INSTITUTIONAL DIMENSIONS OF WATER RESOURCES MANAGEMENT

Comparative Analysis in the European Union and the United States

1995

WATER MANAGEMENT TRENDS IN THE UNITED STATES

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WATER MANAGEMENT TRENDS IN THE UNITED STATES

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Introduction

United States water management policies generally reflect the changing focus of the nation's goals and the attitudes of its citizens. At the federal level, the "iron triangle" of agencies, Congressional Committees, and local interests, has been the principal driving force. Unfortunately, the emergence of new policies often lags the need, and old policies sometimes linger on far after they have outlived their purpose.

Early in the 20th century, most U. S. water management activities occurred at local levels where problems were evident, and resolution could generally be obtained. As settlements spread, transportation and other regional issues became more important, and the dimensions of water management expanded. Today, the water-related issues of concern range from those easily accommodated by local governments (wastewater treatment, for example) to those requiring interstate, national, and even international cooperation (acid rainfall, for example).

Institutions

Since the turn of the 20th century, politically supported objectives have given rise to an array of water management institutions. These agencies, laws, regulations, and customs were established to facilitate water resources management, but today many of them are obsolete and some of them even constrain, or preclude, good water management practices. It is important, therefore, to understand these institutional elements so that needed reforms can be identified and implemented. Issues of concern include:

- -- inconsistent, conflicting, and outdated laws and regulations;
- -- separation of programs related to water quality and water quantity, groundwater and surface water, and land and water resources;
- -- the belief that water is a free good;
- -- a focus on parochial actions (individual projects), rather than holistic plans to solve water problems;
- -- the softness of many priority-setting mechanisms;

-- poor linkages between planning and implementation processes;
-- diffusion of legislative (decision making) jurisdictions;
-- poor coordination among water resources agencies, plans and programs;
-- the proliferation of regulations; and
-- inadequacies in performance measures and standards.

A Brief History

For about one hundred years there has been a progression of studies designed to reshape U. S. water policy. Several of these are mentioned here, others are well documented (Holmes 1972, Viessman and Welty 1985). In 1973, the National Water Commission (NWC) released its landmark report "Water Policies For The Future"; in 1978 President Carter developed his "Water Policy Initiatives"; and in 1981, President Reagan established a Cabinet Council on Natural Resources and Environment to address water-related issues. The NWC report emphasized a shift in focus from water supply to water quality and environmental protection, and strongly endorsed a "user pays the cost" principal. Carter's water policy reform proposals were designed to improve water resources planning and management, to permit construction of sound water projects, to emphasize water conservation, to enhance federal-state cooperation, and to increase the focus on environmental quality. The Reagan administration's approach embodied the philosophy of transferring responsibility for some of the water programs to the states, increasing the level of non-federal cost sharing for water projects and programs, and encouraging full cost recovery. The Clinton administration has not taken a specific water policy stand, but its strong environmental focus clearly bends water policy decision making towards environmentally compatible projects and programs.

Although the National Water Commission's report is over twenty years old, many of its recommendations still stand as models for political action and water policy change. The Commission's seven recurring themes are relevant today and are worth repeating here.

-- Future water demands are not inevitable, but are the result of policy decisions within the control of society. Good planning should be based on a range of plausible alternative futures.
-- National priorities are shifting from water resources development to restoration and enhancement of water quality.
-- Water resources planning must be tied more closely to land use planning.
-- Water use efficiency should be emphasized, and policies to encourage wise water use and conservation practices should be promoted.
-- Sound economic principles should be incorporated in decisions on whether to build water projects. Benefic-

iaries should pay for the costs of the services they receive and unjustified subsidies that distort allocation of scarce resources should be eliminated.

-- Laws and legal institutions should be reexamined in the light of contemporary water problems.

-- Development, management, and protection of water resources should be controlled at that level of government nearest the problem and most capable of effectively representing the vital interests involved.

During the last 30 years, the water management roles of every level of government in the U. S. have changed significantly. The Water Resources Planning Act of 1965, the National Environmental Policy Act of 1969, and the Water Pollution Control Act Amendments of 1972 have been the principal driving forces. The states are thinking more inwardly about water issues, how these issues should be dealt with, ways to finance them, and how water management proposals fit into the fabric of their other programs. There are, however, many factors that affect a state's capability for managing its waters, and these elements must be dealt with in the context of that state's resources and policies.

