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Urban-Rural Water Dilemmas in the American Middle West: Closing the Conservation Gap

I'm going to speak today about urban-rural water dilemmas from the point of view of a conservationist. The Soil and Water Conservation Society (SWCS) is an international professional association of conservationists largely concerned with how we use and manage working land—cropland, pasture, rangeland, forestland—to produce food and fiber, and, simultaneously, enhance the environmental goods and services flowing from that land. In the Middle West—the subject of this panel—this means we are largely concerned about the conservation of natural resources on privately owned agricultural land.

Conservation Gap

The dilemma I'm going to address is what I think is best called the conservation gap. Specifically the conservation gap in the Middle West is:

- The discrepancy between what we know we could and should be doing and what we actually are doing to manage agriculture's effects on water resources.
- The discrepancy between what the best farmers—the conservation showcase farmers—are doing and what the rest are doing.
- The discrepancy between our justly heralded success stories and what is really happening on most of the agricultural landscape in the region.

We have to close that gap—the difference between what is happening on the best conservation farms and ranches and the rest of the farm and ranches in the Middle West—in order to resolve urban-rural water dilemmas. In short, we have to help (or make?) the rest like the best.

The facts, as I understand them, suggest the conservation gap in the Middle West and the nation is large, meaning we have our work cut out for us. Take, for example, the extent to which well-understood and generally recommended conservation and pollution prevention practices are currently employed on the agricultural landscape.

Soil Conservation

Progress in soil conservation is the brightest spot in the agricultural conservation picture. The decade between 1985 and 1995 was marked by rapid progress in the control of soil erosion from cropland—largely in response to two initiatives in the 1985 farm bill: conservation compliance and the Conservation Reserve Program. Data from the USDA/NRCS National Resources Inventory suggest that the risk of erosion caused by water was reduced by 37% (1.69 billion tons/year estimated annual erosion in 1982 to 1.06 billion tons/year estimated annual erosion in 1997). The risk of wind erosion declined 39% (1.38 billion tons/year estimated annual erosion in 1982 to 0.84 billion tons/year estimated annual erosion in 1997).

We should celebrate this achievement as an important conservation victory. But even as we celebrate, the soil conservation gap appears to be widening. The same data I referred to that measures our progress also indicates that we have made no further progress in reducing the erosion risk since 1995—there is even some evidence of a slight increase in erosion risk between 1996 and 1997. Of more concern, rates of adoption of conservation tillage—the practice primarily responsible for our decade of progress—have flattened, according to data compiled by the Conservation Technology Information Center. The number of acres protected by conservation tillage increased from 26% to 35% of cropland acres between 1990 and 1994, but has hovered around 36% of cropland acres since.

Today, as a result, most cropland—63% to be specific—remains unprotected by conservation tillage. The risk of soil erosion from cropland is still 1.9 billion tons/year. No-till—the most protective conservation tillage practice—has increased each year since 1990, but still protects only 18% of cropland.

Nutrient Conservation

A tour of websites at land-grant universities and natural resource agencies in the Middle West yields a bumper crop of information on best management practices to conserve nutrients and prevent pollution. But a review of available information suggests that a small minority of acres benefits from the application of those practices.

All of the websites I toured, for example, recommended two key practices—applying fertilizer at or after planting and applying nutrients at rates determined by direct assessments of crop needs and/or the nutrient status of the soil after the crop has emerged. I didn't find any systematic information about the second recommended practice, but I did for the first. In the corn belt in 1996—the last year for which I found published data (USDA Economic Research Service. 2002. Soil, Nutrient, and Water Management Systems Used in U.S. Corn Production. Agriculture Information Bulletin No. 774):

- 24% of corn acres received all nitrogen fertilizer at or after planting.
- 19% of corn acres received all nitrogen fertilizer in the fall.
- 51% of corn acres received all nitrogen fertilizer sometime before planting.

In other words, from a pollution prevention perspective, about one-quarter of the acres received nitrogen at the best possible time; somewhat less than a quarter of the acres received nitrogen at the worst possible time; and about half of the acres received nitrogen somewhere in between the best and the worst time.

