2

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To advance the science and art of good land use

CONTENTS

Features

69
Viewpoint: Soil conservation: A farm woman's perspective
Beverly B. Everett outlines a larger role for women in soil and water conservation

70
Soil erosion in the Palouse: An aerial perspective
B. E. Frazier, D. K. McCool, and C. F. Engle look at uses of aerial photography to assess soil erosion and its control

75
Cross-compliance to enforce soil and water conservation
Jay I. Kaplan-Wildmann investigates the argument for use of this much-debated concept in federal farm programs

79
The political component of national forest planning
Hanna J. Cortner and Merton T. Richards discuss the importance of political awareness to resource managers

82
LESA—agricultural Land Evaluation and Site Assessment
Lloyd E. Wright, Warren Zitzmann, Keith Young, and Richard Googins explain the use of a new tool for judging the agricultural value of land

87
Implementing LESA in Whitman County, Washington
Richard W. Dunford, R. Dennis Roe, Frederic R. Steiner, William R. Wagner, and Lloyd E. Wright describe one of the first pilot tests of LESA

90
Commentary: Florida's Santa Fe Swamp: To mine or not to mine?
Theresa Waldron looks at a controversy symbolizing society's many energy-environment dilemmas

93
Commentary: The politics of wetland conservation: A wildlife view
Keith W. Harmon and Chester A. McConnell trace the impacts of political processes on the status of U.S. wetlands

Departments

66
Pen points

96
In the news

100
Upcoming

101
Books, etc.

Research reports

104
Effects of late-growing-season inundation on tree species in the Central Plains
M. W. Melichar, W. A. Geyer, W. L. Loucks, and F. J. Deneke

106
Erosive wind energy distributions and climatic factors for the West
Leon Lyles

110
Wind erosion calculator: Revision of residue table
E. L. Skidmore

113
Characteristics and use behavior of innertube floaters on southern Appalachian streams
William E. Hammitt, Gary D. McDonald, and H. Ken Cordell

115
Soil erosion on subarctic forest slopes
James W. Aldrich and Charles W. Slaughter

119
Hiking boot impacts on woodland trails
Fred R. Kuss

122
Diversity indexes and interpretation of recreation supply inventories
Paul R. Saunders and G. Wesley Burnett

124
Cattle grazing impact on surface water quality in a Colorado Front Range stream
Howard L. Gary, Steven R. Johnson, and Stanley L. Ponce

Cover
Aerial infrared photograph of divided-slope cropping in Washington's Palouse region (see page 70). Bare soil with rough surface (lower left corner) captured sediment from steep north-facing slope in center. Severe rilling occurred on both dry (gray) and wet (blue) soils. Red tones indicate onset of winter wheat growth. Photo by B. E. Frazier.

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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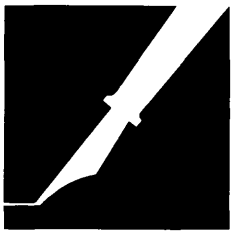

PEN POINTS

Conservation has no bounds

...thanks for your viewpoint on the need to re-evaluate conservation for all land and all people in the last issue [November-December 1982] of the *JSWC*. I agree with you 100 percent.

There is definitely a continuing need to re-study, update, and put into action the basic concepts presented in the 1964 District Outlook report if conservation districts are going to take and hold their rightful and needed place in resource conservation for our nation.

Many conservation district programs did expand and do deal with a conservation program in urbanizing areas and on other nonfarm lands. NACD (National Association of Conservation Districts) has an urban conservation committee with a good program scheduled for the annual meeting in February 1983. Our Illinois State Association of SWCDs has an urban conservation committee with a very competent chairperson in Eldoro Zimmerman from Winnebago County.

However, I'm afraid you are right in your observation that there is no longer a strong "push" or incentive to work hard at informing and involving nonfarm officials or leaders in the essential need to use land within its natural capabilities and care for it with the necessary conservation practices. I appreciate the fact that this is not an easy task; not all leaders, whether farm or nonfarm, have the same interests, goals, and objectives.