In July of 1965, The Water Resources Planning Act was signed into law. That Act ushered in a new era in water management. It signalled a more comprehensive federal attitude toward water resources programs and provided the foundation for many states to begin active water resources planning endeavors of their own (Viessman and Biery-Hamilton 1986). Grants to the states were provided to aid them in developing and/or expanding their capacity for addressing water and water-related land resources problems (U.S. Congress 1975). For the first time, many states embarked on their own water resources planning programs. And these provided the platform for a more comprehensive look at their resources and for a more effective partnership in water resources development with the federal government. In addition, a more sophisticated procedure for evaluating the efficacy of water projects emerged. The Water Resources Council's 1973 Principals and Standards (Principles and Guidelines as of 1982) required, in theory if not in fact, a much more extensive scrutiny of proposed water projects as a prerequisite to their being considered for authorization. This tightened review process turned out to be a harbinger of changing times for the specifications of federally supported water resources projects as well as for allocating responsibility for them.

The National Environmental Policy Act of 1969 and the Water Pollution Control Act Amendments of 1972 (PL 92-500) profoundly changed the federal emphasis in both funding and effort from the traditional water resource development type of activities to those related to environmental protection and/or restoration. These Acts served to increase states' efforts in comprehensive water management; brought about a shifting from water supply to pollution control as the target for federal funds; and introduced a legal re-

quirement that environmental impacts be addressed in the planning, design, and construction of water projects. Furthermore, these new legislative mandates set in place a marked change in the water resources agendas of both the states and the federal government.

The events that occurred between 1965 and 1975 significantly influenced the water management philosophies that prevail today. It was still a time when federal dollars were the principal source of support, but it was also a time of awakening of new state roles in water resources management.

Since 1975, several events have further shaped the current setting. In 1977, President Carter's "hit list" of what his administration felt to be unsound water projects typified the antagonism between the President and many pro-development members of the Congress. This incident also signaled an increasing effort by the federal government to tighten accountability for expenditures on water resources projects and programs. And while the Reagan administration took a more receptive stand toward water projects than its predecessor, the worsening state of the Nation's economy when he took office limited funds for any significant revitalization of water resources development activities at that time. Even in the area of water pollution control, efforts to curtail federal water-related expenditures were evident.

Finally, passage of the Water Resources Development Act of 1986, culminated years of effort by both the Carter and Reagan administrations to require greater levels of non-federal cost sharing for water projects and programs (Viessman and Welty 1985, U.S. Congress 1986). That Act significantly affected federal and state roles in water management. It increased the likelihood that states would be more discriminating in their pursuance of water projects and suggested that they will play a more dominant role in identifying alternative strategies for meeting their long-term water supply and water quality control needs.

The period from 1975 to 1988 was one of: tightening federal budgets; transfer of authority to the states; growing public sentiment that future water development activities should be predicated on a more comprehensive analysis of options; weakening of "old line" water fraternities in the Congress; common rebellion of the public toward what would have been pro-forma action on proposed water projects a few years ago (Smerdon 1988); and increasing expectations that users should pay their full share of the costs associated with water projects (U.S. Congress 1986).

There has emerged a new focus on how water resources should be managed, and on what constitutes a beneficial use. These changes in viewpoint have infiltrated both federal and state laws, and they have played a major role in defining water management roles at all levels of government. Many states, have taken strong environmental stands (Florida, California, Colorado and Wisconsin, for example)

and in such states, local regulations often impose more stringent conditions on water management practices than federal laws prescribe. State water management views are also translated down to the local government level. Furthermore, changing attitudes about the value of water in various settings have resulted in some states undertaking extraordinary projects that would never have been considered before. Florida, for example is restoring the developed Kissimmee River system to a more nearly natural state, a project that" old time" developers would have considered heresy. Such emerging trends in non-traditional water resources allocations have become shaping forces in the U. S. water policy arena.

