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Melvin G. Blase
Iowa State University

John F. Timmons
Iowa State University

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Why Do We Let Our Soil Erode?

by Melvin G. Blase and John F. Timmons

MUCH OF IOWA’S heritage—the soil—is still eroding away through gullies and sheet erosion. Despite public programs to reduce soil erosion and widespread knowledge of erosion-control practices, progress toward control still is slow. Why? Why aren’t more farm operators doing a better job of erosion control?

For the past 10 years we’ve been studying this problem, along with possible solutions, on the rolling erosive soils of western Iowa. Farm operators in the area have been interviewed three times—in 1949, 1952 and 1957. Landlords of the sample farms were interviewed in 1957.

What’s Happened?

Though much progress was made in reducing losses from erosion between 1949 and 1957 in the area, soil losses are still greater than the goal of public erosion-control programs—to reduce soil loss to 5 tons per acre per year. (An acre of topsoil 1 inch deep weighs about 140 tons.) Between 1949 and 1957, soil losses decreased from an average of about 21 tons per acre per year to about 14 tons on the 138 farms studied. The farm operators also changed their erosion-control goals in this period—from an estimated average of 16.4 to 11.7 tons per acre.

So we can draw two initial conclusions from the studies. First, both erosion losses and operators’ estimates of losses permissible to maintain soil productivity decreased. And second, erosion losses were greater than the level of control farm operators believed necessary to maintain productivity of the soil.

Between 1949 and 1957 there also was a change in the types of erosion-control practices that soil conservationists considered to be needed to reach the 5-tons-per-acre goal. Results of research at Iowa State and other Midwest experiment stations showed that some practices were more effective and others less effective than was formerly believed.

The effects of that research showed up in the differences in two sets of erosion-control plans for the sample farm in 1949 and 1957. In each of the two years, the Soil Conservation Service prepared (1) a mechanical practice plan—which included terraces and a high proportion of row crops—and (2) a high-forage rotation plan—which included no terraces and a high proportion of forage crops—for the 138 farms in the sample. Both the 1949 plans and the revised 1957 plans would have reduced soil loss to 5 tons per acre if fully carried out.

The revised mechanical practices plans in 1957 included more terraces and substantially higher proportions of row crops than did the plans in 1949. But there was little change in the high-forage rotation plans with respect to the amount of land in row crops. The revised plans showed that combinations of mechanical practices would reduce soil loss and still enable operators to follow rotations with about the same proportions of row crops that were on their farms in 1957.

Though there weren’t as many mechanical practices on farms in
1957 as recommended, the number of farm operators using these practices had increased since 1949. Grass waterways and contouring were found more frequently than other practices in 1957, while operators objected most frequently to high-forage rotations and terracing. In spite of these objections, the percentage of land in forage increased between 1949 and 1957. In percentage terms, grass waterways and terracing increased more than other practices. Contouring had become readily accepted by farm operators in 1957.

**Major Obstacles . . .**

The farm operators we questioned identified 15 different obstacles to adopting erosion-control practices. The three most important were (1) need for immediate income, (2) custom and inertia and failure to see the need for a particular practice and (3) field and road layout.

**Need for Immediate Income:** Many operators said that need for immediate income was an obstacle—either because of the high cash costs of the practice or because they felt their income would be reduced if they adopted these practices. Other operators, however, didn't have enough information to estimate the expected consequences of erosion-control plans. More than half of the operators couldn't estimate the cost of any part of the mechanical practices plan.

Though their information was limited, operators rated erosion-control practices relatively low as an investment preference. Funds for adopting erosion-control practices were limited more by the operators' preferences not to borrow than by credit not being available. Part of the resistance to borrowing may have been due to the unfavorable weather and falling farm prices in the area in the mid-50's. But the presence of the income obstacle in the earlier studies indicates that weather and prices of the mid-50's weren't entirely responsible for the attitude toward borrowing.

We also looked for a relationship between soil loss and changes in land values between 1949 and 1957. But there didn't seem to be any measurable change in land prices as a result of changes in soil loss. Nor did variations in the amount of erosion among farms seem to affect the differences in land prices.

**Custom and Inertia:** Erosion-control practices weren't adopted on many farms because of failure to see the need for the practices and because of custom and inertia. Farm operators stated that they didn't want or didn't need many of the recommended practices. Others said they preferred not to change their established methods of farming.

**Field and Road Layout:** Difficulties because of field and road layout seemed to increase in importance as terracing and contouring were more widely recommended in the area. Operators objected to short rows and the difficulty of farming over terraces in fields with rectangular boundaries.

**Other Obstacles:** Other obstacles mentioned, which were less important in explaining high soil losses, included objections to choice and amount of particular practices recommended, insufficient roughage-consuming livestock on the farm and preference not to increase the amount, unsuitable rental arrangements and too little cooperation by the landlord.

**The Farms . . .**

In addition to the obstacles mentioned by the operators, we looked at relationships between characteristics of the farm businesses and soil erosion. We found that soil losses were considerably lower on farms where the operators participated in Soil Conservation districts and were higher on farms where the operators didn't participate. And soil erosion was lower on farms where the operators recognized the seriousness of the erosion problem.

More soil was conserved on farms where the operator worked at some nonfarm job—thus relieving the pressure for immediate income. Soil losses were higher on farms with large natural erosion hazards than on those without large erosion problems. Finally, we found that soil losses were much lower on farms when the operators were willing and able to borrow funds to install erosion-control practices.

