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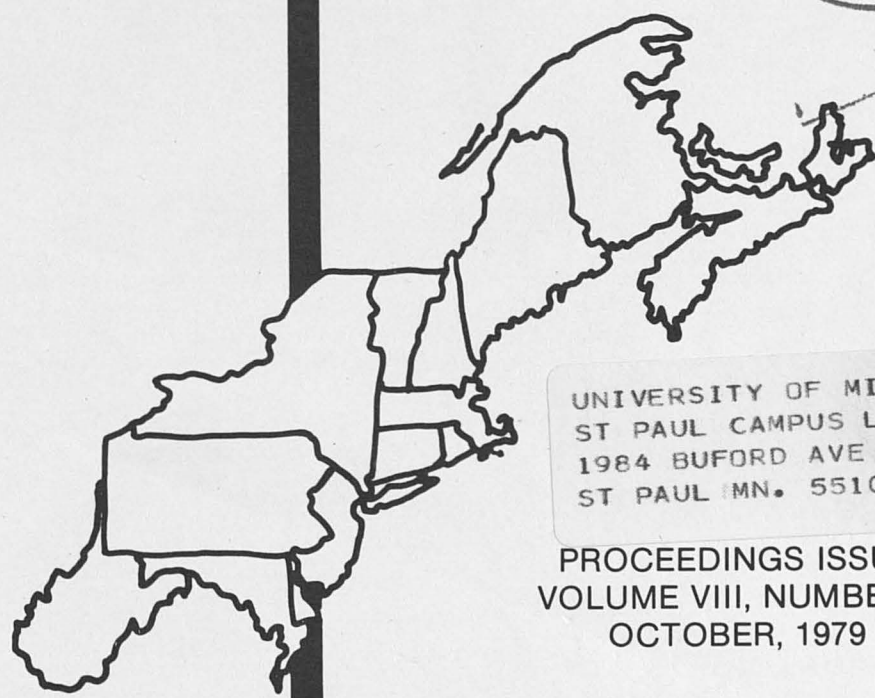
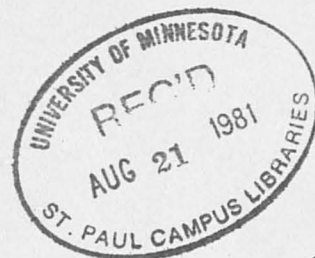
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NATIONAL SOIL AND WATER CONSERVATION POLICY:  
AN ECONOMIC PERSPECTIVE

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and  
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Soil and water conservation programs of the U.S. Department of Agriculture (USDA) are under increasing scrutiny. Congress, interest groups, and departmental budget people are requesting systematic documentation of the impacts of these programs. Their basic concern is economic performance -- the "payoff" for public dollars invested in conservation. This paper examines two aspects of the increasing application of economics to soil and water conservation policy. Both are discussed in the context of current efforts within USDA to implement the Soil and Water Resources Conservation Act of 1977. This new law provides a policy setting within which questions of economic performance are addressed. Examined first is use of formal analytical models in identifying economic consequences of alternative conservation strategies. Second, issues concerning economics of public choice are addressed. The first implies search for greater efficiency of resource use; the latter concerns the distribution of policy impacts in the political economy. Both are important. The paper concludes by identifying research needs. This is a policy paper, not a report of research results.

Recent History and Policy Setting

Soil conservation has always been considered as one of the true "goods" of society. Programs began after the Dust Bowl days when something clearly had to be done. Dedication to a relatively well defined purpose -- retaining the productive capacity of this nation -- spawned a political and social movement that must be reckoned with today (Held and Clawson 1965, Morgan 1965). Soil and water conservation programs and technical expertise to deliver them have institutionalized an awareness of our natural resource limitations, a collective sense of responsibility for our soil and water. A cohesive power cluster evolved, linking farmers and other resource users to technical advisors, national agricultural agencies, with State and local staff, all lubricated by consistent funding. Everybody gained; the programs flourished.

