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Staff paper 81-61

POLICY ALTERNATIVES TO MANAGE SUPPLY
CONSERVATION OF SOIL AND WATER RESOURCES

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Agricultural Economics Staff Paper No. 81-61

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POLICY ALTERNATIVES TO MANAGE SUPPLY: CONSERVATION OF SOIL AND WATER RESOURCES

By

LAWRENCE W. LIBBY*

Introduction

Opening sentences on a topic of this magnitude have to be concerned as much with what will not be covered as what will be covered. A glossary may help. I will stick with "conservation" advisedly. Conservation refers to extending the productive life of a given resource. It is the opposite of "depletion", another implicitly normative term. Time is the important dimension in conservation economics--the inter-temporal distribution of resource use. It may involve substitution for the resource in question, as in conservation of fossil fuel; or reducing economic "waste", as in water conservation. Soil conservation refers to efforts to retain the productive qualities of soil longer than might otherwise be the case. The implicit purpose is to achieve long run efficiency by avoiding future loss of productivity. In his 1951 treatise on the subject, Earl Heady defined conservation as preventing reduction of future productivity of soil in response to given amounts of labor and capital, or retaining a production function over time (8, p. 365). It means phased use not preservation or non-use. In the context of today's meeting, conservation is designed to help protect our agricultural supply response capability over time.

The other key term in my glossary is soil. It is the productive "factory" for growing food. It is something less than land which includes the soil/water interface, terrain, and location.

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This paper focuses on soil conservation as an area of public policy. I give particular attention to links between soil conservation and agricultural supply response. That is the on-farm aspect of conservation. I do not discuss off-site effects in any detail. I examine the rationale for public policy in this area and the key policy choices involved.

I have not dealt with what is commonly referred to as preservation of agricultural land. Ag land preservation policy is concerned with retaining the opportunity to produce food, while soil conservation is concerned with the response once that opportunity is provided. To some extent quantity and quality of farmland are substitutes for each other. Quantity of farmland is clearly an important factor in supply response capability. But the policy variables are somewhat different from those in the quality area and the confines of one paper, even for the policy conference, require limitation of the topic.

Soil and Water Conservation as a Policy Area

The policy setting for soil conservation has been relatively stable for the past 40 years, with strong internal political consensus on the need to protect future productivity. As with many policies, soil conservation programs were products of crisis and have been sustained on the argument that problems which generated the soil erosion crisis of the 30s have yet to be alleviated. A well focused mission, with consistent public funds to provide voluntary incentives to farmers, has produced a fairly homogeneous policy power cluster (11).

There has been relatively little policy extension work in this area over the years. There have been few policy choices to talk about. Extension involvement has consisted primarily of participation on state Soil Conservation Committees and occasional work with soil conservation districts. The education part of soil conservation has been called technical assistance and assigned to the Soil Conservation Service.

Recent Policy Changes. Several policy actions of the 70s have imposed outside stress on this cozy policy setting. More people care about soil conservation now than a decade ago. Most recent, and most important, is the Soil and Water Resources Conservation Act of 1977 (RCA). This law was originally designed to add sustenance to the conservation movement by broadening the purposes and building a more formal program management system. It requires full appraisal of the soil and water resources of the nation, and evaluation of policy options for curbing erosion. USDA is to submit periodic reports to the President and Congress on the status of soil and water programs for conservation. A fully implemented RCA would imply more centralized policy with a more diverse political constituency supporting a variety of program outputs. It emphasizes accountability in conservation policy. The Carter administration put great emphasis on coordinated policy development, with several agencies of USDA working together. Of course, SCS and ASCS have history and expertise in their favor, thus they would be key to successful policy under any model. As discussed in detail elsewhere, there are inconsistencies between the soil conservation policy structure of the past and that implied by a fully operational RCA (9).

RCA is not a one-shot reorganization. The 5-year update and improvement of conservation data will be available whatever the policy structure. RCA has broadened the political constituency and agenda for conservation whether or not the law is fully implemented. States and local units are passing more aggressive soil conservation laws on their own, and are adding to their list of conservation outputs, partly to protect themselves from RCA. The coordinated RCA approach has been dismantled in Washington, with acknowledged as well as de facto leadership going back to SCS and ASCS (4).

