ECONOMIC ASPECTS OF WATER RESOURCES MANAGEMENT

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Overview

Active water resources management, as seen by analysts, managers, hydrologists and others, causes many changes in economic and environmental benefits and costs. These changes may be positive or negative to society or to different groups and individuals. The benefit-cost analysis has been an integral part of the planning process for surface water management for some 80-90 years. The benefit-cost model was developed first in response to its need in surface water project development by the Federal Government over a 50 year period of initiatives and compromises among the Congress, the Executive Branch and the Federal construction agencies. This tool and other economic tools have not yet been widely applied in the management and development of water resources at the state or local level of government, particularly in Georgia. This is partly because the hydrologic, engineering and economic data are not well develeled for state water resources projects. Also, water resources, as used and managed by state and local governments, have not been subject to the same competing demands and allocation systems as surface waters developed by the Federal Government.

Economic Issues

Several economic issues regarding water resources management and development are discussed as a prerequisite to recommending that State (DNR) development of water resources be subject to the benefit-cost analysis and at least to the environmental quality constraints of the current "Federal Principles and Guidelines" (U.S. WRC, 1983). These issues include (1) the economic impacts of uncertain property rights, (2) accounting for external second and third party costs accruing from common property conditions in riparian systems, (3) plans and institutions required for effective water resources development and management, (4) related technical matters such as demand estimates, time preferences, financing/repayment terms, benefit/cost allocations, environmental impacts, etc. These issues are addressed from an economic perspective as tools that may be useful in developing and implementing policies for regional reservoirs that will affect physical stream allocations, waste disposal opportunities, economic allocations and other management considerations. Particular attention should be given to data needs and analyses for developing water management policies and development plans for remote streams and aquifers that are not in service directly for using water systems under natural conditions. That is, both intra- and inter-basin transfers must be considered carefully to avoid regional and inter-regional conflicts. The State should adopt a modest benefit-cost and environmental measurement system for state water resources development plans that will enhance both efficiency and equity outcomes to be expected through the use of readily available multiple-attribute planning models.

Background of Regional Reservoirs

The last few years of drought has heightened the interest of Georgians in their water resources, especially in water supply issues. This drought event was coincident with creation of the Governor's Growth Strategies Commission (GSC). These events together coalesced the Legislature into a near-unanimous support for the concept of "... the State's management of water by comprehensive water planning, creation of regional reservoirs for water limited areas and other measures," (Governor's Growth Strategies Commission, 1988). Regardless of how one feels about the misguided central recommendation of the Commission to implement a central planning bureau (now discredited by the Federal Government and by many other national governments) our discussion will be focused on the economic aspects of policy and technical issues associated with the creation of state reservoirs. Given that the 1989 Regional Reservoir Act will go into effect, how can we insure that we achieve some minimum level of efficiency and equity in spending State tax monies and in the allocation of the State's resources? The idea's in the Growth Strategies Commission report linking comprehensive planning to regional reservoirs are contradictory in practice. There has been little evidence of comprehensive planning regarding the creation of regional reservoirs. If any planning has been done it was not generally available to the public but we have already designated the reservoirs to be built. How can we be more certain of this alleged need and how can we approach this issue to insure we get a positive return on any investments the State might make in reservoirs? I have organized some thoughts on this around four issues previously described.

UNCERTAIN PROPERTY RIGHTS

The current conventional wisdom of the Growth Strategies Commission is that we must have state-wide, centralized, land-use planning before we build the already designated regional reservoirs. This is the cart being pushed by the horse. How did the Federal Government successfully build so many reservoirs without a national land use plan and without national land use zoning? One can answer that several ways but the fact is one can build a reservoir using existing national and state environmental regulations without creating a "State Planning Commission." Creation of this type expensive operation is as likely to prevent economic growth as it is to promote growth through the advent of uncertainties and bureaucratic bungling prevalent in such organizations. Generally, they have no vested interests in the assets being zoned. Most landowners will welcome a reasonably designed, needed reservoir that provides reasonable benefits relative to costs. They will not welcome the imposition of costs and taxes imposd by a State planning agency when many of the costs are of unknown magnitude and timing. It is likely that the adverse economic impacts from coupling state-wide zoning to regional reservoirs will outweigh any expected gain from building the reservoirs. If a thorough analysis of these negative impacts and real costs is not done for the private asset holder as well as for the counties and cities involved, we will have no process for determining the efficiency of the project without resorting to the

courts -- and the courts are not famous for using economic processes. The effect of "state-wide" zoning and planning will be to introduce uncertainties into property rights that reduce investment and growth.

EXTERNALITIES IN RIPARIAN SYSTEMS

In the traditional, reasonable-use riparian rights water allocation system, many externalities were addressed by the limitation preventing a riparian from using the water resources in a manner that would damage other riparians. It is questionable whether the problems with the existing system (lack of coordination, lack of planning, inconsistencies among regions and communities, lack of public understanding and other lacks in the state) as alleged by the GSC are of sufficient real importance to override a proven, centuries old, common law basis of efficiently, equitably and fairly allocating water resources (G.S.C., 1988b). If we materially change, through zoning, the distribution of costs and benefits among individuals or among counties, or among river basins, we introduce the serious problems of externalities. These are the costs imposed on individuals or society that lose asset values with a restricted property right, on counties that lose tax bases or growth potential, on river basins that lose their natural productivity without acceptable compensation. Externalities are also the unpaid gains to beneficiaries of state imposed policy changes. My point is that we must carefully analyze all externalities and devise offsets if we are to properly plan/design a regional reservoir to serve one region without undue expense to another. Much of any adverse eternalities would accrue to the less developed areas while the positive externalities flow to the already developed areas, with state assistance -- not exactly what planners say -- but most likely what the public will get. With good economic analyses, the data to resolve most externalities of regional water reservoirs can be provided. The actual resolution of these externalities will depend on the willingness of the State to see that they are resolved.