The bottom line is that U. S. water management policies and practices are changing markedly even though many of vestiges of the past remain. Some conclusions that may be drawn from a review of historical U. S. water management trends include:

-- Water resources development in the U. S. has been heavily influenced by local political interests;
-- Crises and/or intense public pressures have been the major motivators for legislative actions;
-- Recognition of regional variances is historic, but few regional designs and/or efforts have been sustained;
-- Societal attitudes have changed significantly in the last thirty years, and with these shifts have come transitions in water management policies and programs;
-- Planning and development agencies have been slow to react to, or have overlooked, signals from the public;
-- New legislation to deal with emerging political and social pressures has not been accompanied by needed revisions and/or recisions of existing laws;
-- The importance of long-term planning has not been given the attention it should. Short-range concerns having more immediate payoff have tended to dominate. The result has been preclusion of efforts to prepare for events that are expected to occur in the future; and
-- Sound technical information, presented in an understandable manner, is needed to support decision making processes, but the key to accommodating this need has been elusive.

For the remainder of the 20th century, it is expected that U.S. water resources management will fall more heavily on state and local governments; relate more to water quality than water supply; be more holistic in nature; focus more intensely on the water requirements of natural systems (wildlife habitats, wetlands, etc.); be more cost-effective; and be more encouraging of conservation measures. A brief summary of several water management issues of importance in the U.S. follows.

Providing the Right Forums

Formulating water policies which effectively address public views requires providing the right forums for the circumstances. Sometimes, existing forums are adequate, but commonly, non-traditional approaches are required. Two types of forums are needed, those related to resolving conflicts (consent building), and those related to solving problems that transcend normal political and/or agency boundaries (system-encompassing).

To deal with conflicting interests, the principal stakeholders (publics), must be brought together in an atmosphere that encourages cooperative exchanges of views. The first step is that of identifying the affected parties, those whose consent is necessary to formulate an acceptable action, the second step is getting them to the table, the third step is keeping them there until an agreement is reached. Where the stakes are high, it is important to do everything possible to make certain that each party knows it has a lot to lose by leaving the table, and that they know it. The key is to make negotiation rather than litigation the vehicle for settlement.

Workable strategies are needed to enhance the ability of agencies to deal with the various publics as they address water resources problems. Agencies should work to provide forums in which all of the involved publics can explore mutually acceptable courses of action.

Improving Planning Processes

In a 1985 survey of state water resources planning programs, it was found that all but three states in the U. S. were engaged in some type of comprehensive water resources planning process, while all had water quality plans (Viessman and Biery-Hamilton 1986). Most of the state water supply planning efforts had roots in the 1965 Water Resources Planning Act, while most water quality planning programs resulted from the Water Pollution Control Act Amendments of 1972. Other findings of the 1985 study were that:

- -- most states had addressed the issue of plan implementation but few had a system that guaranteed that this would occur;
- -- all states had some type of public participation element but only a few had developed broadly effective approaches;
- -- only a few states had comprehensive, continuing water resources assessment processes;
- -- the urgency associated with protecting groundwater quality resulted in a flurry of activity in state groundwater policy development;
- -- only in rare instances had states effectively integrated water quality and water quantity planning;

-- most state water plans did not have identifiable regional provisions although a trend toward considering sub-basins or sub-regions as viable management units appeared to be emerging; and
-- very few states had addressed the issue of consistency of water resources plans at various intrastate levels of government or of consistency of state water plans with other major state planning efforts.

Evidence shows that the states are assuming increasing responsibility for managing their water resources. It appears, however, that this has often been the direct result of pressures by the public for improved environmental protection, fired by a diminished federal role. Finally, it is noted that there is considerable variability among the states in terms of the intensity and sophistication of their water management efforts. This is a function of uneven economic conditions, a ranging scale and nature of water problems, and divergent political and social perceptions.

Coordinating Land and Water Resources Management

Water resources development affects associated lands, and land use practices affect related waters. Reservoir developments change land use patterns for better or worse; management of solid wastes may affect associated water quality; land treatment residues appear in runoff waters; channelizing streams affects their flood plains and wetlands; watershed management can affect the amount and quality of water available for use; attitudes of landowners are reflected in the impacts they make on water quantity and/or quality; and facilities siting can have significant spillover effects on water resources, particularly on water quality. These examples of close ties between land-water management practices underscore the need to coordinate water resources planning and management with land use planning and regulation. The need has long been recognized, but overcoming the institutional barriers to it has lagged (NWC, 1973). A creative exercise of land use control powers, such as zoning, could, however, go a long way toward mitigating this problem.