Conservation continues to enjoy success in the late 70's, but the mood has changed. Some say we are losing the conservation ethic, that people simply don't care as much as they used to. Others point out that despite

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expensive conservation programs, costing some \$20 billion in federal funds in 40 years, soil continues to wash away, filling rivers and streams and reducing our productive base. While conservation is important, it must stack up against other social goals in the scramble for greater "good" per public dollar. Several recent policy actions have focused this concern.

The General Accounting Office (GAO), acting on a request by the Senate Committee on Agriculture, Nutrition, and Forestry, conducted an appraisal of conservation programs in 1976. GAO presented its findings in February 1977, concluding that conservation programs administered by the Soil Conservation Service (SCS) and the Agricultural Stabilization and Conservation Service (ASCS) "...have not been as effective as they could be in establishing enduring soil conservation practices and reducing erosion to tolerable levels." GAO staff described an urgent need for targeting federal dollars on critical conservation problems rather than relying entirely on initiative by farmers to drive the programs.

An oversight directive from U.S. Senators Talmadge and Dole in December 1976 requested that USDA, particularly the Soil Conservation Service, get serious about producing evidence of the impact of conservation programs. The implication was clear -- show Congress why conservation programs should be supported.

The latest action is legislative. Performance, analysis, and systematic policy development are prominent aspects of the Soil and Water Resources Conservation Act of 1977 (RCA), P.L. 95-192. To implement RCA, the Department of Agriculture must formalize the good intentions it expressed in responding to the oversight request. To guide future policy, USDA must create and apply procedures that can analyze conservation goals and programs.

There are three basic products mandated by RCA: an appraisal of existing resources and institutions, a conservation program based on the appraisal, and an annual evaluation of program performance in achieving conservation objectives. Analysis is limited to private and other nonfederal lands of the nation.

The appraisal is centrally concerned with describing what exists -- the physical and institutional setting -- but it must also indicate the capability of those resources and institutions to meet projected future demands for various goods and services.

The program will recommend various techniques and institutional arrangements that can accomplish short- and long-range conservation objectives that emerge from the appraisal. The program will state how and by whom conservation will be accomplished. Secretary of Agriculture, Bob Bergland, has stated that "nothing is sacred" in this effort. In other words, existing conservation programs -- and their associated distribution of authority -- must outperform other approaches to be continued. Various alternative institutional sets must be identified and systematically compared with what we have now. The specific charge is to propose a conservation program, based on analysis of costs and benefits. The President will submit an appraisal and program to Congress at 5-year intervals, beginning in 1980. In addition, the President will present to Congress his detailed statement of policy regarding the full range of soil and water conservation activities.

## Economic Evaluation of Conservation Programs

Direct application of economics to decisions about conservation is at two levels: 1) examination of the costs and benefits of individual practices and programs, and 2) use of linear programming to analyze the impacts of conservation policies on agricultural production costs. The former implies incremental policy; the latter implies selecting an optimum policy mix. Much of the rhetoric surrounding RCA thus far involves this distinction. Some in USDA and elsewhere are calling for nothing less than the optimum conservation program. "We've got to stop muddling through," they say, "and develop a program based on simultaneous, definitive, and fully coordinated analysis of all conservation activities of the Department." Managers and politicians, on the other hand, tend to be "incrementalizers," seekers of the possible rather than the perfect. We hope that the final product will be a blend, a conservation program built on evidence of how various components perform, and on the vision and direction that an optimum strategy can provide.

### Program Evaluations

Program evaluations have been conducted within USDA since the late 1960's, beginning with programming, planning, and budgeting systems. Conservation program agencies have their own evaluation staffs. At the Department level, the Office of Budget, Planning and Evaluation reviews agency actions and conducts selected program evaluations.