**Landlord Objections . . .**

Tenants and landowners decide together which erosion-control practices are to be used on rented farms. So we interviewed the nonoperating landlords also. Landlords objected more frequently to the high-forage rotation plans than to any other practice. Terracing was disliked by two-thirds of the landlords interviewed.

Many of the landlords objected to the recommended practices for the same reasons as did tenants. Not enough roughage-consuming livestock and the need for immediate income seemed to be most important. Their expectations of costs and returns from erosion-control plans were more important than their debt positions in determining the immediate income obstacle.

Some of the landlords believed their gross income would be either unchanged or decreased from using the erosion-control plans. But more of the landlords were uncertain about the effects of the plans. They were more doubtful about the profitability of the high-forage rotation plans than of mechanical practices plans. About half said they would need to borrow funds to adopt the control practices—and about a fourth of the landlords interviewed said they wouldn't be willing to do so.

A lack of livestock—and no provisions in rental arrangements for increasing the number of roughage-consuming livestock—were often mentioned as reasons for not adopting erosion-control practices. Lack of awareness of the problem was another obstacle for some landlords.

As with farm operators, we analyzed the characteristics of the farm businesses of the landlords we interviewed. On these farms, we found soil loss best explained by the short expectancy of continued ownership of the farm, the need to borrow funds for erosion-con-
Looking at Groups . . .

We also looked at selected groups of farms in the area. For example, we examined in detail, 18 farms on which soil losses were over 5 tons per acre in 1957 than they were in 1949. Failure to recognize the need for erosion-control practice plus a need for immediate income were reasons for the large soil losses on these farms. These farms were relatively small in size, and their operators were unable to borrow funds to establish erosion-control practices.

Another group of 13 farms had high soil losses in 1949 which had not been reduced by 1957. Here we also found an inability to borrow funds and a need for immediate income. These operators indicated that lack of financial resources was the most important problem.

On 27 farms where soil losses were estimated to be less than 5 tons per acre in 1957, the natural erosion problem was not great. Compared with the rest of the farms studied, the operators of these farms generally were Soil Conservation District participants, had ability to borrow funds and operated large businesses with respect to number of acres farmed and animal units per farm.

There also was a group of 20 farms with relatively large natural erosion hazards on which soil losses were below the average. Operators of these farms generally cooperated with the Soil Conservation District program, recognized the seriousness of the erosion problem and worked off the farm more than the average operator.

In 1957 there were 26 farms whose operators said there were no obstacles to prevent adoption of erosion-control practices.

What Can Be Done?

Assuming that erosion control is in the public interest as well as that of the individual farmer, the results of this series of studies suggest several possible ways to overcome obstacles to erosion control. Three possibilities—education, additional research and direct public action—were considered in developing the following suggestions.

Educational Programs: Additional education about the seriousness of the erosion problem is needed if we want to overcome custom, inertia and failure to see the need for erosion-control practices. For example, educational programs are needed which show the costs and returns of erosion-control practices. With a better basis for appraising the profitability of conservation practices, farm operators can then decide whether the reduced immediate income is balanced by the longer-run benefit. More information is needed, too, about the advantages and disadvantages of including the costs of erosion-control practices in long-term loans.

Expanded Planning Aid: Experience with the Soil Conservation District program has shown the importance of farm plans in reducing erosion. But this phase of the program needs to be revised and expanded. Objections to the choice and amount of a recommended practice indicate that additional effort should be made to make erosion-control plans more acceptable. This could be done by making them more comprehensive—economic as well as physical considerations are essential. The need to revise plans for the sample farms, and the desire of many operators to adopt practices slowly over a long time period show that farm plans need to be flexible.

Since public agencies have limited resources, the follow-up work of improving and updating farm plans is pretty much impossible with present methods of farm planning. Budgeting with electronic computers is one possible low-cost method of enlarging the amount of farm planning for erosion control.

Research Needs: Further research is needed to develop an estimate of future land use needs in the United States. This would be a guide in determining the total amount of erosion control needed—as well as the particular practices that would be consistent with the economic advantage of each area. The growth of surpluses and the need for immediate income indicate that this information is needed both by public agencies and by individual operators in making long-range plans. Federal farm programs also need to be analyzed with respect to their expected effects on erosion control over time.

Additional and better information about costs and returns of erosion-control practices will be needed. The obstacle of field and road layout suggests that further research is necessary to determine ways of modifying some erosion-control practices. Farm operators frequently state that terraces would be acceptable if they were laid out in parallel fashion. Research on the physical possibilities and economic feasibility of parallel and cut-and-fill terracing may help overcome this obstacle.

Direct Public Action: Additional research, particularly on estimating costs and returns of erosion-control practices, may show that individual landowners' interests in erosion control fall far short of public interests to warrant an increase or revision of incentive payments for control practices. Incentive payments can be justified only when practices in the public interest are not profitable for individuals to assume. For example, incentive payments seem to be justified as part of the remedy for the obstacle of field and road layout. In 1957 the Crawford County Agricultural Conservation Program made incentive payments for changing fences to conform to the contour. The public benefit from reduced soil losses, and the inadequacy of economic incentives for individuals to undertake the practice, justified this use of federal funds.

The Conservation Reserve Program has facilitated continuous forage production on many farms since 1957. It's also possible that future farm programs may aid both in the control of soil erosion and of the production of surplus crops.