nation's environmental goals.

The USDA also has been asked to look at all of its program for agricultural assistance, soil conservation, technical assistance and housing loans to assure that it is consistent with President Carter's water policies.

"There is general agreement among top level staff at USDA that water policy is among the most crucial concerns for the future of agriculture in this country. There is much at stake," Cutler said.