The next most important conservation-related policy action of the 70s is the Rural Clean Water Program of 1977. This essentially added emphasis to the off-

site impacts of soil erosion. It provided more cost share support for farmer actions that would reduce erosion--the same practices for different reasons. The most important link to soil and water conservation policy is in the implementation device. Soil conservation districts and the states have the primary role for accomplishing water quality goals. Recent cut-backs in EPA suggest that SCD's may be left out on a limb--all charged up to reduce non-point pollution by getting practices on the ground, but no money to bribe farmers to cooperate.

The National Environmental Policy Act (NEPA) is less directly related to soil and water conservation. NEPA was the first natural resource law to emphasize accountability. It requires government to consider and document environmental consequences of policy choices. It does not direct policy, but requires better accounting of the social price of certain actions. Environmental groups are geared to provide information that will discourage those public actions with high environmental cost. RCA, with its accountability thrust, has attracted the attention of environmentalists who are ready to help document the costs of failing to keep soil in place and use water wisely.

The other key changes in the conservation policy environment concern the apparent reduction of "slack" in the food system (14). There is the alleged possibility that land-replacing production technologies may be approaching some final plateau in terms of increased yields. Demand potential on the export side is virtually unlimited. Food policy makers will be looking more to expand supply of food than manage surplus. Without technological substitutes for land that means bringing more erosive marginal lands into use. Timmons and Cory* estimate a 72% increase for erosion in the corn belt with high exports. Many food experts are alarmed about exporting our productivity in the form of higher erosion rates (19). Thus the policy process of soil and water conservation is made even more complex

*Reported in Soth (19).

by growing interest among policy specialists who had formerly been preoccupied with storage and management of surplus.

The sum of all this is almost more attention than the soil and water conservation types can stand. The agenda is getting crowded. There has been a recent explosion of literature on soil and water conservation policy from all parts of this increasingly diverse and intense power cluster.

Why Conservation?

There are several important policy questions concerned with the rationale for government concern about soil and water conservation. Economists have a penchant for seeking some coherent and systematic reason for things that have already happened. Developing such an economic rationale does not change the fact of what has happened in conservation or any other area of policy, but it somehow makes us feel better as professionals. We can convert the obvious into sophisticated language that can keep us secure in policy and in company with other social scientists.

Perhaps the most cogent reason for policy economists involvement in conservation policy is the simple fact that it exists. That is not as tautological as it sounds. Policies and public concerns emerge in response to perceived needs of citizens and voters. We have conservation policy because groups of people have felt that government has an obligation to protect production options for future generations. They felt that the institutions operating in the absence of conservation policy were inadequate or inappropriate to deal with the erosion problem. The mix of participants has changed over the years but the general support continues. There may be little to be gained by introspection on this point. Perhaps we should not belabor the question "why conservation" but get on with the business of trying to evaluate benefits and costs of policy options.

Schertz and Wunderlich (16) have suggested a "grants economy" rationale. We are taking steps now that entail the giving of a grant of productivity to future

generations of consumers. Farmers conserve and thus give a grant to the rest of us. Generations conserve, thus granting productivity to future users. There is no particular reciprocal expected, beyond the recognition that a grant is occurring and that it has value.

Conservation and Market Failure. There are at least three threads to the market failure rationale. First is the possibility of measurable difference between private and social benefit of conservation or between social and private costs of erosion. The question is whether "society" has a stake in conservation beyond that for the farmer, for whom land is the source of both income and wealth. A second type of market failure is the possible discrepancy between private and social rates of time preference. Thirdly, is a set of market distortions caused by the unintended consequences of policies or programs designed to accomplish other purposes. Many of these impacts are central to the relationship between conservation and supply response from agriculture. Performance of our food system including supply response to increasing demand is conditioned by the entire set of incentives that are internal and external to conservation.

