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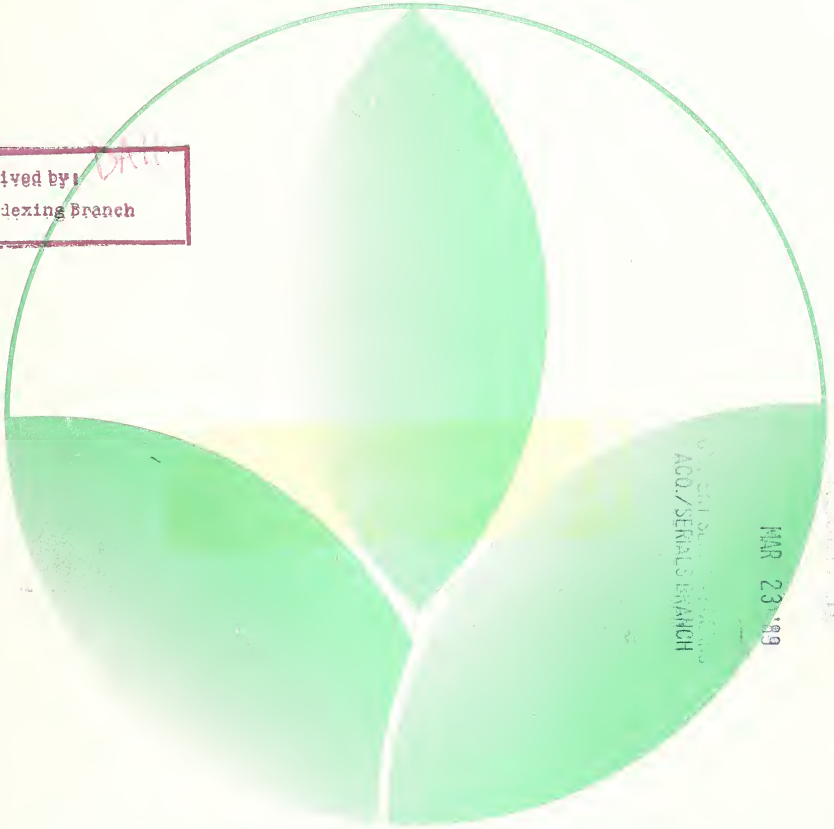

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GROUNDWATER QUALITY: A CATALYST FOR A NEW LAND MANAGEMENT ETHIC

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Emerging water quality concerns are forcing a new perspective in land and water management. If you deal with land and water, your job description will change in the next few years. Preparing for change is part of what this conference is all about. But change is a topic that is easier to discuss than to accomplish. How can we plan for the future, based on the mindsets of today?

Is the United States Department of Agriculture (USDA) looking at the future with the kind of perspective that will allow it to face new and unknown challenges? How will the role of Cooperative Extension and the Soil Conservation Service change? Are our present attitudes and policies at the cutting edge of emerging issues, or are they institutional barriers to change?

What are some of the water quality issues that will impact the USDA into the 21st century?

Each year about 1,600 million tons of soil wear away from 417 million acres of U. S. farmland into lakes, rivers and reservoirs. While soils in some areas of the country can tolerate a certain amount of erosion, many fragile soils cannot.

Erosion control remains the top priority of USDA because of its threat to farm productivity, but sediment by volume, is the greatest pollutant of surface waters in the United States. (Robinson, 1972) Sediment from cropland, pasture/range land and forest land is estimated to constitute 60 percent of the sediment discharded to the nation's waters from all sources. The costs of offsite damages caused by erosion have been estimated to be between $3 billion and $13 billion dollars annually. (U.S.D.A., 1978) Agricultural nonpoint source pollution has been reported as a moderate or severe problem in 36 states.

Farm policy and modern farming practices encourage farmers to apply agrichemicals in ever greater amounts. Between 1966 and

1981, herbicide use alone increased 175 percent. Fertilizer use in the U. S. increased over 200 percent between 1960 - 1980, with nitrogen holding the lead.