It is very gratifying to find a person like you who is still "on the job" suggesting that conservation districts and assisting agencies pay more attention to conservation of all land.

Minott Silliman, Jr.
Toulon, Illinois

I was pleased to read the comments of Ms. Lundberg under "Viewpoint" in your November-December issue [1982, pp. 308-309].

I am chairman of the North Cook County Soil and Water Conservation District in the Chicago metropolitan area and am very concerned with the role soil and water conservation districts will play in the future. The four recommendations that resulted from NACD's special committee on district outlook are extremely important, and any shift from this people-orientated approach to districts' future planning would be disappointing. If this happens, "conservation" of the land will not take place.

The urban soil and water conservation districts and their directors must take the initiative to educate all people, nonfarmers and farmers alike, and to motivate them to work together for the common good of the land. We must start to communicate and broaden our thinking to all issues and all land. Only then can we conserve all the land for all the people. We must be equally concerned with both the farm and nonfarm areas. We both are using the land; the only difference is how we use it. It is in its use that we generate all the undesirable environmental impacts. We have come a long way and have accumulated the information necessary for us to use the land properly for whatever our intended use. We know what it takes to prevent erosion on any and all lands, the elements that must be in place if we are to control flooding, and what we must do to protect all land and people from pollutants.

Our district has been fortunate to have the expertise and assistance of the Illinois Department of Natural Resources and the USDA's Soil Conservation Service, both of which have been sympathetic to the urban soil erosion and sedimentation problems. Whatever the situation, conservation needs do not recognize boundaries. Conservation belongs to everyone and everyone must be involved in order to make any progress at all. Let's broaden our thinking and place our priorities for the benefit of the land and people, not its usage.

Hart Kargenian
North Cook County Soil and Water Conservation District
Rolling Meadows, Illinois

No conservationists disagree with Marilyn Lundberg's reaffirmation that soil conservation goals should spread over "all people and all land." In fact, the idea remains so good, I see no likelihood nonfarm areas will forsake their newfound concern for soil erosion and sediment control and water quality protection—if that is her worry.

Municipal permit reviewing agencies are steadily improving their counseling capability and enforcement authority in regard to soil erosion and water runoff standards. Urban planners, public works engineers, and zoning boards have their BMP [best management practices] handbooks and soils maps at their elbow; these references are dog-eared from usage or soon will be.

The SCS [Soil Conservation Service] and districts can take considerable credit for infusing city hall with concern for soil conservation and promoting erosion control standards and know-how. Modern water pollution abatement policies and programs can also take some credit because it was water cleanup, both urban and rural, that lent the extra incentive to be specific about soil erosion and storm water management.

What Lundberg may fail to appreciate is that the so-called radical de-emphasis of the nonfarm sector in soil conservation programs is not so much the result of the current financial pinch, the orientation of the chief, or RCA [Resource Conservation Act] as it is a psychological imperative that was building from long before.

It took the 1976 GAO [General Accounting Office] evaluation of SCS and ASCS [Agricultural Stabilization and Conservation Service] programs to spell out that soil conservation programs were doing a deceptively poor job on agricultural soil erosion control. That assertion had a penetrating psychological impact. The fact of program ineffectiveness, per se, was not a surprise, but the fact that GAO (Congress' own auditor) was courageous enough to make an issue of something so sacred was revolutionary.

How had it come to pass that an otherwise dedicated agency should de-emphasize its central mission? It was those new and exciting urban challenges in the 1950s and 1960s with their enthusiastic and articulate clientele that afforded the rationale for the substitution of priorities. Urban erosion control was only one such challenge; wildlife ponds, flood control, and outdoor recreation were all pieces of the "new soil conservation" and each exciting piece possessed the forbidden fruit: nonfarm benefits. Collectively, an army of technical experts and top management capability was diverted from agricultural soil erosion control. Throughout the 1960s and

early 1970s, agency services flowed to where the willing customers were and shied from where they were not. For a time, the soil conservation program, so far as agriculture wanted it, was essentially a tiling program.