The Concepts: There are both short and long run dimensions to the possible discrepancy between private and social gains to conservation. The short run concerns have to do with whether productivity is enhanced by conservation within a time horizon that is reasonable for the individual manager. In other words, does conservation pay for the farmer? If so, we assume that it is a rational action that needs no additional incentive from government. The longer run question has to do with whether or not land values will capture the relationship between conservation and productivity and pass that advantage on to subsequent managers of the farm.

Crosson (5) concludes that there is little reason to believe that there is a departure between private and social consequences of erosion. If erosion is damaging, it imposes costs on producers that are passed along to subsequent

producers in the capital value of land. The question is whether farmers are any less able than government to observe impacts of conservation programs on productivity in either the short or long run. Surely there is imperfect information, but it exists for both government and farmers. It is in the farmer's interest to protect his income and his assets by observing erosion impacts. Neither is there reason to assume farmers and the land market are less informed than the government with regard to possibilities for future soil-replacing technology. It is certainly true that the planning horizon for an individual farmer on a given piece of land is shorter than that for society as a whole. But there is a relationship between current and future productivity which is the foundation for the value of that resource to future producers. The market is a long run institution, just as are the forces of government. In fact, given the vagaries of policy changes with the party in power, the feasible planning horizon for the market may be substantially more consistent than that for government.

The Evidence: There are two important empirical questions following the Crosson line of argument. The first is whether or not conservation practices will affect productivity and the income earning capability of a farmer within his feasible planning horizon. The second is the longer run question of whether in fact land values will capture the presence or absence of conservation practices as a factor determining relative usefulness of that land. The evidence is mixed for both questions. In keeping with the instructions for this conference, I will not review the extensive literature on the returns to conservation. Most studies have examined specific cases and results difficult to generalize (18). The central conclusion is that "it depends"--on the crop being grown, location of the farm with respect to other economic activities, the depth, quality and slope of the soil, and other factors that are site specific. Conservation pays in some places and not in others. On some farms, the soil may be eroded from one field and deposited in

another (10). Does society really have a responsibility for allocating productivity among fields on a farm or even between farms?

There is more consensus in the literature regarding the payoff from limited till farming. Studies suggest that limited tillage can pay substantial dividends on many kinds of soils and crops. There are some disadvantages in that the farmer must acquire additional equipment in most cases and must use more pesticides to control weeds and insects that would not survive conventional heavy till practices. In areas of the country where there is plenty of top soil there is no particular incentive for the farmer to undertake low till farming. Thus we may conclude that conservation does pay--for some practices, on some soil, for some crops, for some farmers, under some economic conditions, with certain sets of institutional variables. That hardly seems an airtight case for accepting or rejecting conservation programs.

The evidence on the conservation impact on land values is equally mixed. Many factors influence the value of land being farmed. Not the least of these is the location of the farm with respect to various nonfarm activities. Land values have escalated substantially in regions where urban development is possible. Development potential may be the most valuable attribute of land in these circumstances. Inflation affects land, as other economic commodities, further masking of the impact of conservation. Presumably one could hold these other factors constant in an experiment and determine the extent to which the presence or absence of conservation is a factor in value. There is little evidence that lenders recognize conservation as an important factor in determining repayment capacity for land in farms. There is little evidence that a farmer who does not undertake conservation is penalized for that action when it comes time to sell the land or convey it to another party.

Other Factors: Various market distortions may interfere with the rational inclination of the farmer to protect his income and investment. Taxation, tenure

arrangements, and economic policies that affect general price levels or capital availability may have a substantial effect on the behavior of farmers with respect to conservation. The problem with many of the conservation impact studies is that various factors increase yields at the same time erosion may decrease them. These effects are netted out in the farmer's management decision. Economic circumstances for individual farmers are highly variable and will affect his or her conservation judgement. Sandra Batie has done an excellent job of examining the full range of economic conditions facing the farmer considering conservation (2). The price of soil substitutes such as fertilizers or chemical pesticides is certainly a factor in the attractiveness of conservation.

