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THE CASE OF WATER RESOURCES

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Policy conflicts may arise regarding development and use of water in two regions of the U.S. — East and West. One significant difference separates the two — the East is well watered, while the West is relatively dry. So the availability of water for development and use differs in the two regions. Problems past and present are unique to both.

History of Development

Early development of water in the East was largely a private and local government responsibility and was accomplished for municipal and industrial needs and uses. As towns and cities grew, local water resources were tapped to serve the residents. Early industry was located on or near large rivers and bays and experienced little difficulty in securing adequate water.

The federal government became involved with water development in the East as the needs for power generation, flood control, and water transportation grew. Large projects were conceived and implemented to control and manage the great rivers of the East. The power requirements of the industrial areas throughout the East were well served by the numerous dams and reservoirs with electrical generating facilities. Transport on the Mississippi, Ohio and other rivers were viewed as vital to the economic development of the Midwest.

Development of water in the West, via impoundments and elaborate water transport systems, was an early requirement for settlement and economic growth. The earliest towns and cities were located on or near streams and rivers. Development didn't occur without adequate water supplies. Some very interesting examples of water transport systems can be found at old mining sites. Others can be found still functioning in some irrigated agricultural areas.

The great reclamation projects of the West, funded largely by the federal government, provided power, flood control, and huge quantities of irrigation water. As in the East, electrical power contributed importantly to municipal and industrial development. But the creation of water supplies for agriculture were vital to the West. Most of the large irrigated areas have reclamation projects as their base. Many urban centers exist within and depend upon these projects.

Not to be overlooked in the development of the West is groundwater — the water resources created over thousands of years via percolation into the soil and parent material and held in aquifers. As the tools and methods for extraction of this resource were improved, significant areas of irrigated agriculture were developed. The High Plains area is the outstanding example of the use of this water resource in agriculture and rural communities.

Issues and Policies

Policies have evolved concerning development, distribution, management, and use of water in both the East and the West. In some cases they have provided acceptable solutions; in others they have extended and complicated the issues or problems.

We have a national policy on quality degradation related to use. Surface and ground waters across the nation have been affected by waste disposal, soil erosion, acid rain, and other polluting phenomena. Our national policy is directed to restoration of quality in water supplies, but controversy exists with respect to desired or achievable levels of quality, tradeoffs with valuable commercial/industrial uses, cost sharing between the polluters and the public, etc. Though progress has been made, debatable issues remain. Policies are unsettled.

Water for transportation was for a long time assumed to be in the public interest. As a contribution to economic development, it was unquestionably a worthy use. But in recent years questions of use and payments for use have arisen. Does lower-cost water transport, made possible by the public investment, give some business entities an unfair advantage? Are user charges sufficient for maintenance of systems and even returns on the public investment? Is there too little or too much regulation of use? Policies for regulation and use of water for transportation are unsettled too.

Though the problems associated with declining groundwater are more critical in the West, they exist in the East also. In most instances, uses of groundwater are depleting the resource, i.e., withdrawal exceeds recharge. What is the public's interest in this matter? Diminution of stocks of groundwater can and probably will affect economic viability of communities, areas, or regions. Some states, concerned about impacts of withdrawal, now regulate wells, pumping rates, and annual uses. How much control is justifiable? What is the extent of individual rights? Should states be responsible for regulation or is federal management needed?

In the West, allocation of scarce water supplies among the competing uses is the dominant issue. Our long developed policy gives the superior rights of use to the earliest claimants and users. These have tended to be mining and agricultural users. But competing uses of water — municipal, industrial, commercial, and recreational uses — have developed over time. Should a reallocation be attempted? By

what means and with what criteria? Should the courts be asked to settle the disputes? Should legislative acts be undertaken? Should the market be employed giving users opportunities to bid for water or rights to water? We would, for example, pay more for a gallon of water to drink than to grow a bushel of corn.

And of course, further development of water supplies is an issue. Whose responsibility is it to continue the development of water in the U.S. but specifically in the West? Who benefits and who pays? If benefits accrue largely to the region, e.g. the Southwest, should the nation (taxpayers) bear the costs of development? Does regional (western) development of water supplies give comparative advantage to some water users and cause significant shifts of productive activity? The last two administrations have reduced the level of federal involvement in water resource development. Has this been largely an issue of budget, or have philosophical differences been most important?

These are only a few of the issues and problems which are and have been the reasons for policy. Others are important and occupy the thoughts and influence the actions of many individuals and groups. What is the responsibility of the educator, i.e., the researcher and extension agent, in the debate over issues, problems and policies? What should be our involvement, our strategies, our approaches to education?

Educational Programs

After consideration of the above and other issues of policy, interested participants in the National Public Policy Education Conference recommended educational programs as follows:

1. *Defining the dimensions of the problem.* Debate of issues of development and use of water is often clouded by a lack of information about them. Such questions as, Who needs (and is willing to pay for) water? What rates or levels of use can be reasonably anticipated? How much water is available? How and at what cost can water be transported? What conservation measures can be employed?, must be asked and answered. Educators can facilitate the debate by providing factual information and a forum within which the debate can take place.

2. *Understanding water and water systems.* Often the arguments about development and use are confused by a lack of understanding of the hydrologic system. Where and how does the water exist? How are surface and groundwaters related? What is the effect of use of water on the system? Is recycling a possibility and how will it impact quantity and quality of water in the system? Our colleagues in engineering and natural resources can give assistance in programs that will improve understanding of water issues.

3. *Economic and institutional considerations in water development and use.* Persons concerned with management and use of water must

be aware of institutions we have employed (policies) to cause and facilitate water development, allocation and use, and economic circumstances (costs, prices, use, values) which surround the use of water for various purposes. Discussions of further development, alternative uses, comparative values, etc. of water will take place within this economic/institutional framework. Only frustration can come from a debate of issues that ignores water law, water policies, and water markets. The policy educator can be especially helpful with programs which address the economic and institutional considerations.

4. *The viability of water markets.* Competing users are naturally interested in the market as a developmental/distributional mechanism for water. And the traditional rights holders and water users are naturally suspicious of the mechanism. An educational program that provides for examination of the market as an alternative to rights as an allocative device for the water resource requires thorough development. Impacts must be well analyzed and projected, and the process for change to a market orientation must be well thought out. Such questions as: What kind of market? What would be for sale? Who would manage the supply? What kind of controls? will be in the minds of interested parties. Some reasonable estimates of supply, costs, uses, values, and prices will be demanded. This program will require much preparation by the policy educator.

5. *Uses and longevity of groundwater.* Where groundwater is of principal (sole) concern, the question of withdrawal and use is critical. What physical quantity of water exists? What are past and current levels of use? What are the costs of withdrawal and use? What is the economic lifetime of the aquifer? Not only do economic enterprises, like farms in the High Plains, depend on this water source, but rural/urban communities do also. Studies like that of the Ogallala aquifer are essential, and they must be followed by educational programs that extend the information, stimulate the debate, and facilitate the decisions that will be so important to the use of groundwater.

Other programmatic possibilities surely exist and demand attention. Policy educators must recognize them and give the issues/problems/policies their attention.