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To advance the science and art of good land use

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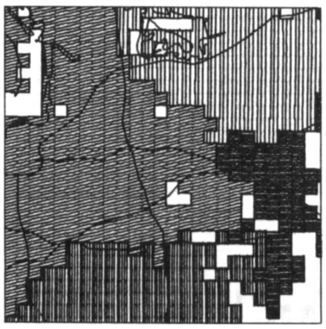

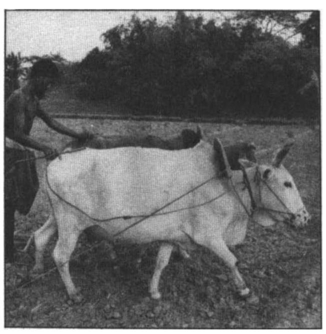

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Cover
A sublime vista is used to symbolize efforts by conservationists to sustain the beauty and productivity of forest resources (see pages 459 and 462). Photograph courtesy of Boise Cascade Corporation.

The Soil Conservation Society of America is dedicated to promoting the science and art of good land use, with emphasis on conservation of soil, water, air, and related natural resources, including all forms of beneficial plant and animal life. To this end, SCSA seeks through the *Journal of Soil and Water Conservation* and other programs to educate people so that mankind can use and enjoy these natural resources forever.

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PEN POINTS

Conservation a tillage by-product

A response is needed to the article by Korsching et al., "Adopter Characteristics and Adoption Patterns of Minimum Tillage: Implications for Soil Conservation Programs" [*JSWC*, September-October 1983, pp. 428-431]. The article contains a basic flaw in the analysis. While showing that adopters of minimum tillage follow the normal adoption curve and that adopters were "younger farmers with farm operations larger in size and scale," the authors' logic failed when they equated minimum tillage primarily with soil conservation. Soil conservation is a *by-product* of minimum tillage; the major advantage of minimum tillage is labor savings. Pierre Crosson [in "Conservation Tillage and Conventional Tillage," published in 1981 by SCSA] estimated the difference in labor requirements between conventional tillage and conservation tillage (which included minimum tillage) at roughly 100 percent, that is, minimum tillage requires only one-half as much labor as conventional tillage (preharvest activities only). The reason that younger farmers with larger farms adopt minimum tillage is the same reason they buy larger tractors; they are the specialized corn/soybean farmers, planting larger and larger acreages of cropland. The labor savings advantage of minimum tillage allows these adopters to plant more acres, farm more ground, and expand their operations. They consider minimum tillage to be an economically profitable, commercial innovation. While the authors earlier acknowledged a difference between other soil conservation technologies and minimum tillage, in the discussion section they revert to applying their results to *all* soil conservation technologies. The sentence "Knowing that soil conservation practices are adopted according to a pattern that is similar to other new practices provides conservationists a valuable tool in developing and implementing soil conservation programs" should read "Knowing that *minimum tillage* is adopted...."

A real problem in the literature concerning farmers' response to soil conservation technologies is lumping all of the technologies together or counting the number of practices adopted without differentiating between the types of soil conservation technologies at all. In fact, there are very different types of soil conservation technologies, ranging from capital-intensive, land-based structures, such as terracing, to cropping patterns, such as sod-based rotations, and finally to mobile technologies, such as tillage choices. According to J. E. Carlson and associates [Idaho Agricultural Experiment Station Bulletin No. 601], in a study of farmers in the Palouse, a difference was noted in the *type* of soil conservation technology adopted by farmers, especially in the farmers' choices between land-based soil conservation technologies and mobile technologies, such as minimum tillage:

"The study showed that farmers did not adopt erosion control practices in a random or haphazard manner. Those control practices requiring minimal capital investment seemed to be used together, and those practices requiring large capital investment tended to be found together."

I conclude that not all soil conservation technologies are alike and that different technologies are adopted because of different types of farms and the structure of agriculture. For example, a dairy farmer can incorporate a sod-based rotation. A large landowner may adopt terraces or expensive land structures because of the tax write-off.

Therefore, while Korsching et al. show quite well that the adoption of minimum tillage fits the adoption-diffusion model, I would have to disagree with the authors and agree with F. Pampel, Jr., and J. C. Van Es [Rural Sociology 42(1): 57-71] that such a model only fits economically profitable or commercial innovations (which is the primary reason farmers adopt minimum tillage) and that the model still has little application to other soil conservation technologies having low immediate or short-term economic gains.

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EPIC: How valid?

The article "EPIC, A New Method for Assessing Erosion's Effect on Soil Productivity" by Williams, Renard, and Dyke [*JSWC*, September-October 1983, pp. 381-383] provides an insight into the implementation of the RCA [Resources Conservation Act] process. The effort by USDA [U.S. Department of Agriculture] to develop a method of quantifying the cost of soil erosion is commendable. The authors conclude that the EPIC model has produced reasonable results but still requires rigorous testing for validation.