While surface water pollution has been more readily monitored since the passage of the Clean Water Act, groundwater is now emerging as a greater concern. Groundwater supplies drinking water to 53 percent of the nation's population and 97 percent of its rural population. Land-use activities have a potential to affect groundwwater.

Although hidden from sight, groundwater isn't hidden from sources of contamination. Major sources of groundwater pollution include: agricultural chemicals; feedlots; leachate from septic systems; landfills, mining activities; underground storage tanks and hazardous waste disposal sites.

- An estimated 20 million tons of commercial fertilizer was used on American cropland in 1985 and an average of 661 million pounds of active pesticide ingredients are used annually by American farmers.

- According to the USDA, some contamination of groundwater by agricultural fertilizers has been confirmed in 31 states and contamination of groundwater by pesticides has been confirmed in 37 states.

- There are an estimated 93,000 landfills in the United States.

- There are an estimated 181,000 surface impoundments, most of them unlined.

- There are approximately 20 million home septic systems.

- The U. S. Geological Survey (USGS) has estimated that 20 percent of rural wells tested showed nitrate concentrations indicative of human activities and approximately 6 percent of those wells exceeded the recommended nitrate concentrations for drinking water.

- There are an estimated 1.5 - 2 million underground storage tanks currently being used to store gasoline, with as many as 75,000 to 100,000 believed to be leaking.

- Conservatively estimated, the average homeowner produces one pound of hazardous waste each year. That means in a community of 20,000 people, that 10 tons of hazardous waste can go into the local landfill each year.

These examples clearly demonstrate a relationship among groundwater, surface water and land-based activity. They also clearly demonstrate the important emerging national concern with the public health implications of water contamination. The past decade has seen an increase in federal funding of water quality programs and a reduction in water development funding. The Clean Water Act; Safe Drinking Water Act; Superfund; Federal Insecticide, Fungicide, and Rodenticide Act; and pending groundwater legislation clearly reflect a growing national concern over water quality, particularly drinking water.

Never has an issue been so closely tied to public health as groundwater contamination. Thousands of private and community wells have been closed nationwide. Because groundwater is often untreated and largely untested, yet used by such a large number of people, the potential threat to public health is considerable.

In a recent poll to state health departments taken by the Association of State and Territorial Health Officers, water quality was listed as the number one concern by environmental health officers.

Protection of underground drinking water supplies is now among the nation's priority environmental issues. Given the seriousness of these water quality concerns, groundwater protection is becoming a major force in reshaping traditional land management practices. Groundwater has become the catalyst for a new land management ethic.

Rick Kelley of the Iowa Department of Natural Resources was recently asked to highlight the most significant event that pushed Iowa to develop its innovative groundwater legislation. He said the single most influential event was the public opinion poll that showed 52 percent of Iowans surveyed believed farm chemicals were the greatest threat to their drinking water.

According to the USDA, 80 percent of the people they surveyed believe that groundwater pollution is a national problem and 70 percent believe that agricultural chemicals are the cause. That poll was undoubtedly instrumental in making water quality one of the top two priorities in the USDA National Conservation Program.

Groundwater monitoring that revealed quantities of pesticides in residential wells was the primary initiative for Massachusett's Wellhead Protection Program, and for groundwater programs in Iowa, Wisconsin, Minnesota and California.

And it was groundwater monitoring in the 1960's and 1970's which revealed high nitrate levels that pushed Nebraska into a leadership position in nitrogen management efforts.

According to Jeffrey Carlson, chief of the Pesticides Bureau of the Massachusetts Department of Food and Agriculture, "States are being forced to take a more assertive role in dealing with groundwater contamination problems. In view of the economic, environmental and health-related costs associated with contamination, more and more states are leaning towards a prevention-based policy."

While there is a lot of concern about the inadequacy of risk assessment data on health effects, there are enough red lights going on in research and enough unknowns to warrant a cautious approach. The issue is far more complex than the debate over" what is a part per million." No one is exposed to just one part per million of anything today.