Actually, the current retrenchment that Lundberg decries may be more agency dressing than substantive. If her argument proves persuasive to agency administrators, then dressing will be all that it is. But the political astuteness signified by recent, however reluctant, priority shifts is fully justified: A formidable backlash is among us. Lundberg must accept the fact that a backlash sooner or later was inevitable; agriculture is simply too fundamental to be an "also ran." Vacillation now will only cause the final remedy to be more revolutionary.

Soil conservation, Lundberg might agree, was given much rope and an ample expense account—actually more than two decades—to show it could both walk and chew gum at the same time. It couldn't. The walk, or as accountants like to say, the bottom line, in soil conservation is agricultural soil erosion control. This is not one of many facets; it is the paramount mission.

Soil conservation is not an agency; it is a tenet overlaying many resource management objectives. However, soil conservation institutions (as defined for governmental convenience) do not overlay all other institutions and, therefore, they shouldn't try to be everywhere. Other resource agencies and programs must and will contribute to the whole. The message for local districts or committees is not to concentrate their attention in a single institution, but to decentralize their allegiance to all institutions who can contribute to a comprehensive program. Districts should do all that Lundberg says, but the USDA [U.S. Department of Agriculture] should not.

Dale E. Marsh
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Understating sedimentation

I usually enjoy browsing the *JSWCs* that are circulated across my desk, especially when they contain articles about sediment deposition, such as the one in the September-October [1982] issue by P. A. Kammerer, Jr., and W. G. Batten [pp. 302-304]. At first glance, I thought this was an excellent documentation of the two record events. But I'm afraid others might have been misled by the terminology used in their discussion.

The first misinterpretation is that the "sediment yield" was 3,200 tons per square mile. Sediment yield was *not* measured. The sediment *deposition* was measured at 3,200 tons per square mile. To estimate (or measure) sediment yield, one must add to this the amount of sediment that passed through the spillway. Data for two dry reservoirs were published by Gunnar Brune in 1953. One was Senecaville reservoir, Ohio, which trapped 48 percent and the other was John Martin reservoir, Colorado, which trapped 62 percent of its sediment inflow. Since this is also a "dry" structure and the flood waters were detained less than 24 hours, the percent trapped may also have been only 50 percent or, in other words, another 3,200 tons per square mile may have gone through the spillway. A more accurate estimate of the percent trapped could be made if the authors had used the University of Kentucky's DEPOSIT model. Another method is to compare average particle size of the highly eroded soils with the average deposition particle size to see how many tons of clay and silt (which went through the spillway) it takes to make them balance. In the meantime, a conservative estimate of sediment yield would be 6,400 tons per square mile or 10 tons per acre.

A sediment deposition rate of 4.1 acre-feet in 3 + years seems to be about the national average for structures of this size (2). Since 82 acre-feet were allotted to sediment storage, the designer must have expected this rate of sedimentation.

What is alarming is the rate of erosion that must be taking place somewhere in the watershed. If one would assume that the erosion is mostly from the cropland (58 percent of the watershed), then it must have eroded 17 tons per acre to get an average of 10 tons per acre for the whole watershed. (This is assuming 100 percent delivery to the impoundment.) Apparently, the reported annual sediment yield of .02 tons per acre (13 tons per square mile) during 1968 to 1974 was not representative of this watershed.

Why did the authors measure sediment density in only four locations while measuring sediment thickness in 204 sites? Why go to all the trouble of surveying the impoundment and then skimp on a measurement that could cause a 10 percent error or more?

In a study of unit weight of deposited sediment, Lara and Pemberton (3) were able to predict unit weight based on particle size of sediment. Using 405 samples from 63 normally dry reservoirs, a prediction equation was developed. Using their equation for this southwestern Wisconsin structure, it predicted unit weight to be 72 pounds per cubic feet, or 10 percent lower than the authors. The standard error of estimate was ± 12 pounds per cubic feet and 90 percent of the samples were within ± 20 pounds per cubic feet. One would have to be very lucky to get the right answer using just four locations. I would recommend at least 11 locations (one per range) and 3 per range if possible. Using the full depth cores was a good procedure though.

What particle size should I associate with a "silty upland" or a "sandy silt" soil? This terminology is new to me.

