

**EFFICIENT INVESTMENTS IN WATER RESOURCES:
ISSUES AND OPTIONS**

**Congress of the United States
Congressional Budget Office**

PREFACE

Over the last 150 years, the federal government has gradually accepted responsibility for most of the costs of developing the nation's water resources. Federal investments have provided valuable services to a developing nation, including navigation on inland waterways and coastal ports, irrigation of western lands, flood control in all major river basins, and hydroelectric power primarily in the West and South.

Today, with a more mature national economy and with most nationally important water projects in place, the need for a strong federal role in new water development is less compelling. The most likely future water resources needs--maintenance of existing facilities and new construction of local projects--could be met more efficiently if states, local governments, and direct beneficiaries had a greater responsibility for project costs, financing, and selection.

This study analyzes three options that are under Congressional or Administrative consideration. Each recognizes the changing nature of water development responsibilities and aims to combine cost-sharing reform with financing mechanisms and changes in decisionmaking processes that, taken together, would promote a more efficient water resources investment program. The Congressional Budget Office (CBO) has prepared this report at the request of the Water Resources Subcommittee of the Senate Committee on Environment and Public Works. In keeping with the CBO's mandate to provide objective analysis, this paper offers no recommendations.

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SUMMARY

Widespread support is beginning to develop for fundamental redirection of the federal government's water resources policies. Traditionally, the federal government has played a major role in choosing, financing, and paying a large share of the costs of water projects. In contrast, the responsibilities of state and local governments and private users have been relatively small. This extensive federal participation was appropriate for the early development of the nation's major river basins, waterway transport systems, and western regions. It appears less so today as water investment priorities continue to shift from construction of new projects toward the management, repair, and modernization of facilities now in place and to projects of increasingly local character. The Congress, therefore, faces the task of reorienting federal water policies to conform to these changes.

Two components are central to any such policy reorientation. The first is greater state and local responsibility for project costs, financial arrangements, and project selection. The second is increased user fees to recoup those portions of project cost that provide private rather than public benefits. Taken together, these policy changes could lend strong incentives to states, local governments, and private beneficiaries to work with the federal government to ensure that the most cost-effective projects are built and maintained.

Many legislative approaches to carry out such a reorientation are possible. This paper concentrates on three that appear closest in intent and structure to those that have recently been considered by the Administration or the Congress:

- o Establishing a self-sustaining federal loan fund to replace annual appropriations for local water resources projects.
- o Replacing federal grants for projects of local interest with block grants to states, allowing greater local choice of investments.
- o Targeting the remaining federal project grants toward water projects that are national in character.

ORIGINS OF THE FEDERAL ROLE--DEVELOPMENT AND PUBLIC GOODS

The federal role in water resources originated in the early 1800s, largely out of a concern for the nation's regional development and economic growth. Toward these ends, the federal government built a network of inland waterways to provide transport services to developing regions. The federal government also built and maintains a system of inland and coastal ports to aid commerce and provide for the national defense. Since 1902, the federal government has built almost 700 dams to provide water and power to help settle the West. And in the 1930s, the federal government began to develop the water resources of an entire river basin--the Tennessee--to stimulate economic growth in the South.

To promote growth and regional development, the federal government has paid an average of 70 percent of the combined construction and operating costs of such projects, leaving states, localities, and private users to carry the remaining 30 percent. Such subsidies have even been extended to cover some of the costs of providing marketable water services. For example, the federal government pays 94 percent of the cost of inland water transport services, 81 percent of irrigation water and recreation services costs, 84 percent of harbor dredging, and 64 percent of municipal water and hydroelectric power generation. The remainder of the costs are borne by nonfederal participants (see the Summary Table).