Program reviews completed to date give little attention to accomplishments such as reduced erosion. Instead, they focus on budget costs and intermediate products such as feet of tile installed and numbers of conservation plans completed. Most of these programs depended largely on data contained in agency management systems. Few new performance data were collected. In 1978, however, evaluations of two key conservation programs -- the Agricultural Conservation Program (ACP) of ASCS, and the Conservation Technical Assistance Program of SCS -- were begun that used new field data. These evaluations will measure the impacts of conservation practices on soil loss and other resource conditions by collecting information before and after practices are installed. With appropriate cost figures, these studies will compare the cost-effectiveness of alternative conservation system in achieving physical targets. They will not determine the final benefits of conserving soil and water resources. Further, they are incremental analyses. They describe performance of major aspects of a particular program with little attention to related activities in other agencies. While technically sound and sufficient when examined separately, incremental evaluations are difficult to use in comparing different programs.

### Application of Linear Programming

The search for more comprehensive decisions has led RCA analysts to use a linear programming (LP) model. The RCA model is a later generation of the model that Heady et. al. (1971) used in analysis for the National Water Commission. A partial equilibrium model, it will minimize the cost of producing commodity levels consistent with specified domestic consumption

and export. The return to land is determined endogenously, but the model assumes a competitive equilibrium wherein other farm resources receive the market rate of return.

USDA has had previous experience with this model for the agriculture portion of the Second National Water Assessment (Meister, et. al., 1976). Several changes have been incorporated in the model for RCA. New land base data have been added from the SCS National Resource Inventories begun in 1977. Sediment deposition as well as gross erosion is computed using the model enhancements developed by Wade (1975). The RCA model computes gross erosion, and estimates sediment deliveries to specified points within each of the 105 producing regions. The erosion and sedimentation portion of the model is based on the Universal Soil Loss Equation, with revised soil loss coefficients. The model uses alternative sets of crop yield projections to reflect different assumptions about improvements in production technology. Output tables have been revised to display energy costs associated with each model run. Several runs of the model will be made using 1985, 2000, and 2030 as projection points. Alternative population, domestic consumption and export levels for each time period are based on the most current Department of Commerce and USDA projections.

It is perhaps as important to recognize what this model cannot do as to know its strengths. First, the LP approach describes the interaction between inputs, outputs, and costs through linear approximations only. Since it assumes constant marginal products for the inputs, LP does not consider scale economies. Nevertheless, the model can discriminate between alternative production possibilities and optimize the objective function within given constraints. The economist's role is to build the data sets and constraints to facilitate comparison of reasonable alternative policies. Consider, for example, analysis of a national soil erosion control policy to limit annual soil loss to 5 tons per acre. The analyst would set up the model by removing from consideration all crop production activities (combination of soil groups, crop rotations and conservation practices) that yield over 5 tons gross erosion. The required output must then be met through less erosive activities and at minimum cost of production.

The model's major purpose in RCA is to compare alternative conservation policies. Results must be viewed as approximations of conditions under any policy alternative being analyzed. The absolute values for data such as total acres of cropland, acreage of a particular crop, and commodity prices are not definitive. But we can conclude that a particular national soil and water conservation policy would raise or lower 1985 per capita commodity prices by some percentage compared to the 1985 base run. Regional land use and crop production shifts associated with such a policy can also be described.

USDA policy officials will consider the RCA model results in the context of natural resource appraisal data, comments and suggestions generated through public participation, and the counsel of program managers in the individual agencies. There is clearly some apprehension among various interested parties -- inside and outside of the federal government -- that this and other technical models will drive the whole policy system. Inevitably, much information is compressed in the numbers that ultimately show up on computer printout. Some consider this information compression as necessary to filter out irrational or unarticulated human bias. Others put absolutely no trust in the printout because it seems so inhuman. Both are right, of course.