Data presented in table 2 of the article do raise some questions concerning the validity of the model, at least for the Iowa yields reported. There are 10 yields reported for Iowa research plots. For nine of the plots, simulated yields are greater than measured yields. Of the eight corn yields compared, seven are higher for the simulated model. The eighth corn yield was roughly comparable for the simulated and measured methods. For the seven corn yields that were higher by the simulated method, yield differences ranged from 120 kilograms per hectare (2 bushels/acre) to 1,140 kilograms per hectare (19 bushels/acre), with an average of 714 kilograms per hectare (11.9 bushels/acre). From a statistical point of view, the standard deviations overlap. However, it does seem that some simulated yields should be lower than the measured yields if the EPIC model is providing an unbiased estimate of yields. Additional information about the location and kind of research plots and annual yields would be helpful in evaluating the data presented.

The potential uses listed for the EPIC model, in addition to the RCA analysis, indicate the impact this approach may have on soil conservation activities. Thus, it behooves all of us concerned with soil erosion, soil productivity, and conservation policies to encourage the testing needed for validation of this or other models that attempt to simulate field conditions.

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"Pen Points" is a forum for comment on published material or land and water management issues in general. Readers are invited to express their views in a letter to the editor. Letters are judged on clarity of expression and pertinence. They should be as brief as possible. Long letters may be shortened.—Editor

Agricultural Management and Water Quality. Edited by Frank W. Schaller and George W. Bailey. 400 pp., illus., 1983. Iowa State University Press, Ames, 50011. $39.95.

Can conference proceedings be interesting? Schaller and Bailey make an excellent attempt in their recent book, *Agricultural Management and Water Quality.* Their editing of technical papers presented at the National Conference on Agricultural Management and Water Quality (May 27-29, 1981, Iowa State University) is to be commended. The proceedings cover major segments of agricultural nonpoint-source pollution, including current issues, pollutant sources/loads and impacts, best management practices, and policy implications.

Unlike other conference proceedings, photographs are placed at important section headings to heighten reader interest and entice the reader into the next section.

To mention a few highlights among the articles, Nelson and Logan's article on chemical processes and transport of phosphorus is an extremely comprehensive discussion of phosphorus forms. The authors survey in understandable language the various forms and lucidly discuss phosphorus transformations in the environment.

In a section on predicting loads and water quality impacts, Donigian, Imhoff, and Bicknell give a detailed description of the water quality model, HSPF (Hydrologic Simulation Program-Fortran). They examine the model's capability to analyze and to predict the quantity and quality of runoff from agricultural lands, including the development of best management practices (BMPs). In another article, Knisel, Foster, and Leonard discuss in straight-forward terms the CREAMS mathematical model for assessing nonpoint-source pollution. The authors indicate the advantages of using the relatively simple CREAMS model to compare and choose between agricultural management practices.

Finally, in the part on agricultural best management practices, Baker and Johnson's "Evaluating the Effectiveness of BMPs from Field Studies" gives an excellent overview of the effectiveness of agricultural management practices in controlling water quality problems. They indicate the difficulty of showing statistically significant differences between practices because of uncontrolled variables in the farmer's fields or practices.

Two other authors, Nowak and Korsching, present particularly frank views on why farmers may reject best management practices. The authors found through surveys that farmers generally have a tendency to view BMPs as poor solutions to minor or nonexistent soil erosion and water pollution problems.

If there is a fault with the book, it is the lack of groundwater information among the articles. Overall, however, the editors did an extremely credible job of bringing order to the complex subject of agricultural nonpoint-source pollution. With the conference papers covering a broad spectrum—from economics to science to psychology—the editors worked effectively to present a coherent view of the current status of agricultural nonpoint-source pollution. If you are looking for a technical, informative publication on agricultural management and water quality, this book is a must.—*CHARLES R. TERRELL, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.*

Resource and Environmental Effects of U.S. Agriculture. By Pierre R. Crosson and Sterling Brubaker. 275 pp., tbls., apps., index, 1982. Resources for the Future, Washington, D.C. 20036. $15.00.

This research paper represents another significant contribution by RFF to the careful management of our natural resource base. Between now and the year 2010, the authors see additional demand being placed on farmland resulting in negative environmental consequences. In fact, the authors expect that production agriculture could change from "one of chronic surplus to one of recurring if not chronic scarcity."

This shift would be, in part, attributable to the continued growth of agricultural exports due to increasing world population and income. The authors' basic conclusion is that production costs and environmental damages will increase in real terms, resulting in at least a 25 percent rise in the cost of feed grains and soybeans. As a result of this additional pressure on land, the future impact on the environment from fertilizers, insecticides, herbicides, soil and water salinity, and sediment from soil erosion will require gradual changes in current policies to cope with the situation.