A better indicator of nutrient conservation and pollution prevention is the difference between the amount of nitrogen or phosphorus applied in a given year and the amount of nitrogen or phosphorus harvested in the crop. The residual mass, that is, the amount of nitrogen or phosphorus left over at the end of the crop growth cycle, is an indication of the risk of what nitrogen or phosphorus could be lost to water or air and wasted as far as agricultural production is concerned. A U.S. Department of Agriculture, Economic Research Service analysis of this residual mass found that:

- Between 1990 and 1997, the percentage of corn acres with "high" residual nitrogen, defined as inputs exceeding outputs by 25% or more, ranged from a low of 42% to a high of 75%. In five of the seven years, more than 50% of acres had high residual nitrogen balances.
- Between 1990 and 1997, the percentage of corn acres with "high" residual phosphorus, again defined as inputs exceeding outputs by 25% or more, ranged from a low of 36% to a high of 57%. In three of the seven years, more than 50% of corn acres had high residual P balances.

Of most concern for our topic today, I found no apparent trend toward reduced nitrogen balances between 1990 and 1997. In other words, there was no indication that nitrogen management was getting better—or worse—over those seven years. There was some indication that phosphorus management—again from a pollution prevention point of view—was getting better.

Conservation Buffers

The final example I will use to quantify the conservation gap is conservation buffer technology. Thanks to the U.S. Department of Agriculture's National Conservation Buffer Initiative, buffers have received a lot more attention over the last five or six years. The rate at which buffers have been installed on agricultural land has increased dramatically. Since USDA's buffer initiative began in 1997, producers across the country have installed about 4.8 million acres of buffers—two-thirds of USDA's goal of two million miles (7.2 million acres) of conservation buffers. Importantly, from our region's perspective, Iowa, Illinois, and Minnesota lead all other states by far in the application of buffers. Iowa producers, for example, have used the continuous Conservation Reserve Program sign-up to install more than 360,000 acres of buffers in recent years. About one in three Iowa producers has a CRP contract for buffers.

Again, this is cause for celebration. Producers should be congratulated. So should the USDA employees and their partners who have worked to get buffers on the ground. But we've only scratched the surface of what potential exists for use of this technology to prevent pollution. A recent estimate suggests that in Iowa alone we could use a million or more acres of filter strips and riparian forest buffers along our streams and around our

lakes—about five times the acres currently enrolled as buffers in the CRP. Nationally, a conservative estimate of the potential for use of buffers along permanent and seasonal streams approaches 20 million acres—fifteen times the acres currently enrolled in filter strips and riparian buffers in the CRP. The opportunity we are missing is large. A study by Texas A&M University scientists, for example, concluded that installing buffers, where appropriate, within and at the edge of crop fields nationwide could reduce sediment yield by as much as 60%.

Emerging or Promising Conservation Practices

Please remember that the examples of the conservation gap I have reported here are for practices that are generally well understood and recommended. The gap is even wider when one considers nontraditional, currently unconventional, or alternative farming systems. Cover crops, for example, can have tremendous benefits for soil and water quality, but they appear to be used on only 1% to 4% of the acres planted to major field crops. Site-specific, variable-rate application of nutrients occurs on about 15% of farms in the corn belt. Controlled drainage, an approach that could integrate buffers, wetlands, nutrient management and water management in tile-drained landscapes is currently recognized as a practice in only a handful of states. When it comes to holistic or integrated farm and ranch systems—the real cutting edge where ecological principles are integrated with production agriculture—I could find no systematic, published information at all.

Which brings me to my final point regarding the conservation gap—lots of talk about problems, but very little good information about how we are doing in applying solutions. If you listened closely and perhaps skeptically to my remarks so far, you would have noted that many of the statistics I used are fragmentary and out-of-date. I find it troubling that we have such inadequate systematic and published information about the way our working land is managed today. A cynic might conclude that: (1) we really don't care about water quality as much as we say we do or (2) we care more about defining problems than we do about tracking solutions. I think both conclusions are true, and both conclusions contribute to widening the conservation gap in the Middle West and the nation as a whole.

Help (or Make?) the Rest Conserve Like the Best

Please don't misunderstand me. I think we should be encouraged by, proud of, and celebrate those award-winning conservation farmers and ranchers who are at the cutting edge. But exemplary work by the few just won't be enough. Water quality and water conservation are aggregate phenomena. It takes a critical mass of producers in the right locations to achieve any measurable and sustainable improvement in water quality and conservation, healthy streams and lakes, or well-functioning watersheds.