## Economics and Public Choice

Development of recommendations for the soil and water conservation program is basically an exercise in the economics of public choice. Options are compared and positions taken on the basis of perceived distribution of the benefits and burdens of program components. As taxpayers and consumers, we all have a stake in minimizing dollar cost of food and fiber production, improving water quality, and achieving various other resource goals specified in the RCA process. But these concerns will not predominate in the debates to come. Questions of who should pay or sacrifice to achieve these goals will drive the process. Conservation inherently requires that the rate of resource use be redistributed toward the future and, often, that economic returns be postponed. Conservation policy is intended to alter the behavior of today's resource users in the interest of reducing off-site impacts and protecting options for future resource users. Government is involved because of externalities associated with resource use, and because of differences in the time preference rate of the individual resource user and that of society. Off-site beneficiaries and future resource users do not directly pay the costs of conservation policies. Those who must pay -- today's resource users -- are concerned about an equitable distribution of the burden.

### Agenda Setting

At these early stages of implementing RCA, debate has revolved around whose judgment counts in shaping the policy options. The power of the first draft is legendary in Washington, as elsewhere. All are aware that setting the agenda for policy debate will influence distribution of real impacts that follow. The right to be heard, to influence, and to be a part of policy solution is a key bargaining point. Exercise of that right implies an obligation to others to listen. That is the essence of political power.

Authority for implementing of RCA was initially delegated to the Soil Conservation Service, since SCS programs are specifically cited in the Act. But the push for greater emphasis on economic performance, plus recognition by other USDA agencies that the RCA stakes are high, led to creation of an interagency coordinating committee based in the Office of the Secretary of Agriculture. The committee is designed to build support for the final product by ensuring political access for parties determined to have a legitimate stake in the outcome. Eight USDA agencies are members as well as the Office of Management and Budget and the Council on Environmental Quality.

Conservation districts are the most notable nonfederal entity with an immediate interest in RCA. These districts are not just an interest group. They are formally constituted units of state government with direct links to conservation programs. Their whole reason for existence depends on a consistent soil conservation program. The National Association of Conservation Districts (NACD) was a key architect of the legislation. Districts fear the RCA could mean major centralization of policy in which the feds would set all the priorities -- with none set by State and local interests. Districts recognize that agenda setting is important. Those

with a stake in the decision want to help shape the options.

### Affected Parties

Policy decisions in soil and water conservation turn on distribution of expected impacts. We are starting from a base of some 30 established programs, each with its network of affected parties. Any policy change will have repercussions: some will gain, some will lose.

We assume for this discussion that the primary affected parties are --

1. Farmers, other landowners and land managers. They make the investment decisions. Their land use and spending behavior determines soil and water use. Their motives can be characterized as stewardship tempered by economic realism, with a relatively short planning horizon.
2. Conservation districts. Farmers and nonfarmers are members. Their stewardship motive is less constrained by year-to-year economics. They have a life of their own, and a clear stake in continued funding for conservation programs.
3. Local governments (other than conservation districts). They depend on local landowners for political and financial support and have primary authority of land use controls.
4. State government. States have their own soil conservation structures -- a state natural resource or conservation agency, universities, state soil conservation committee.
5. Federal government. Two USDA agencies are the principal actors -- SCS for technical and financial assistance, and ASCS for cost sharing on conservation practices. In addition, the Farmers Home Administration makes conservation loans for various purposes, and the Science and Education Administration (SEA) and the Economics, Statistics, and Cooperative Service (ESCS) carry out research.

It is apparent that units of government and agencies at all levels are vitally concerned with how and by whom conservation is accomplished. They have a major stake in policy decisions. Citizens and taxpayers are also affected as constituents of these governments. Environmental organizations, farm suppliers, and other groups have a stake and will be lobbying for support of their views, but are not considered here.

### Implications of Alternative Conservation Programs

Alternative conservation strategies are now being developed. Without anticipating what actually comes out in the 1980 RCA program, we would like to consider important distributional consequences of these major strategies. Program alternatives are different sets of institutional devices aimed at changing the way people use land and water. These sets can be compared by distribution of dollar cost, discretion, power, authority, and responsibility among the participants. For some purposes, a key comparison would be relative budget cost -- achievement of soil and water goals at lowest possible cost, including administrative cost. There are measurement problems,



of course, and selection of targets is partly influenced by who is affected how. But we will beg the efficiency notion here and focus on public choice. A number of alternative program approaches for achieving soil and water conservation objectives have been identified. Selection of any particular theme as the focus of USDA conservation policy will have important implications for the primary affected parties.