The potential long-term health effects of pesticides, the synergistic effect of multiple pesticides and multiple exposures with other toxic substances in the air, water or food we eat; exposure to substances at home and work; our genetic predisposition to disease and the growing concern with pesticide degradation products, (the metabolites or breakdown products) has led public health professionals to a more preventive, proactive stance. They do not want to regret in 10 years, the decisions they are making today.

States are going to define risks within a social, political and economic context, as well as a scientific one. Science does not exist in a void and science alone, does not dictate public policy.

States will be setting policy and developing management practices without all the data. Society cannot afford to wait until all the data is in, because all the data is never in. Research is an ongoing process, but so is management and policy.

There are also major social and economic issues related to groundwater contamination.

Connecticutt has dealt with the issue of liability for groundwater contamination from agricultural chemicals. The State Department of Environmental Protection recently found that five farmers had contaminated 280 private wells with the pesticide EDB. The company that manufactured EDB paid for the installation of water filters in the affected homes. The State recently passed legislation protecting farmers from liability if they follow certain prescribed management practices. You can no longer say that what you do on your land is your own business, if it affects groundwater. There will be increasing personal and corporate liability for groundwater contamination.

It has been said that government policy has traditionally emphasized cheap food, but in so doing, fails to account for the external costs of pollution from modern agriculture. Yet communities and businesses are becoming more aware of the hidden costs of pollution to local economic development. As they develop frameworks for assessing the costs of environmental degradation, there may be an impetus to consider such costs in establishing a farm policy and commodity programs more in harmony with conservation programs and environmental objectives.

Well monitoring, installation of filter systems, bottled water, new well construction and connecting to alternative systems are all significant costs that are associated with groundwater contamination. If a municipality must look for an alternative system, it could begin to compete with other municipalities for limited supplies. Water pollution could further limit usable, available water supplies, especially in water-short regions.

According to real estate analysts, soil and groundwater contamination on a potential development sight reduces the value of the real estate by the cost of the cleanup. In two small Minnesota suburbs where contaminated wells were discovered in 1987, county assessors recently interviewed environmental specialists and real estate agents in an effort to re-evaluate home values.

The communities had three levels of contamination:

81 properties had levels of contamination severe enough to require the use of bottled water.

90 properties had trace levels that were under the threshold to require bottled water.

365 properties were in an area determined to have high potential risk. They were included in a well advisory area.

The following valuation reductions were established for 1988:

$19,000 for properties using bottled water,

$12,000 for properties with trace levels in well water and

$3,000 for properties in the well advisory area.

The total reduction in market value was $3,714,000. This resulted in an approximate 1.8 mill increase in the local mill rate. The amount of tax reduction experienced by affected properties has to be picked up by all other properties.

In a small Massachusetts town of 4,000 people, $3 million dollars was recently spent on a new water system as a result of private well contamination from ethylene dibromide and aldicarb. When property is transfered in Olmsted County, Minnesota, there is a finance company requirement that water samples be taken by the county health department and that certificate letters on the conditions of the well and septic system be issued. These market mechanisms will provide a stronger incentive to proactive groundwater management than any federal or state legislation.

Lastly, no discussion of water issues is complete without mentioning the potential impact the "greenhouse effect" could have on the country's water supply. Congress recently directed EPA to conduct studies on the effects of a major warming and what could be done about it. The summary of the study of the effects, which is being sent to scientists for their comments, makes it clear that the EPA is concerned.

"We have no experience with the rapid warming projected to occur during the next century," the report draft states. "The findings collectively suggest a world that is different from the world that exists today...The ultimate effects will last for centuries and will be irreversible."

Among the study's findings are that up to 50 percent of Southeast farmland and 22 percent of Great Plains farmland could be abandoned by 2030, as hotter and probably dryer weather makes agriculture uneconomical.