Conclusions. It would be extremely difficult to conclude on the basis of careful economic analysis or review of case studies that there is a significant measureable discrepancy between private and social on-site benefits of conservation. Those of us interested in conservation policy may have to seek solace in the observation by Aaron Wildavsky that "to have your personal values done in by your professional values is no fun at all" (21). It seems to me that the social stake in conservation largely involves the responsibility of the greater society to be cautious with the natural endowment of this country. Productivity has certain public good characteristics. As an element in the sustained national strength of this country, it contributes to an overall sense of well-being among the population. It is like national security in that respect. Productivity has "existence value" beyond utility to individuals. We are not willing to take the chance that land values will reflect productivity or that farmers will be rational even if there are productive gains to them as individuals. The costs of overconserving are important but trivial compared to the possibility of exceeding some irreversible limit in our capacity to respond to demands for food or respond to an unexpected disease or weather event.

We must acknowledge that programs begun in response to an earlier crisis can gain a life of their own which extends beyond the original problem. It is true that conservation programs and policies are currently sustained by many types of expectations, far beyond those of present and future productivity or the capacity of our food system to respond. As policy specialists we must sort out and clarify these various motives.

Policy Issues - Conservation and the Supply Side of Production

There are several important issues having to do with the relationship between soil conservation and supply response capacity of U.S. agriculture that suggest extension education needs. I will discuss these in three categories: 1) those issues concerning conservation as an area of policy; 2) issues internal to conservation policy, and 3) issues concerned directly with how conservation and agricultural supply are related. Some of these issues are addressed in the form of concluding observations about needs or priorities.

Conservation as a policy area. Soil and water conservation has evolved as a distinct area of concern. It has its own history, its own initiating crisis, and its own interest groups. I do not wish to overstate the point, but I am impressed with the validity of the Ogden "power cluster" notion and how it describes the evolution of policy options that are frequently quite independent of those in related areas. Soil conservation is distinct from water policy, water quality, ag land preservation and land use planning. Disciplines within the Land Grant university tend to reinforce these distinctions as different professions become aligned with the information needs of particular policy areas. Each has its own professional meetings, journals, and other instruments of information dispersion. Clearly there are cross memberships. Soil conservation has a strong physical science base given professional respectability by the agronomists and agricultural engineers who have provided the needed expertise and data. Several agricultural economists have

spanned the boundaries and have focused on economic implications of policy and action in several different areas. I think of the work of Earl Heady, John Timmons, and Earl Swanson with respect to implications of soil conservation for various other policy concerns in the food producing region of the country. The growing complexity of the food policy setting requires more interaction among these policy areas.

There is an important educational challenge here for extension. We all need to break out of the problem areas we find most comfortable to deal with the problems that evolve out of relationships among those specific areas. In particular, we need to identify the various incentives that affect conservation actions of farmers and discuss conservation as a part of a more complex policy environment for rural America.

Policy Issues Within Conservation RCA has definitely opened up the possibility of different institutional packages than have existed in the past. The political forces put in motion by RCA will bring about adjustment in the institutional mix with or without changes specific to the national law.

The matter of who will pay for achieving soil erosion reduction is the number one policy issue. The question is how will the burdens for accomplishing conservation goals be distributed among farmers whose actions affect erosion, consumers who purchase commodities grown on soil of variable productivity and taxpayers who support the conservation bureaucracy? Some people fit in all three categories. It is the same policy issue that exists relative to the quantity of land available for food production.

Property rights are a part of this analysis, not external constraints on possible action. Much of the soil conservation policy literature begins with the assumption that property rights and the discretion allocated to individual farmers are given and the only challenge is to produce incentives sufficient to encourage

the farmer to do certain things within his authority to "take it or leave it." Eleveld and Halcrow (7) have discussed policy options available when institutions are assumed to be fixed. They conclude that the options for bringing private benefits and costs in line with social benefits and costs are additional public research and education to identify erosion abatement techniques that will be economically viable for the farmer; the imposition of a tax or penalty on erosive farm practices to reflect true costs of erosion; or to offer incentives including technical assistance that will induce the farmer to act in a way that will maximize net social benefit. We know, in fact, that property rights are under constant adjustment as various actions are taken which expand or constrain the options open to land users. There is no reason to assume that farmers must be reimbursed for all actions taken which may contribute to social benefit at the expense of private income. The incentive approach may be the most practical, with lowest transaction costs, but alternatives which impose a greater responsibility on the land manager are within the realm of possibility. RCA raised the possibility of compulsory soil erosion standards, and cross compliance between conservation and eligibility for various commodity programs.