It is this latter problem, soil erosion, that most concerns the authors, in that they predict that sediment losses will double in the next three decades.

The authors expect erosion to persist in two forms: the on-farm reduction in long-term productivity, and the off-farm impacts on ditches, streams, lakes, rivers, and water impoundment areas. They view the latter as being more severe because the on-farm impact can be overcome with additions of fertilizer, animal manures, and organic matter. Because they project that sediment loads will nearly double by the year 2010, public intervention is economically justified to remedy the off-farm impact.

Their suggested solution is the development of higher-yielding technologies with the potential to reduce soil erosion. An existing technology that can accomplish this is the expanded use of conservation tillage. They estimate that conservation tillage will be used on at least 50 percent of U.S. cropland by 2010.

The authors go on to review past policies in coping with point and nonpoint pollution, the use of pesticides, and soil conservation programs. Because the authors do settle in on soil erosion as the main environmental problem of agriculture, much space is devoted to the subject. The effectiveness of past SCS and ASCS programs is reviewed, including suggested policy changes such as targeting resources for farms with highly erosive soils, performance contracts, cross-compliance, taxing soil erosion, and increased government agency coordination.

Ultimately, greater social control will have to be exerted over the land to avoid these excessively high environmental costs, unless land-saving technologies are developed. As such, research should be an integral part of any future policy to reduce the stress on land, including baseline data on environmental changes.

In their analysis, the authors avoid the extensive use of quantitative modelling, opting rather for general descriptive changes. Although focusing primarily on national policy issues, they discuss some regional and state environmental concerns, such as soil and water salinity, a problem mainly in the western United States.

If one were to look for shortcomings of the book it would have to be the data one has to carefully struggle through to understand the authors' position on future trends and projections. At times, there is a tendency to belabor particular points, a distraction to the reader. On the other hand, Crosson and Brubaker have provided us with a perspective on the future such that policy changes can be considered today to avoid crisis management tomorrow. Given its emphasis on soil erosion, the book reinforces the need for effective soil conservation programs. It therefore should be of particular interest to the soil conservation community.—*DONN A. DERR, Department of Agricultural Economics and Marketing, Rutgers University, New Brunswick, New Jersey 08903.*

Land Drainage. By L. K. Smedema and D. W. Rycroft. 1983. Cornell University Press, Ithaca, N. Y.

This textbook was prepared for land drainage courses in agricultural or civil engineering at the undergraduate and graduate levels. According to the authors, the book's subject areas relate to applied soil physics and appied hydrology. This approach apparently explains the limited emphasis on engineering design procedures and specifications. Water movement through soil, spacing of subsurface drains, and other hydrologic concepts are adequately covered.

The subject matter relates primarily to drainage practices in The Netherlands and the United Kingdom. Bcause the authors have had wide experience in these and other countries, the scope of the text covers a broader geographic area than most books on this subject. Some information is based on U.S. experience, and terminology is somewhat different in the United States. For example, the authors imply that shallow drainage systems include surface drainage, mole drainage, and pipe drainage. Subsurface drains are called groundwater drains and include both pipe and ditch systems. This distinction between surface and subsurface drainage is not emphasized as much elsewhere as it is in the United States.

The book is well written and illustrated. The references are adequate. The units are all metric and consistent throughout. Example problems are given in about half of the chapters, barely adequate for a textbook. An instructor wishing to assign students work problems will be disappointed, as there are none. For this reason, the book would be a better reference than a text.

A couple of chapters on "salty soils" and on "salinization due to irrigation" are useful, but would normally not be found in a book on drainage. Cost examples are given, but some procedures were difficult to follow and need further explanation. The use of different currencies in the examples complicates interpretation into practical terms. Subjects, such as land grading, drain pipe quality and soil loads on pipe, tractive force for design of channels, and design of sumps for pump drainage were entirely omitted or covered very lightly. Considerable space was devoted to peak runoff rates from sloping watersheds. Land reclamation (polders) and seepage through embankments were included.

The authors are to be commended for collecting and condensing a large amount of literature on land drainage. Much valuable information is included that is not otherwise readily available in one volume.—*G. O. SCHWAB, Department of Agricultural Engineering, Ohio State University, Columbus, 43210.*

General

Encyclopedia of Environmental Science and Engineering (second edition). Edited by J. R. Pfafflin and E. N. Ziegler. 1,200 pp., in three volumes, illus., 1983. Gordon and Breach, New York, N.Y. 10016. $500.

Forests

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Managing the Family Forest. 89 pp., 1983. Forest Service, U.S. Department of Agriculture, Atlanta, Ga. 30367.

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