There is a need for better coordination and consistency among the governments and agencies engaged in land-water management (Viessman and Welty, 1985). In general, there is no pervasive mandate or organizational arrangement that provides for these elements. Without question, planners and managers should be sensitive to the impacts their proposals may have on other governments, agencies, and programs, but there are few formal structures for requiring this. Viewing problems in all of their dimensions is crucial to effective resource management, and yet we continue to operate principally along strict disciplinary or agency lines.

The public's desire for optimal use of its lands and water resources is not being reflected consistently in the reality of agency, or agency approved, plans and their implementing actions. Legal reforms are needed to accomplish this task. Even when fragile lands, such as wetlands, are in state ownership and subject to public trust rights, damages from developmental activities such as drainage sometimes occur. Usually this is due to poor record keeping on ownership, lack of coordination of agency missions, and narrowly-scoped planning processes.

Taking A Regional Focus

It has become increasingly clear that many water management problems cannot be solved in the context of traditional governmental units. The Viessman and Biery- Hamilton study showed that about half of the states in the U. S. had considered regional subdivisions in their planning processes as of 1985. Furthermore, a number of states had plans for some form of regional water management authority. Two states, Nebraska and Florida, have established a class of management districts that blanket the state and have rather broad powers to manage water resources and provide facilities. The twenty-four Nebraska Natural Resources Districts and the five Florida Water Management Districts have similar powers including the ability to levy property taxes to support their programs (Kovar 1987, Viessman and Welty 1985, Viessman and Biery-Hamilton 1986). These types of districts could serve as institutional models for other states. A problem, however, is that the states do not all have equal fiscal resources, and problems associated with financing projects and programs can be severe.

Educating and Communicating

Education and communication are critical elements in shaping the direction of water policy. The better acquainted with issues citizens are, the more likely they are to demand quality decisions by their elected officials. The better informed the decision maker, the more likely he/she is to make good choices. It is important for the public to become more conversant with the water-environment agenda, its roots, and its links to other issues of concern to society.

Adult, public, and professional education programs that deal with water issues should be expanded. To facilitate this, agencies could establish centers to communicate relevant scientific and technical information. And basin-wide or regional workshops and/or conferences could be held to acquaint citizens with the true dimensions of water management problems and to identify potential courses of action.

Every citizen should be taught to accept a moral obligation to protect the earth from abuses by governments and individuals and to strive to bring about a more environmentally conscious electorate.

And progress along these lines is being made. For example, in 1983, the Texas Society of Professional Engineers became convinced that an informed citizenry was a prerequisite to solving the state's water problems. Farsighted leaders saw the value of incorporating information on water resources in the curricula of elementary and secondary schools. It was believed that benefits would extend from students to their parents through a student-parent network.

Uniting Technology and Public Policy

The technologic capability for addressing water management problems is staggering. But exploitation of its potential is constrained by our inability to apply it within the realities of political and social systems. Scientific and technical understanding should be united with the goals of society. Optimal technical approaches may be socially unacceptable, and compromises often have to be struck. These agreements must be based on a blending of technical options with the public's view of what it deems to be an acceptable solution to the problem at hand. Technicians must exercise every measure available to them to ensure that the public view is understood and incorporated in their designs.

As the states in the U. S. assume increasing levels of responsibility, they also face the need for expanded technologic capability. An understanding of what technology has to offer and an ability to apply state-of-the-art approaches to water management problems are requisites. And while technology is only one of the principal factors affecting water resources decision making, it is ubiquitous in that it permeates planning, policy making, regulatory, design, and implementation processes.

In the past there was a substantial federal role in providing technologic aid to the states, but this has been decreasing. The federal government continues to provide technical support, but its dimensions are cloudy and the states must strengthen their technologic capabilities if they are to undertake a broader mission in managing their waters. Changing state policies, added resources, and revised salary scales are all factors that must be considered. In addition, the technologic requirements necessary for contemporary water management extend considerably beyond those of the turn of the century when hydraulic and hydrologic skills were the mainstay.