Financial and technical assistance is a major part of the current strategy. Technical assistance for planning and design is provided by SCS. Cost sharing for the installation of specified practices comes from ASCS. The program is strictly voluntary and dependent on landowners' initiative and response to the incentives of free advice and cost sharing. The program is very decentralized; yet neither states nor local county governments have a direct function. Basically, local soil conservation districts and ASCS county committees are directly involved in decisions on how federal personnel and funds are used.

Other management options are being considered that would imply a different mix in setting priorities. One option is a new national policy on types of eligible practices and the federal cost sharing rate. Another is a merger of incentive and technical assistance functions. Another alternative is state administration and a reduced federal role. States would likely have to pay part of the cost under this arrangement, with resulting impacts on state taxpayers. State targeting would cause shifts within states that would disadvantage some counties. Economic targeting might occur at the national level, resulting in redistribution of funds among regions of the country in search of greater conservation returns per dollar. Since conservation problems exist nationwide but differ in character and severity from one area to another, we might establish a multistate decision structure or a structure based on hydrologic units.

Regulations have been used for several years to establish the control of point-source pollution control; now they are being considered as a tool in soil and water conservation. They rest on a redefinition of property rights that says society has the right to pollutant-free streams and to farmland protected from erosion. Society's right can be protected by penalizing the offending land owners and users. Long-run benefits would be sought through investments in conservation practices and through land use changes in some situations that entail short-run monetary costs to land users (Libby and Parsch, in press). But the major costs would be political as farmers, their interest groups, and conservation districts would point out perceived inequities. Enforcement would be expensive to taxpayers. If enforcement were national, achieved through some federal structure at the local level, local governments would object to the redistribution of traditional authority; regulating land use has been the prerogative of cities, towns, and counties. State enforcement is possible. Iowa and a few other states already have compulsory sediment control laws. There is little likelihood, however, that a series of individual state laws would permit national targeting on the most serious conservation problems. Lacking the staff and the resolve to post a guard on every farm, enforcers would have to concentrate their efforts. Which federal agency would have the dubious privilege of being the enforcer? ASCS has 40 years of experience built on handing out price supports and other financial rewards to farmers. Would ASCS enthusiastically accept this new role? The Soil Conservation Service has the technical data and interpre-

tations necessary to a regulatory approach but has no tradition as an enforcer. Conservation districts could stand the financial transfusion, but not the side effects.

This mandatory approach is attractive to many. It seems to be the nonsense approach. But careful projection of enforcement cost, including efforts to convince landowners that perhaps it's not so bad after all, could well push this option into the red column. Virtually all the major actors would have problems. Gains would be broadly dispersed throughout the public, mostly in the future.

Taxation as a tool in conservation policy also shifts the major cost burden to the land user. Taxation, by assuming an initial distribution of rights that emphasizes the social domain and individual responsibility, is thus related to the regulatory approach. Imposing a sediment or pollution tax would require better data on pollution sources than we now have particularly concerning the effects of land use and conservation practices on water quality. It would also require considerably more monitoring and enforcement. The agency or unit required to enforce would not be popular, and that would add some social cost to the achievement of water quality objectives. Those who depend on the good will of farmers, for example conservation districts, would also perceive disadvantages in this approach. With no cost sharing funds to distribute, agencies set up to do that would be disrupted. Part of the penalty to farmers could be offset by income tax credit, while maintaining the direct link between action and cost.