High federal shares of costs have also been justified on grounds that the federal government was the appropriate supplier of nonmarketable water services--termed "public goods"--such as flood prevention, fish and wildlife enhancement, or water quality control. These services benefit the public at large, but they offer no fiscal incentive to invite private investment. The federal government took on major responsibility for these often heavily capital-intensive undertakings for two reasons. First, until recently, few states had the fiscal capacity to afford such projects. Second, public benefits often accrued to clusters of neighboring states, leaving no single state with the incentive to pay for the development. Thus, since the 1930s, the federal government has paid between 80 and 90 percent of the costs of flood control dams, up to 97 percent of water quality control costs, and about 85 percent of fish and wildlife preservation costs.

SHIFTING NEEDS AND SHORTCOMINGS OF CURRENT POLICY

Although public benefits remain valid as a motivation for major federal involvement in providing nonmarketable water resources services, the continued subsidization of marketable products and services (for which user charges are appropriate), together with federal payments for public

SUMMARY TABLE. EFFECTIVE NONFEDERAL COST SHARES OF FEDERAL WATER RESOURCES DEVELOPMENT, BY PURPOSE AND AGENCY (In percents)

Project Purpose	Army Corps of Engineers	Bureau of Reclamation	Soil Conservation Service	Weighted Average of all Federal Water Agencies
Urban Flood Damage Reduction	17	a/	a/	20
Rural Flood Damage Reduction	7	10	27	11
Irrigation	19	18	54	19
Municipal and Industrial Supply	54	71	100	64
Hydroelectric Power	61	65	b/	64
Water Quality Control	3	82	b/	60
Fish and Wildlife Preservation	11	13	57	14
General Recreation	17	18	63	19
Inland Waterways	6-11 c/	7	b/	6
Commercial Harbors	<u>16</u>	<u>b/</u>	<u>b/</u>	<u>16</u>
Agency Mean	20	37	49	30

SOURCE: Adapted by Congressional Budget Office from Water Resources Council data.

- a. Agency reported a cost category for this purpose but not cost sharing.
- b. Agency reported no activity for this purpose.
- c. Receipts from the fuel tax implemented pursuant to the Inland Waterway Revenue Act of 1978 could increase the nonfederal share to as much as 11 percent from the Water Resources Council's 1974 calculation of 6 percent.

investments of state or local interest, appear to create rather than solve problems.

Since the inception of many water resources programs, the United States has reached economic maturity, and the development objectives of many original water resources policies are now largely accomplished. The inland waterway system, for example, is well-established and needed coastal harbors are built. The West, once unsettled, now has a mature industrial and agricultural base. Most major interstate river basins have been developed to meet the needs of past generations. Water policy now confronts different objectives--namely, the maintenance and rehabilitation of water resources structures and services that are already in place and construction of new projects of mainly local importance, with user support when feasible. Further, many states that once lacked the fiscal capacity to finance their own water services have grown in economic strength. Finally, the cost-sharing, financing, and management arrangements stipulated under current policy no longer mesh well with these changing circumstances.

Economic Distortions

Federally subsidized marketable water services tend to be undervalued and overconsumed by users. This stimulates demand for continued subsidies rather than promoting cost-effective, user-supported investments. Federal water subsidies, for example, have resulted in irrigation of farm land at costs per acre far in excess of that land's productive value. In effect, general taxpayers pay for irrigation projects that beneficiaries would not support if water fees reflected the full cost of development. Moreover, federal subsidies--hence, low prices for water--blunt western farmers' incentive to conserve water and encourage cultivation of water-intensive crops, such as cotton or rice, in arid regions. For example, southern growers, who would otherwise have a natural competitive advantage in growing cotton, are forced to accept lower prices and reduced returns as cotton production continues to shift to western states. Similarly, subsidies to freight shippers on the inland waterways amount to more than one-fourth of the costs of the barge industry, many times the federal subsidy to competing freight modes, such as railroads, trucks, and oil and gas pipelines. By encouraging the use of barges, this subsidy stimulates demand to build more locks and dams with federal dollars. Thus, proportionately more of the cost of freight is transferred from direct users to general taxpayers.