Unless we bring conservation and pollution prevention to scale and achieve that critical mass of conservation in key locations all across the Middle West, we simply will not solve the urban-rural water dilemmas that confront us. And just as important, all the

investment, work, and dedication of those exemplary farmers and ranchers won't pay off for them or agriculture in general by eliminating water pollution as a potential constraint to the growth and prosperity of the agricultural enterprise in the United States.

The big question before us is this: "How do we help, or make, the rest conserve like the best?"

I don't think we know with certainty why the conservation gap is so wide. I think the reasons vary from place to place and from one conservation concern to the next. That means the hard work of getting conservation on the ground remains, as always, a farm-by-farm and region-by-region job. But I do think there are key issues that will have to be addressed generally across the Middle West and the nation as a whole if we are to make serious progress toward bringing conservation to scale on agricultural land. I'd like to share my thoughts with you about what those issues are.

Resource development versus environmental management.

The first and most important issue we need to acknowledge is that the purposes and methods of traditional agricultural conservation programs in the United States are changing and have to change to address urban-rural water dilemmas. Natural resource stewardship first entered farm policy in the 1930s. At the time, there were crises on the farm and on the land. The role of stewardship then was largely to serve agriculture by developing and managing soil and water resources as a means of enhancing agricultural production and rural development. Conservationists and some policymakers, of course, recognized the larger social benefits of conservation — flood prevention, pollution prevention, and habitat enhancement — at the outset of what became the conservation movement of the 1930s. But those benefits were considered ancillary to enhancing and sustaining agricultural production.

Soil and water conservation proved successful in fulfilling its historic mission of preventing widespread degradation of the productive capacity of soil and water resources. Consider that in the 1930s, a national assessment reported that only 160 million acres – about 42% of the land we are currently cropping — were considered capable of being safely cropped, given the conservation and farming know-how of the day.

In contrast, the 1997 National Resources Inventory reported that about 270 million acres — 72% of cropland — was being cultivated with no harm to productivity, at least from erosion. Application of conservation practices thus had nearly doubled the area of cropland that could be farmed without damage to its productivity from soil erosion.

Natural resource stewardship has contributed in a major way to the development of the highly productive agricultural enterprise we now enjoy. Moreover, conservation has sustained that enterprise without the widespread and persistent wastage and degradation of soil and water resources that were common historically and that now threaten many areas around the world.

I think it is safe to say that we simply could not have achieved the miracles modern agriculture has wrought if conservation had not progressed hand-in-hand with agricultural technology. This victory over widespread waste and degradation of soil and water resources is among the most significant, although now largely overlooked, accomplishments of modern conservation. In the process, we created a scientific and technical services infrastructure for conservation that quite literally is the envy of most nations.

Now, however, conservation is being called on to serve agriculture in a different way. Our job is still to help ensure the sustainability and commercial viability of agriculture. But we will do that by helping producers improve their environmental performance rather than by helping them develop soil and water resources.

The shift from resource development to environmental management first became apparent in The Food Security Act of 1985. That law contained three major innovations in the relationship between natural resource stewardship and farm policy:

- Conservation Compliance/Sodbuster.
- Swampbuster.
- Conservation Reserve Program.

In the case of Conservation Compliance/Sodbuster and the Conservation Reserve Program (CRP) the enemy was the same — soil erosion and land degradation. The reason to fight the enemy was different, however. In 1985, we worried more about sediment in our streams than about soil productivity. The off-site environmental cost of erosion rather than the on-site damage to agricultural production was our rationale for action.

Swampbuster was perhaps the clearest indication of the changing role of natural resource stewardship in farm policy. Farm subsidies were denied producers for doing what government had once used conservation programs to encourage. Five years later, in the 1990 farm bill, we would authorize a program to begin restoring wetlands.

The movement away from resource development toward environment protection has accelerated in each succeeding farm bill—symbolized by the transition from the Agricultural Conservation Program (ACP), to the Water Quality Incentives Program (WQIP) to, finally, the Environmental Quality Incentives Program (EQIP). That transition was accompanied by steady increases in funding. In 1996 the new EQIP was funded at about three times the level of its predecessor program, ACP. The 2002 farm bill funds EQIP at more than 15 times the level of its predecessor program, ACP. At the same time, the new law expands the conservation agenda for USDA conservation programs well beyond the traditional focus on soil erosion.

The change in purpose and approach signified by a change in program names may sound subtle, but it is very real. It is proving painful and in many cases unwelcome. But I think it is necessary and inexorable.