I agree with the authors that large storms play a significant role in producing sediment yield. Erosion control structures must be designed to withstand the large storm. However, the authors have understated their case by ignoring the sediment that passed through the reservoir. In addition, their case is made weaker by only sampling density in four locations.

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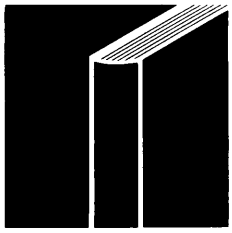

BOOKS, ETC.

Water for Western Agriculture. By Kenneth D. Frederick and James C. Hanson. 241 pp., illus., apps., tbls., index, 1982. Resources for the Future, Washington, D.C. 20036.

In *Water for Western Agriculture*, an excellent research paper from Resources for the Future, Inc., Kenneth D. Frederick and James C. Hanson have thoroughly traced the past importance of water for western agriculture and have outlined some of their concerns for the future. They describe their work as primarily a synthesis of work done elsewhere, supplemented and updated by interviews with agricultural water experts in the West and some original research. The effort was undertaken because of the considerable uncertainty stemming from widely differing views on irrigation's importance to agriculture and the potential impacts of losing irrigated acres in the West.

Although reliable data is hard to come by, the authors estimated that by 1977 more than 60 million acres of land were irrigated in the United States, which was nearly 15 percent of the nation's total cropland use. Fifty million of these irrigated acres are found in 17 western states, accounting for nearly one-fourth of cropland in these states. Western irrigation expanded rapidly between 1967 and 1977. The Soil Conservation Service survey data indicate a 21 percent growth during this period. Most of this expansion came in the Northern Plains area, concentrated in Nebraska and Kansas, which together accounted for 61 percent of the increase in western irrigation.

In this period, the irrigation growth centers have changed markedly from the Southern Plains and Pacific Region to the Northern Plains area. The locus of future growth will remain in the north.

Surface water withdrawals have remained fairly constant since the mid-1950s. Several factors indicate this trend will continue. However, groundwater withdrawals have risen three-fold since 1950. Groundwater currently supplies about 39 percent of all western irrigation water, resulting in the mining of more than 22 million acre-feet per year.

Institutional arrangements have changed little in the West. Western water law and management institutions were developed when water was plentiful in relation to demand. Water is now scarce in relation to demand, yet there has been little adjustment in the laws and institutions that control and manage the resource.

Costs for water, especially groundwater, have increased. Groundwater irrigators pay the most for their water and are most susceptible to further cost increases stemming from rising energy costs and declining water levels. Surface water costs tend to be considerably lower than groundwater costs and are not as subject to change. Water from federal water projects is provided to a fortunate group of irrigators. This subsidized water is used on nearly 20 percent of the West's irrigated acreage.

A variety of environmental problems are associated with irrigation, but the ones likely to have any significant effect on the future role of irrigation are low stream flows, groundwater depletion, and salinity. Another environmental problem is groundwater pollution from the infiltration of agricultural chemicals.

Projections of irrigated acreage are difficult to achieve. Almost every method devised has a number of shortcomings. In the future, changes in total irrigated acreage will depend largely upon what happens to agricultural commodity prices. This is true more so than in the past. Future expansion will be influenced by very different cost and resource conditions, making past trends of limited value for projecting future irrigation. Even in the absence of any significant change in crop prices, however, some net expansion of western irrigation seems likely. Most of the expansion will be in the Northern Plains, and more specifically within the Nebraska Sandhills.

There will be some qualitative changes in western irrigation. The nature as well as the rate of growth of irrigation will be very different from the past. As costs rise, water will be used more efficiently. Although total irrigated acreage may not peak until the first decade of the next century, total water withdrawals for irrigation will peak much sooner, perhaps within the next decade. Improvements in yields and changes in cropping patterns will increase the value of irrigated production even after these peaks are reached.

In conclusion, Frederick states, "The West is running out of water. It is running out of low-cost water, however, and no set of policies and programs will alter the fact that water is becoming increasingly valuable in the West."—*DAYLE E. WILLIAMSON, Nebraska Natural Resources Commission, Lincoln, 68509.*

The Politics of Agricultural Research. By Don F. Hadwiger. 230 pp., illus., refs., tbls., bibliog., index, 1982. University of Nebraska Press, Lincoln, 68583, and London.