State and local governments may experience similar incentives for overconsumption of nonmarketable water services subsidized by the federal government. While self-financed flood control projects may never be realistic, communities have an incentive to overvalue flood-protected land

so long as flood protection is perceived as an essentially "free" good. In such cases, the costs of flood control can exceed the real development value of flood-free land. Moreover, federal provision of flood-prevention structures discourages communities from exploring more cost-effective alternatives.

Policy Issues

A great deal of evidence suggests that water resource investments could be made more cost-effective and equitable if they depended more on users and states for financial support. To these ends, the Congress confronts three basic policy issues.

Project Selection. Investment decisions are now made by the Congress based, in part, on requests from state or local governments or private beneficiaries and, in part, on engineering, environmental, and economic analyses performed by the federal water agencies. This system, however, offers little guarantee against undertaking projects of questionable merit. Higher cost shares for users and for local governments would provide incentives for greater local involvement in project selection, more realistic project evaluation, and, therefore, more cost-effective investments. For projects of national significance, an independent review board could avoid the lengthy process (as long as 28 years) that now characterizes the evolution of many water projects.

Project Financing. Federal financing without repayment requirements can perpetuate current subsidies. Yet strict reliance on state financing could prevent the construction of some needed projects, especially in relatively poorer states. This suggests that a mix of federal and state financing would best serve the goals of efficiency and equity.

Cost Sharing. Inefficiencies created by subsidies to direct beneficiaries and to state and local governments could be reduced if cost-sharing policy were based on two conventions. First, direct beneficiaries should pay for marketable benefits consumed, and second, all levels of government should share the costs for water projects that provide nonmarketable benefits.

FEDERAL POLICY OPTIONS

The water resources policy options considered in this report are representative of recent proposals under Congressional consideration. Each option would place greater responsibility for project selection, financing,

and repayment on states, local governments, and direct beneficiaries. This emphasis could provide greater incentives than current policy to work with the federal government to ensure that the most cost-effective projects are built and maintained, and to provide an equitable distribution of government services. But this shift in responsibility would also affect the federal and state budgets and private-sector beneficiaries of public works projects.

Federal Loan Program

Rather than continuing the dominant federal role in financing and decisionmaking for local water projects, a federal loan program could be used to increase nonfederal responsibility. Federal loans would provide up-front capital for state and local investments. These loans would be repaid from user fees, to the extent that marketable benefits are provided, and from state funds for half of the nonmarketable benefits. Though financed with federal loans, these projects would be selected and managed at the state or local level. Nationally important projects, on the other hand, would continue to be selected, financed, and operated by the federal government, with costs recovered through federally administered user fees when applicable.

Investment Efficiency. The availability of federal loans would ensure the ability of all states to build needed local projects, even if they were unable to finance such projects themselves. The federal loans would not be committed until the applying state met two conditions: establishment of a cost-recovery system based on user fees for projects with marketable benefits; and state acceptance of legal responsibility to repay at least half the cost of all projects with nonmarketable benefits. This approach would focus user support on the most needed projects, based on realistic, unsubsidized prices of water and water-related services. Similarly, those projects perceived by state governments to have the highest public return on their investments would be promoted first. This would allow states and localities to choose their own local investments without undergoing the time-consuming process demanded by current policy.

Projects of national importance could be selected by an independent federal and state review board, subject only to Congressional appropriations. Such a board might be freer to judge the economic merits of an investment without being subjected to the political pressure that is now brought to bear on the Congress by special local interest groups.

Effects on Federal and State Budgets and Users. The potential efficiency gains of a federal loan program must be balanced against three effects. First, in the early years, before state and user payments began to

accrue, high state financing demand could deplete the loan fund, putting budgetary pressure on the federal government. Federal capital outlays could increase from the fiscal year 1982 level of \$2.3 billion to over \$4 billion if water resources projects that extend beyond current policy were undertaken. In time, this problem would diminish as user fees and state repayments replenished the fund. Second, although a loan program would accommodate the repayment capacity of most states, it would impose additional burdens on the states, including new financial responsibilities for project evaluation, management, and cost recovery. Finally, recipients of marketable benefits would have to pay substantially more for such services or reduce their consumption. Many users might have to accept reductions in services because of increased costs.