Cross-compliance is based on the notion that to qualify for price supports, production loans, or other positive incentives, farmers must demonstrate their good citizenship by conserving soil and water. The gainers and losers from this strategy are more difficult to identify. Those who now benefit from government incentives would object to additional constraints. They presumably would not object, however, if the conserving farmer were to get more rather than the nonconserving farmer getting less. Cross-compliance is an idea whose time has just about arrived. It is intuitively appealing - the old carrot and stick approach. It seems fair to most people, and it seems cost effective though evidence is scarce. Support is broad, from hard-line environmental groups such as the Natural Resources Defense Council, to Congressional staff, conservation districts, some conservation agencies in government, and the President's environmental staff. While the idea is acceptable, real support will depend on who is asked to bear the cost. If farmers have to change their behavior to keep what they have, they will see a net loss. ASCS and SCS may also object to that approach since it could erode their popular support. "Who must come to whom?" is the key question in this policy option.

The Office of Management and Budget (OMB) has raised a significant word of caution on cross-compliance. Tying price supports to conservation would clearly change the incentives to farmers. Farm production programs are designed to influence supply, price, and income stability. Tacking on a conservation requirement would distort that incentive. We cannot deny that farm programs affect conservation. On several occasions, Secretary Bergland has pointed out that fencerow-to-fencerow production, encouraged by earlier farm policies, can increase erosion. But the consequences of tying production related incentives directly to conservation must be identified.

It is clear that these alternative strategies are fairly discrete and may not fit well together in a single program. To regulate some people and bribe others would lead to charges of unequal treatment. The inter-agency coordinating committee must struggle with these options or variants of them. We cannot afford to approach conservation policy from the least common denominator with the only changes being those that meet no objection from the agencies. Past performance suggests that some changes are needed. At the same time, we must focus our efforts on policies that can be realistically expected to be implemented and to work.

### Summary and Conclusions

The era of unqualified support for conservation is coming to a close. Popular support may be as great as before, but there will be more information on what is supported and at what price. There is strong pressure at the federal level for more quantitative and detailed analysis of government programs and decisions. RCA is but the latest expression of this movement. Agricultural and resource economists are being asked to conduct applied research that will actually guide policy. Most of the work is being conducted by USDA staff economists, but linkages have been established with some academicians and consulting firms.

### Improved Communication Between USDA and the Academic Community

While some USDA agencies, ESCS, SEA, and Forest Service, for example, have traditionally maintained close working relationships with the universities, others have not. Pressures for better economic analyses have led action agencies such as the Soil Conservation Service to build their own economic staffs. Their work appears in agency staff reports rather than professional journals.

We feel that this situation is unfortunate for the agencies and the profession. Agency economists need broader discussion of their work. They need to focus more on the why of policy, given the broader conceptual mode of academia. University economists would be forced to follow through on their work, to go beyond asking tough questions and get to the point of decision. Agencies should do more to encourage their economists to participate in professional meetings. The academic community in turn could invite more participation by agency economists and analysts in seminars, symposia, and other professional meetings. Short-term exchange of staff would be mutually beneficial.

### Research Needs

Several topics have emerged in the RCA process that need additional research by economists in government and the universities:

1. What is the impact of alternative land ownership and management arrangements on land use and soil conservation? For example, does the planning horizon available to corporate farms facilitate greater use of conservation?
2. What would be the consequences of cross-compliance

in price support and soil conservation programs for agricultural production, commodity prices, land use patterns, and erosion control?

3. To what extent do per-farm limits on conservation cost-sharing payments inhibit achievement of conservation goals?
4. What are the on-farm and off-farm economic benefits and costs of alternative crop management and soil conservation systems? Related to that, what are the economics of private investment in soil conservation?
5. What difference would it make if states set priorities and administered soil and water conservation programs?
6. What is the impact of conservation education in getting conservation on the land?

These are some of the questions being asked of economists by policy officials, OMB, and the Congress. In a few months when the 1980 RCA report is completed and the internal critique of our current analytical process has been prepared, we need to open up our thinking for the 1985 program effort. The agricultural economics community can help. We will need not only reviews of the current work but, most of all, suggestions on improving the data and analytical tools for 1985. We welcome your ideas on how to communicate more effectively with the profession and establish priorities for future research.

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