While there has been discussion and debate for years about the "greenhouse effect", scientists continue to debate its severity, timing and impact, but change is evident. Yet amid the debate one reality holds true. Most water management in the United States is based on the obsolete perception that water supplies will remain constant in the foreseeable future. This attitude hinders flexible, realistic, long-range planning for adequate water supplies, particularly, in already vulnerable water short regions.

Water planners, policymakers, cities, businesses and industry must build a changing water/weather dynamic into their water supply and demand forecasts to enable more efficient and realistic water management for the 21st century.

In the latter part of the 20th century, we have come to realize that most of our troubles stem from neglecting the interconnectedness of knowledge and the interdisciplinary character of all real world problems. Our general and professional educational processes must incorporate this multi-disciplinary concept into their training programs and management approaches.

What does this mean to USDA. The rules for land and water management are changing. We will be managing land and water differently in the next 20 years than we managed it in the last twenty years. If your job touches on land and water issues of any kind, your job description will change.

At a 1987 conference on Agricultural Chemicals and Groundwater Protection: Emerging Management and Policy sponsored by the Freshwater Foundation, the U. S. Environmental Protection Agency, the National Agricultural Chemicals Association and planned in conjunction with USDA, conference participants made a number of recommendations. I would like to highlight five of them here, along with five challenges for USDA in the decade ahead.

1 - An immediate need exists on behalf of agencies, organizations and farmers for information on agrichemicals and their impact on groundwater quality and public health.

2 - Farmers need practical, demonstrable, best management practices regarding agrichemical use and groundwater protection.

3 - Institutional barriers built into bank loans and government programs which encourage excessive agrichemical usage, need to be eliminated. Food production and commoditites programs should be brought in harmony with conservation and environmental goals.

4 - Farmers need economic incentives to change current practices which rely on the heavy use of agrichemicals.

5 - A need exists for continued groundwater research and monitoring to assess the extent, direction and impact of agrichemical contamination.

The growing national concern over the quality of groundwater is providing the USDA with five major challenges:

1 - The economic and public health implications of groundwater pollution are forcing a more preventive and proactive approach to management and policy. Economics and public health are the new politics of water quality - the driving forces behind present and future management and policy decisions.

2 - The groundwater connection has been a catalyst to forming a more holistic perspective on all land use activities, but in particular, agricultural land use and this new perspective will reshape traditional land and water management programs.

3 - We have already passed most of the major federal water legislation and the states are clearly taking the lead on groundwater. The challenge we now face is implementation. How do we institutionalize best management practices, how do we pay

for groundwater monitoring and who should pay? These are just a few of the less glamorous, but ultimately more important issues which determine whether our legislative goals are achieved.

4 - These problems did not develop overnight and they will not be solved overnight. Point source pollution lent itself to technical solutions but nonpoint source pollution is a complex social, political, legal and economic problem which requires new attitudes and management processes.

5 - Broad-based public involvement and support is critical to developing effective, enforceable and lasting water management plans. We can only succeed with grassroots cooperation and support.

These challenges are not urban issues, rural issues or agricultural issues, they are social issues. We are all part of this problem and we all need to become part of the solution. And what is at stake is sustainable development, protecting and managing those resources which sustain our social and economic base.

For change to occur, we need three things; information, education and incentives. Information is data. Education is getting that data to the right people, at the right time, in an understandable and timely format. Information and education can change attitudes. But incentives change behavior. Economics and public health are two of the strongest incentives we have for protecting water quality.

The USDA can provide the research and education, disseminate the information and encourage the incentives which will lead to wiser land and water management. USDA can develop strategic partnerships with agencies and organizations whose expertise they need to stay in the forefront of the issues. It can reach out to an expanded constituency and build the cooperation and consensus necessary to effective land and water management.

USDA is an information business in the middle of an information revolution. It needs new information. It needs it in new formats, from new sources for new people with new problems.

In the future..."the power centers are wherever the brightest people are using the latest information in the most creative ways." (The Knowledge Executive, Harlan Cleveland, 1985)

The USDA needs to be such a power center for land and water management for the 21st century.

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