Federal Block Grants

Under block grants, states would again take the lead in selecting local projects. Each year, the Congress would appropriate investment funds for distribution to the states, based on population, land area, or other measures of "need." A state could use the federal funds apportioned to it for local water projects, provided that the state financed half the projects' costs. States would have the option, but not the requirement, to recover their investment with local user fees. The federal government would continue to finance projects of national importance, selected by an independent federal and state review board. Federally administered user fees would recover federal expenditures when appropriate.

Investment Efficiency. Under block grants, economically efficient intrastate projects would be less assured than under the loan program option. This would occur because user fees would not be mandatory, and states could choose to subsidize groups of users if they so desired. States would be encouraged to institute user fees for intrastate projects, however, because of their increased financing responsibilities. Interstate projects, on the other hand, would be conditioned by users' willingness to pay appropriate fees, thus helping to guide federal investments toward projects with the greatest return. Interstate project selection by an independent review board would also help ensure cost-effective federal spending.

Effects on Federal and State Budgets and Users. Under the block grant option, the 1982 level of federal appropriations for water resources--about \$3.7 billion for construction and operations--could have generated a total of about \$5.2 billion in combined federal and state investments. Such potential gains in efficiency, however, would have to be balanced against the increased state financing burden implied by matching grants. Under this block grant approach, states would have to raise

50 percent of the cost of the average water project before work could begin, compared to the current practice of repaying about 30 percent of project costs, sometimes over a 50-year period aided by user payments. This could result in only the wealthiest states' building water projects. In addition, shippers using the inland waterways would pay user fees, which in turn could eliminate traffic on some routes, reduce farm incomes during slack markets, and cause local economic dislocations.

Federal Project Grants Under A Limited Federal Role

Under this option, the federal government would give states the full responsibility for new local projects--selection, financing, and cost recovery (at their discretion). The federal government, on the other hand, would continue to select and finance projects of national significance as determined by an independent review board. Financial and administrative responsibility for all currently operating and authorized local projects would be transferred to the states over a period of ten years. Any new projects that were interstate or international (affecting Canada or Mexico, for example) in scope or contained national security implications would be constructed under current financing conventions. But federally administered user fees would be instituted to recover appropriate portions of project costs. Receipts from such fees would accrue to the federal government and to the states in proportion to their financing contributions.

Investment Efficiency. Federally administered user fees would match costs to beneficiaries, thus linking new federal investments with users' willingness to pay and reducing the tendency for overinvestment. Federal funds would no longer support projects of mostly local significance, and these freed federal resources could be redirected toward other national needs. The states, faced with financing and paying for intrastate water projects, would have a stronger incentive to make priority investments first, recovering their costs through state user fees as they saw fit. The absence of federal financing, however, could prevent the construction of some worthwhile projects in economically depressed states. In such cases, opportunities for cost-effective investments could be lost.

Effects on Federal and State Budgets and Users. This option would place the greatest financial pressure on the states through added costs of operating and managing existing intrastate projects, financing new intrastate projects, and meeting current cost-sharing requirements for nationally important projects. For example, if this option was in place in 1982, out of about \$3.7 billion in federal expenditures for water resources that year, about \$1.5 billion, or 41 percent, would have been a state responsibility. Transferring this responsibility to the states over ten years, however, could

reduce sudden financial burdens and allow more time for states to develop new programs. Two types of states would be at a relative disadvantage under this option: those that have relied most heavily on federal subsidies or technical expertise, and those with the least ability to raise development capital. Many activities of federal agencies would revert to the states, including small watershed improvement projects of the Soil Conservation Service, local flood control projects and some port dredging undertaken by the Corps of Engineers, and up to 40 percent of the Bureau of Reclamation's construction activities. As in the other options, users of inland waterways and nationally important ports would pay more for navigation services than they now do.