Economic performance and accountability are important themes in all areas of resource policy. The question of payoff from certain practices or techniques is an important one. Data on impact and cost will be needed. The notion of targeting emerged in the RCA process and is the number one theme in using available conservation funds to achieve the greatest return per dollar. The recent analysis of current practices under cost share arrangements of ASCS determined that funds are not being allocated to solve the greatest erosion problems but tend to be distributed on an historical basis among all of the districts and counties of the nation.

Soil Conservation as a Policy Alternative to Manage Supply. This brings me back to the theme for this session. The relationship between conservation and

other dimensions of food system performance is important substance for future rural policy extension. These inter-relationships also reveal additional policy levers for influencing conservation (3).

1. Location. The effect of conservation on food supply depends in part on comparison of the incidence of erosion with incidence of production. The most productive regions of the nation, producing the grain, soy beans and corn which are the heart of our domestic and international food supply, are also the most erosive. Thus it would seem that targeting on these most important food producing areas would be the most effective use of conservation funds. There is a direct relationship, in these limited areas, between soil erosion and food supply. Of course erosion impacts are more evident on the shallow productive soils than on deeper soils. Intensive successful agriculture also tends to be most erosive. Large machinery works better on straight rows, with few breaks for terraces, or even contouring. Continuous cropping monoculture also increases the exposure to erosion. Shallow but productive soils allowed to erode will not respond well to future yield-increasing technology (20).

Areas identified by the 1980 RCA Appraisal as having most severe erosion problems include the Palouse and Columbia areas of Idaho and eastern Washington, the deep loess soils of Iowa and Missouri, the potato producing areas of northern Maine, and the light sandy soils in Nebraska, Kansas and southern Mississippi valley. Focusing our conservation effort in these areas would have a major impact on erosion. In those areas where erosion is affecting productivity the program would, therefore, improve our supply response capacity. Twenty-one percent (21%) of the excess erosion is concentrated on less than 1% of cultivated acreage, and 70% of erosion is concentrated on 8.6% of tilled land (12).

2. The motive for conserving by individuals apparently must go beyond that of sustaining productivity or investing in the capital value of land as an asset.

There is need to reinforce other motives which owners may have, including the idea of stewardship. Apparently stewardship provides some utility to farmers, contributes to a sense of well-being or community responsibility that is important to a responsible manager. It is risky to depend on stewardship as the basis of conservation but to neglect it would be equally unwise.

3. Export policies clearly have a direct impact on conservation objectives. At a recent Resources for the Future conference on adequacy of agricultural land, several economists concluded that while there will be no shortage of land for meeting domestic needs, international demands will place a significant burden on the soil and land resources of the nation. Rising grain prices in response to export demand have called for additional grain production, and grains tend to be the most erosive crops. Farmers wanting to expand production will add marginal land or purchase land at prices reflecting foreign food demand, both of which may discourage conservation.

Columnist Lauren Soth has questioned the wisdom of producing for the well-to-do of Europe and Asia at the expense of long run U.S. productivity (19). He observes that we as a nation are often at a trading disadvantage with foreign countries because of our private marketing system and the centralized bargaining by our customers. Our soil is but one of the victims of our poor bargaining position. He and others have suggested that export policies be moderated until problems of erosion associated with high and very selective demands can be resolved. Seitz suggests internalizing these external costs of lost productivity by imposing a special tariff on grain exports to reflect the impact on long run soil productivity (17). There are, of course, problems with any such tariff, and perhaps the recommendation is simply to make the point that costs exceed the price that our customers are paying. Perhaps we should be emphasizing efforts to improve foreign productivity rather than exporting our productivity in the form of grain.

High grain exports also mean very attractive markets for parts of our farm sector while the entire agricultural industry may be damaged in the long run.