This change in purpose largely drives the remaining four issues we must address to bring conservation to scale.

Technical services versus financial aid.

The assumption embedded in current conservation policy and programs is that cost is far and away the most important barrier to bringing conservation to scale. Therefore, U.S. policy leans heavily on reducing the cost of improving conservation through a panoply of cost-share or other financial assistance programs. In some cases, cost is the fundamental problem, especially where effective conservation requires taking land out of production or implementing capital-intensive structural solutions to conservation problems.

But producers' knowledge and skill at ongoing, adaptive management of conservation and production systems is a much more important constraint for many of the most important pollution prevention practices that need to be brought to scale in the Middle West. Sophisticated nutrient management, tillage by prescription, managing water in the soil profile, and taking full advantage of the soil as a partner in production and pollution prevention often, perhaps even usually, reduce direct costs. What these technologies do demand is more management attention, better tools to inform and facilitate adjusting production systems in real-time, and far greater understanding of the interactions of soil, water, and agricultural production systems. In short, farmers need to know more to conserve more.

High quality technical assistance and education is, I think, emerging as the most binding constraint to closing the conservation gap. Money can buy more management attention and knowledge, but only if a farmer has the time to invest in educating himself or herself or can find the technical help and knowledge he or she needs in government, the private sector, or nonprofit organizations.

I think the single most important role for pubic policy in addressing urban-rural water dilemmas is to build a vastly more effective and accessible technical services infrastructure. An infrastructure that ensures every producer has access to the right technical help and education he or she needs when each needs it. That means substantially -increased investment strategically directed to all three components of the infrastructure—research, education, and technical assistance. And it means a strategic partnership and investment plan among government, for-profit, and not-for-profit providers of research, education, and technical assistance.

Conservation on working land versus retiring marginal land.

The landmark conservation provisions of the 1985 farm bill were largely responsible for the decade of progress we enjoyed in soil conservation. Those provisions targeted highly erodible or other types of "marginal" land that were generally considered to be less productive agricultural land. Producers got financial help through the Conservation Reserve Program to take marginal land out of production and convert it to grass or trees.

They got technical help from the Natural Resources Conservation Service to implement the soil conservation practices that were made a precondition to receiving commodity subsidies. The clear priority given to soil conservation on marginal land was a major reason this initiative was so successful.

Now, rural-urban water dilemmas need to receive the same clear priority and the same focus of resources to bring about key changes in the agricultural landscape, but our focus and tools also have to change. Pollution prevention in the Middle West is largely associated with the use and management of some of the best agricultural land in the world. That fact has at least two important consequences.

First, our targeting needs to shift from highly erodible or marginal land to targeting "hydrologically sensitive" land. Research clearly demonstrates that not all land is equal when it comes to pollution potential. Some parts of the agricultural landscape under some kinds of management contribute a disproportionate share of pollutants to waterways and aquifers. Targeting hydrologically sensitive land would improve the effectiveness of pollution prevention efforts. Such targeting would be better for producers, better for taxpayers, and better for the environment. But it means developing new tools to identify those parts of the landscape that are hydrologically sensitive and setting new priorities to direct resources to that land.

Second, the focus on our best rather than our marginal agricultural land means we cannot or at least should not rely on taking that land out of production to prevent pollution. We need to keep producing and improve our environmental performance simultaneously. Again, that shift in focus requires a new set of tools, policies, and programs.

Producers as customers versus partners.

Traditionally, conservationists have considered landowners and land operators to be their customers. Conservationists worked with producers to help them achieve their objectives. Producers set the priorities for conservation on their operations and conservationists helped them achieve those priorities through sound technical advice and planning.

Today, taxpayers are increasingly the conservationist's real customers and producers are increasingly our partners in delivering the environmental goods and services taxpayers want from agriculture. This shift is more than semantic. It means taxpayers—usually represented by government agencies—are setting the priorities for conservation rather than producers. A producer might think that the gully that is forming on a highly erodible field is his or her most important conservation concern. But taxpayers may well think the nutrient pollution from tiles draining other fields is the most important concern. The producer sees a direct benefit from fixing the gully before it makes his or her field unfarmable. The benefits from investing in nutrient management may appear less direct, may take more of his or her scarce management attention to implement, and in some cases may seem to increase the risk of a drop in crop yield.