Today, water technologists must be equipped to deal with a diversity of issues such as: the design and operation of data retrieval and storage systems; forecasting; developing alternative water use futures; estimating water requirements for natural systems; exploring the impacts of climate change; developing more efficient systems for applying water in all water using sectors; and analyzing and designing water management systems incorporating

technical, economic, environmental, social, legal, and political elements. The question is, can the states provide the technologic base to deal with these issues? A companion question is, what is the role of the federal government in this regard? There are no simple answers, but these questions must be answered.

Financing

All water projects and programs must be paid for, and the ability of the sponsoring government to secure the needed funds often spells the difference between success or failure. As state and local governments assume greater responsibilities for water programs, they employ a variety of old and new mechanisms for raising funds. These include: general obligation bonds; revenue bonds; property taxes; user fees; impact fees; sales taxes; licensing fees; the establishment of trust funds; and other special fund raising techniques. To deal with this issue, the states are exploring a number of innovative approaches to finance their programs.

An example of one of these unusual financing mechanisms is Florida's Save Our Rivers Program (SOR). This program was initiated in 1981 to protect Florida's natural waterways, wetlands and the state's drinking water. A water management district can buy lands it believes are the most critical for the protection of the water resources in its region. A documentary stamp tax is placed on all real estate transactions in Florida. In this case, 50 cents is collected on each $100 worth of property sold, 5 cents of which goes directly to the Water Management Lands Trust Fund to be used by the SOR program in purchasing lands necessary for water management, water supply, and the conservation and protection of the resource. In the first five years of its operation, the SOR program generated over $111 million.

Dealing With Outmoded Institutions

Water management institutions include federal, state, and local government agencies, laws, regulations, and social customs, and a variety of interest groups and other organizations. The rationale for establishing most of these institutions generally made sense at the time at which they were conceived, but times have changed and many institutions are relics of yesterday's policies and philosophies. Social goals continue to change while institutional reforms needed to accommodate them grind away slowly. It is well recognized that good water management is hampered by institutional constraints. The challenge is to eliminate them.

Institutional reform is a complex and tedious process. Many traditions and philosophies of agencies, laws, and social customs are deeply entrenched and are resistant to change. But by objectively exploring alternative ways of solving problems and managing systems, identifying the pros and cons of various options,

and displaying payoffs associated with new approaches, reforms can be facilitated. Consolidating functions and reordering responsibilities of agencies is another avenue for bringing about change. Partnering, discussed later, is another way to bring about institutional reform.

Forming Partnerships

There is a need for federal and state agencies to strengthen and/or establish partnerships among themselves and with relevant publics. Such cooperative arrangements aid in conflict resolution, enhance efficiency in commitment of resources, and facilitate the identification of paths that complement and/or supplement each other's goals. This approach fosters learning from, rather than opposing, one another. Partnering is one way to bring about needed institutional reforms.

Partners should be involved in planning and decision making processes from the outset. A total commitment is needed. Addressing the views of each partner in a joint forum aids in overcoming inequities and can preempt objections that might be raised in a more adversarial forum if involvement occurs too late. By allowing all to participate in decision making processes freely, and in a timely manner, tensions are likely to be reduced, and agreement on a common ground for closure regarding the issues of concern reached.

Taking A Holistic View

Water policies of the future must take on broad dimensions. Agencies must begin to adopt holistic problem-solving approaches to planning and management. More emphasis must be placed on regional planning and management, and regional institutions to accommodate this must be devised. In particular, the public must be acquainted with the efficiencies to be gained by taking a holistic view. If such an awareness can be created, the public can become an identifier of options rather than a reactor to them.

Outlook for the Future

U. S. water management policies and practices are in a state of transition. New federal, state, and local government mandates address an array of emerging water-related problems and evolving public perceptions about the environment. Not too many years ago, U. S. water management was focused almost exclusively on issues related to water supply and flood control. Today, these subjects are still important, but environmental protection and restoration, ensuring safe drinking water, and providing aesthetic and recreational experiences compete equally for attention and funds. Furthermore, the environmentally conscious public is pressing for greater emphasis on water management practices with fewer structural components. The notion of continually striving to

provide more water has been replaced with one of husbanding this precious natural resource.

The greatest challenge we face is to guide our water management decision making processes into a more holistic, environmentally sound direction. Opportunities for doing this abound, but to take advantage of them, we must prepare ahead, and be ready to offer credible guidance to those who need it at the right time and in a comprehensible form.

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