PLANS AND INSTITUTIONS

In the midst of a fire the human instinct is to flee. In the midst of a well-publicized drought or flood the governmental instinct is to build a reservoir. Historical evidence of behavior in fires, droughts and floods indicates that logic and studied responses often do not prevail. Sometimes the public is spared expensive quasi- or non-solutions by timely rain or sun. If, in fact, as stated by the Growth Strategies Commission, our goal is economic development, then we have plenty of time to ask economic questions before committing our resources permanently to a questionable solution. How do cities and states in the Southwest outgrow us with only a fraction of our available water supply? Do we really want to turn our water resources planning, management and operations over to a regional authority or to an Area Planning and Development Commission that will have no responsibility to the electorate? Do we want to buy into a reservoir under condi- tions of unknown costs, unknown allocation procedures, unknown pricing structures and unknown management policies? My point is we need to see some criteria for the reservoir plans, some descriptions of institutions (organizations and operating rules) before committing resources to projects proposed for one purpose (economic development) and justified on another basis (the heat of a drought). The State has a very mixed record of managing natural resources -- overall a good record but several glaring mistakes. Perhpas, the State should try one small reservoir before trying a dozen. We should remember that the Federal water interests never built but one TVA.

RELATED TECHNICAL MATTERS

After generalizing to encourage a cautious approach to regional reservoirs as a panacea for economic growth, a few more specific points about the economic aspects of water resources management (and planning) are in order. These are related technical matters in that they will be irrelevant if the general philosophy of the program is to ignore economics or economic impact analyses - choosing rather to pursue popular interest. Only a few of many possible technical economic criteria will be discussed: a. demand estimation; b. time preferences; c. financing/repayment terms; d. benefit/cost allocations; e. environmental impacts.

Demand Estimates. Any proposed reservoir system should be supported with realistic and properly conducted demand estimates. Extending per capita current uses indefinitely at a zero price is both unrealistic and highly inaccurate. An underpriced resource is always overused. Hundreds of competent demand studies have shown that water users can use substantially less water without affecting output or quality of life if the price reflects its true cost or its marginal value. Good demand estimates provide many cost-effective alternatives to new reservoirs - drought or no drought. Good demand estimates are necessary to correctly size any reservoir (or other alternative) that may be proposed.

Time Preferences. Time preferences include the correct selection of such criteria as discount rates, standard project lives, sources of funds (taxes, revenues, bonds, etc.). Time preference variables are critical components of good project planning, because the financing and repayments are based entirely on these factors.

Financing Terms. Financing and repayment terms must be coordinated to satisfy both economic efficiency and financial liquidity needs. There is no need or justification for subsidizing the use of water for any group. To avoid this, repayment terms must be worked out on a present value basis with rates set accordingly to avoid intertemporal, inter-generational and other biases.

Benefit-Cost Analyses. Benefit cost estimates and allocations are needed in project planning to determine both economic and financial feasibilities; to correctly distribute costs and benefits to different users and to project purposes. The estimation of benefits and costs has been central to the Federal process of planning, financing, constructing and operating water resource projects since 1902. The methodology is now well established and credible as a basis for determining the efficiency of each project purpose individually as well as the total project. The benefit-cost analysis is an effective tool for organizing the pros and cons of any public project, especially a long term, capital intensive water project. The benefit cost analysis, properly conducted, will identify the winners and losers from a public project because it includes estimates of social and environmental gains and losses. This process of analysis will allow the public, as well as those affected directly, to make informed judgments about the feasibility of the project. An equally important result of the benefit-cost analysis is that it allows one to

identify the flows of costs and benefits among those affected directly as well as to and from the general public (taxpayers). No reservoir should be planned or built without a thorough benefit-cost analysis that is open to public scrutiny.

Environmental Impacts. Environmental impacts must be an integral part of plans, evaluations and decisions to construct reservoirs. The methodologies to integrate environmental values with economic value are now widely available and easily used by those practiced in modern multiple objective analytical methods. Superficial treatment was given to integrating environmental values into water resource planning in the Federal Principles and Guidelines (1983) but they were never effective, never implemented and never understood by Federal planners. States that assume the former Corps role in water resources project construction now have available very good multiple objective methods that meet engineering, economic and environmental criteria.

SUMMARY

Now that the State is to be involved directly in constructing regional water supply reservoirs, there is needed an enormous effort to construct a realistic and comprehensive planning guide that builds on the 50-80 years of Federal experience to achieve an effective economic and environmental outcome. We must add good guidelines for demand estimation, risk assessment, cost/benefit estimation and allocation and multiple objective satisfaction in order to do a good job of developing the State's water resources. We need to analyze the needs and costs of reasonable alternatives before we choose the solution. Modern economic tools can help when properly selected and applied to the problem.

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