This tension between producers' legitimate conservation priorities for their particular operation and taxpayers' legitimate conservation priorities for their particular environmental concern is real and increasing. Conservationists more and more find themselves asked to work with producers to implement conservation practices and systems that aren't necessarily the practices and systems producers would pick as their top priorities. This tension gets translated into serious differences of opinion over how best to allocate resources from public programs. Should those resources be spread widely to address the conservation priorities of producers, or should they be targeted at specific watersheds or key practices to deliver environmental quality for taxpayers?

The easy answer is to say we need to do both. We do need to do both and in some cases there is a happy congruence between producers' and taxpayers' priorities. But I think in many and perhaps most cases we will need to make hard choices. Improving conservation on farms scattered across the landscape will not solve urban-rural water dilemmas—even if each one of those farms is an award winner. Unless a critical mass of producers in a specific watershed plan and apply the right conservation practices and systems simultaneously, we won't see any change in water quality or quantity and we won't solve any urban-rural water dilemmas.

Increasing the level of conservation effort on farms and ranches is one side of bringing conservation to scale; the other side is focusing that effort at the right geographic scale and on the right practices.

Striking the right balance between the two sides of bringing conservation to scale is imperative. Striking that balance is difficult because it means policymakers, program managers, interest groups, and producers must make hard choices among legitimate priorities.

Voluntary versus regulatory programs.

The last key issue we will need to address to bring conservation to scale is the proper role for regulation. This is the toughest issue for most SWCS members and me. Most of us went into conservation because we liked working with producers as partners. The thought of regulating our partners is uncomfortable at best. Moreover, many of us have worked very hard over the years to increase funding for voluntary programs in order to avoid regulation.

But conservationists are being forced to reconsider our opinions on voluntary versus regulatory programs. We are being forced to do that for two reasons. First, study after study and example after example shows that even heroic effort on the part of dedicated stewards can be undercut by lack of effort on the part of other producers. This is particularly true if the producers lagging behind happen to be located in hydrologically sensitive parts of the landscape. It is increasingly apparent that we cannot protect good stewards—our best partners—from regulation unless something is done to change the practices of the worst stewards. Second, regulation is already part of the day-to-day experience of many conservationists and producers, and the trend clearly seems to be

toward an expanded reach of regulatory programs. Public support for agriculture's traditional exemption from regulatory scrutiny is fading fast, it appears. It may be much better for agriculture and conservationists to engage proactively in shaping workable regulatory programs than simply resist or delay their implementation.

In short, it is growing more apparent that the real question we face is not whether voluntary programs can substitute for regulatory programs, but rather how voluntary and regulatory programs can complement each other. Can we, in fact, design voluntary programs in ways that ease the burden of regulatory programs and simultaneously design regulatory programs that increase the effectiveness of voluntary programs? I don't know the answer to that question, but I think we must try.

Reason for Hope

I think there are good reasons to hope that the conservation gap can be closed and that the urban-rural water dilemmas that gap causes can be solved, three reasons, in fact:

First, we have a strong foundation to work from. Our investment in research and technology development has produced a wealth of knowledge and options that can be applied quickly to close the gap. In other words, the same three discrepancies that make the conservation gap so frustrating, should also give us hope. The fact that nearly everything that needs to be done on the land is already being done by some producer somewhere in the Middle West should make us confident that bringing conservation to scale is within our reach—if we make the financial and political commitment to close the conservation gap.

Second, I think the recently passed farm bill—despite serious shortcomings—is an important step toward making that financial and political commitment to close the gap. The new conservation authorities and funding provided by the Farm Security and Rural Investment Act of 2002 could—if used wisely—help address all of the key issues I described above. Conservation could and should reach hundreds of millions of acres a year instead of the tens of millions of acres those programs currently reach. The challenge will be to harness the new money and authorities in ways that build excitement, a track record of environmental improvement, and ultimately, a constituency strong enough to increase the commitment to conservation in the coming years.

Finally, I think the time is right to change the conversation between agriculture and the environment. For too long that conversation has been about what producers want to do to the environment and what environmentalists want to do to agriculture. Now, I hear more conversations—particularly among a younger, emerging leadership on both sides—about what producers and environmentalists can do for each other. Don't get me wrong. The tension between agriculture and the environment will never go away completely. That is not because agriculture is bad; it is because agriculture is so big. But because agriculture is so big, its potential to enhance the environment is just as large as its potential to impair the environment. I think that potential for enhancement is the basis for a new partnership between agriculture, conservation, and the environment.