4. Biomass. We have public subsidies for production of energy from biomass, including agricultural products. Such programs, while less popular now than a year ago, would have an impact on the rate and location of soil erosion. At the very least, such programs should be undertaken with careful attention to the possible consequences for our soil resources. To achieve the 1990 production goal of 10 billion gallons of gasohol recommended by President Carter would absorb about half of our current corn production if that were the only source (15). That is an enormous demand increase. Removal of plant residue for alcohol production takes away the conservation benefits associated with low till farming. The possibility of using forest wastewoods in alcohol production is also being considered. The result would be increased price for those lands and greater erosion from loss of material otherwise left to hold water and soil in place. The heavy equipment required would also increase the chances of gully erosion. We must seek alternative energy sources but must do so with awareness of these secondary effects.

5. Ownership and Erosion. There is an apparent relationship between ownership characteristics and rate of soil erosion. Thus, food system incentives that encourage certain patterns of farm consolidation and ownership can affect erosion. Evidence is mixed, though one would intuitively suspect that a renter with uncertain tenure would have less interest in long term productivity than would the owner of the farm. By the same token, the farmer who leases land has a definite stake in the year to year productivity, and therefore would have the incentive to install practices that would protect the income flow. Several case studies, one in Iowa (Timmons and Held) and in Nebraska (Hoover and Wittala) found a weak relationship between ownership and perception of erosion problems and willingness

to act. A national study by Linda Lee in 1980 found no statistically reliable relationship between erosion and ownership, excluding corporate farms. Our current conservation programs are clearly geared to owners of land who will realize the results of long term investment in conservation practices. While the evidence is uncertain, it is likely that different kinds of approaches must be used to accommodate the shorter planning horizon of the farm tenant. It is significant that farmers cite absentee ownership as an important conservation problem. Dinehart's recent study of a cross-compliance approach to soil conservation concluded that linking short run income support programs to long run conservation programs would help cope with the incentive difference between owner and tenant (6).

6. Toxics and Agriculture. Various agricultural toxic problems have created the feeling among many people in this country that increased substitution of chemicals for soil may be too risky. Several agricultural pesticides are on the list for hazard review. Some have already been restricted. Additional support for this aspect of environmental protection may limit possibilities for substituting technology for soil and thus enhance the attractiveness of soil saving practices to protect short and long run productivity. The extent of this concern in the political environment is difficult to assess. It is certainly less now than in recent years. But further instances of chemical poisoning that may occur with normal farm practices will likely increase demands for caution in the use of these technologies.

7. Land as Investment. Farmland has always been an attractive capital investment for farmers and nonfarmers alike, particularly during inflationary times. The value of land is clearly an important farm asset. It is likely that factors other than productivity have the strongest influence on land value. Soil specialists in SCS and ASCS have expressed their informed judgement that land values are not impacted by the presence or absence of permanent conservation (2). The effect of productivity on value is masked by these other factors. A single

owner may not have the land long enough to establish a "benchmark" value to use in judging the impact of conservation.

8. Various institutional factors that characterize the food system have effects on conservation policy. These are often discussed as market distortions that have altered the signals to the individual actors with respect to conservation. In fact, however, these institutions are very much a part of the market. They create various intended and unintended incentives on market participants. These institutional factors include tax policy, commodity programs, and lending policies of public and private credit sources (17).

Taxes: Income tax policies make the ownership of land an attractive store of wealth. Capital gains in land value are taxed at a lower rate than regular income, interest on land ownership is a deduction from income and there are various investment tax credits and depreciation allowances which create further incentives that influence conservation policy. Economists from the Great Plains region express the opinion that depreciation and other tax advantages on expensive irrigation equipment are the primary incentive for increased irrigation and cropping of the sandy soils of that region. These tax effects have the cumulative effect of shortening the planning horizon of a farm manager. Special revisions have been made to permit farmers to deduct expenses for conservation from income in a given tax year. Also, cost sharing payments are not included as income. High property taxes can further shorten the planning horizon of the individual farmer. He may be encouraged to get as much annual income as possible rather than invest in long run productivity.