Historically, agricultural research has had an enviable record for providing the information needed for modern farming systems. Although the record measures up well in a cost-benefit analysis, critics contend that the emphasis placed on production efficiency has added little to basic knowledge. Another criticism has been that industry interests have been served, while the concerns for "new agenda" items, such as food safety and human nutrition, have been ignored.

Hadwiger believes that agricultural scientists represent a distinct subculture. This subculture developed because agricultural scientists as a rule were raised on a farm, obtained their training at a land-grant college, did their research on commodity-oriented problems, and kept a distance from the mainstream of basic science research.

The author documents that most administrators of agricultural research in both the state and federal systems come from the ranks of this group of agricultural scientists. As a group they set research policy based on industry needs and have been reluctant to include social needs in their priorities.

The political supporters of these administrators are made up of the many agricultural interest groups, which include farm organizations, commodity associations, and trade groups. Hadwiger discusses the control that the congressional appropriations subcommittees for agriculture have in setting research policy. He emphasizes the tremendous power of the House Appropriations Subcommittee for Agriculture. Congressman Jamie Whitten, chairman of the subcommittee since 1949, is described as a "one-man committee," with a reputation for being a broker for the powers of industry. Even though he is knowledgeable about the agricultural industry and research, Whitten is accused of giving little support to the research needs expressed by public interest groups. His great power results from his acceptance by the president, Congress, the media, nonfarm groups, and research administrators.

The Senate appropriations subcommittee, though cursory in its examination of the agricultural research budget, does be-

come involved in "pork barrel" appropriations. These actions, which have added to the nation's research capability, have resulted in the opening of new field locations. Many of these locations, however, end up with inadequate funds when the senator responsible for establishing them leaves the committee.

The conference committee appointed to the House and Senate subcommittees spend half of their time on research items, even though these items make up less than 6 percent of USDA's budget. In these deliberations, Congressman Whitten has been most successful in reducing those budget items he gives a low priority while increasing those he gives a high priority.

The program control exercised by research managers and the Congress has been and continues to be challenged by public interest groups. Rachel Carson's book, *Silent Spring*, published in 1962, generated great public concern about potential health hazards from agricultural technology. This concern, which has persisted and grown over two decades, has gained the support of many public interest groups. Research policy set in response to these concerns has been in some cases developed without inputs from the agricultural establishments.

Because of the recent success of public interest groups with Congressional policymakers, industry has found that it is expedient to work with them to obtain funds for research of mutual interest. Issues of public concern raised by interest groups outside of agriculture have prompted questions in the minds of some agricultural scientists and administrators about how well the system is responding to today's needs. These questions have triggered a series of committee studies. The reports developed by these committees suggest that new and improved management is needed if agricultural research is to have the impact it should.

The findings of these committees were responsible for the new budget and planning process and a new USDA agency, the Science and Education Administration. A competitive grants program was included to respond to the new research needs of agriculture and special interest groups. This funding mechanism was never supported by state and federal research managers.

The 1977 farm bill, which received support from both the industry and public interest groups, authorized a doubling of agricultural research funds. However, Congress never provided additional funds for the authorization. The author is critical of the lobbying efforts of state agricultural experiment and extension bodies that resulted in the House appropriations subcommittee providing these funds by cutting the heart of the competitive grants programs.

The author wonders if research managers haven't returned to complete reliance on industry support. He expresses concern about stymied growth if this occurs. The reader is reminded that the public is much better informed about world food problems and the side effects of modern agricultural technology than they were in the past. These support groups have learned how to gain access to research managers and congressional committees responsible for appropriating funds. The result could be that Congress, rather than research managers, will reconcile the demands of industry and special interest groups.

The Politics of Agricultural Research is both informative and readable. I recommend it to research managers, legislators, and others interested in agricultural research.—*CARL W. CARLSON, Maryland Agricultural Experiment Station, University of Maryland, College Park, 20742.*

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