Various commodity programs have been undertaken with the explicit purpose of providing more stability to supplies, and therefore incomes of farmers. The result is to reduce the risk for farmers and, therefore, possibly reduce the incentive to conserve or protect the productivity of the soil. Most commodity

programs are targeted on grain crops that are in high demand and tend to be erosive. Some create the direct incentive to remove existing conservation practices. I do not question the validity of these programs. I merely point out that the unintended consequences of programs designed to reduce farmer risk may cause greater loss of productivity through erosion than would have occurred otherwise.

Credit: Lending institutions that permit farmers to borrow at subsidized rates encourage greater purchases of land than would be rational at market rates. There is also less incentive for the farmer to conserve rather than bring new land into production. If land were more expensive, the farmer would be more careful with the land he has.

The utility of conservation as a supply management strategy would seem to be limited in the short run, though greater in the long run. Conservation is not a central pillar of supply response though prudent supply policy cannot ignore conservation. Our best rationale is one of an insurance policy against the possibility of future need for greater productivity.

There are important policy issues and education needs involving the likely move to more comprehensive resource management programs and policies in the future. We are going to have more attention to cost effective programs that consider total supply of the resource and rules for allocating its services among competing users. The national model has been established in RCA and its forestry counterpart, RPA. Regions and states are acting to protect their own resources from "outside" exploitation. Midwest governors meeting recently in Milwaukee, announced formulation of policies to protect the vast water supplies of that region against demands from the oil-rich southwest. The Governors also discussed a special severance tax on farm productivity that is converted to food to be sold throughout the country. The water part of farm production is receiving increasing policy attention at all levels. We will likely have major adjustments in allocating

institutions for water in the next decade. There will be greater needs for farmers to sacrifice some of their independence and their freedom to choose on behalf of the general benefits available to society from a sustained agricultural industry. Policy educators will have to place higher priority on these natural resource policies.

Conclusions

I have two overall conclusions to offer:

First, soil conservation is a valid and important area of national policy. But conservation is not just conservation anymore. It means something very different in the 1980s than it did in earlier decades. Perhaps we need a new term for this old topic. It is definitely on the "third agenda" described by Don Paarlberg (13) as a response to the broadening political constituency for rural resource policy. As policy specialists we need to help clarify the various policy outputs of soil and water conservation.

Maintaining national productivity is the on-site objective of conservation. It is of concern to interest groups outside of agriculture. There is a public good aspect to productivity. The list of off-site outputs of conservation practices is long and getting longer. The case for government action is clear for soil erosion impacts that directly affect third parties off the farm. Public action to sustain natural productivity is largely a safeguard against the possibility that market signals may misjudge the importance of soil in long run farm output. Perhaps we will conserve more soil than is needed for future technology and our ancestors will laugh at our conservatism. We are at least retaining the soil option for future producers. This assumes, of course, that government is able to accomplish greater levels of erosion abatement, and retain production relationships longer than would occur in the absence of government. That will take changes in policy, the subject of my second conclusion.

Secondly, we must improve the efficiency and effectiveness of soil conservation programs. More efficient soil conservation means focusing on areas and types of agriculture with the greatest erosion problem. Ogg and Miller (12) among others, have pointed out the degree of concentration of the erosion problem. We could treat 1/3 of the erosion problem on less than 2% of tilled acres. And not all tilled acres are equally important to output. Distribution of conservation dollars and effort does not coincide with distribution of erosion. Targeting is necessary and targeting will be politically disruptive to the existing institutional structure of soil conservation. Conservation districts unlucky enough to have little erosion can then give attention to the other resource purposes, like farmland preservation or rural recreation.

More effective conservation policy means continued examination of delivery techniques other than voluntary cost-sharing programs. We know that farmers must consider their share of conservation cost along with all other management needs. We know that conservation pays in some cases, but not many. Longer run payoff may be reflected in land value. Even where conservation would seem to be economically rational, the farmer may decline for other reasons. The question is whether he should have the right to decline. Perhaps some practices should be mandatory in high erosion areas. Several states have already enacted erosion abatement programs that are more aggressive than the federal. Farm level discretion will be shared with a government at some level.

As policy educators, we need to sharpen discussion of the various consequences of soil conservation practices and programs. That means drawing on the expanding empirical literature in this area to suggest what we are buying with dollars spent in the name of soil conservation.

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