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Author's comment: Because of the short turnaround time between the most recent Economic Incentives RMS workshop and this redraft, there has not been sufficient time to adequately address some reviewers' comments. The next draft will endeavor do so.

Subgroup: Practice Resources Stewardship

Chapter # Economic Incentives

Loans, Grants, Water Pricing, Technological Change, and Water Market Policies

Economic incentives include financial assistance, water pricing, and water market policies intended to influence water management. Economic incentives can influence the amount of use, time of use, wastewater volume, and source of supply.

Economic incentives include low interest loans, grants, and water rates and rate structures. Free services, rebates, and the use of tax revenues to partially fund water services also have a direct effect on the prices paid by water users. Fines can be used to discourage undesirable water user behavior. Governmental financial assistance can provide incentives for integrated resource plans by regional and local agencies. Also, government financial assistance can help water agencies make incentives available to their water users for a specific purpose. Assistance programs can also help align the economic and financial drivers affecting local, regional, and statewide water management decisions to minimize working at cross-purposes and maximize the benefits of working with consistent goals and objectives.

Incentives can be created or enhanced by facilitating water market transfers by creating market opportunities where they didn't exist, by expanding opportunities where they currently exist, or by reducing market transaction costs. In each case, new or greater opportunity costs (i.e., the option to sell water creates a cost of maintaining it in its current use, the cost of the forgone sales income) can influence water management decisions.

Economic Incentives in California

Water Rate Incentives

The most prevalent water rate policy is for water agencies to recover costs for such things as planning, operation, maintenance, capital, and administration. Water rates are also commonly used to contribute to water agency capital investment accounts for funding anticipated projects. Water rates can be used to recover costs for compensating third party such as agricultural services businesses adversely affected by water market transfers. Other means available to recover costs include ad valorem taxes and revenues from bonds not repaid from water rates.

Some agencies are not required to recover the full cost of development and maintenance. For example, Congress has not required the U.S. Bureau of Reclamation (USBR) to recover all of the costs of providing supplies to Central Valley Project agricultural contractors that meet specific acreage limitation criteria. This is an example of an incentive that was designed to achieve a social goal that affects water use and agricultural development in the West. Urban wastewater treatment also traditionally has not been required to recover the full cost of projects because of substantial federal grant funding through the Clean Water Act. Flood control policy goals have

also been promoted by federal and State cost sharing arrangements that reduce the flood control costs borne by local agencies.

Water rate incentives can take several forms. Water rate structures designed to recover costs can be fixed, uniform, or tiered (Box 8-X Water Rate Structures to Recover Costs). Both uniform and tiered rates can have a fixed component. Where water use is unmetered, fixed assessments might be necessary. For example, water rates can be based on connection size for urban users or acreage irrigated for agricultural users.

PLACEHOLDER: Box 8-x Water Rate Structures to Recover Costs

Most urban water agencies in California are moving away from uniform rates and toward rate structures based on the amount of water used. Many urban agencies have already adopted tiered rate structures where the unit water charge increases as water use increases; the more units of water used, the higher the charge for each subsequent unit. Some tiered water rate structures may have higher season rates. In 1999, of the California urban water purveyors surveyed, about 43 percent had tiered water rates, 45 percent had uniform rates, 10 percent had flat or other type rates, and 2 percent had declining block rates. By 2003, about 41 percent had tiered water rates, 49 had uniform rates, 9 percent had flat or other type rates, and 1 percent had declining block rates. Some agricultural agencies have adopted tiered rate structures. Most apartment building owners do not individually meter their tenants, removing the effect of volumetric pricing on the tenant's water use.

Although most residential wastewater treatment is currently charged at a flat rate, commercial and industrial users are more likely to be charged by wastewater volume (and in some cases, the types of constituents in their wastewater).

Financial Assistance Incentives

The California Department of Water Resources (DWR) and the State Water Resource Control Board (State Water Board) have run multimillion dollar bond-funded programs which have provided grant and low-interest rate loan money to many local water agencies for water conservation, water recycling, distribution system rehabilitation, groundwater storage, water quality improvement, and conjunctive use projects. These programs are intended to encourage local agencies to adopt water management practices which have a statewide as well as a local benefit. Over \$xxx million in grants and \$xxx million in loans have been provided since yyyy. Monies currently available under Propositions qqq and rrr for disbursement pending approved applications include \$xxx for zzz and \$xxx for www (note: data being compiled).

At the wholesale agency level, the Metropolitan Water District of Southern California has recently developed plans to expand its Local Resources Program, which provides an incentive of up to \$250 per acre foot to its member agencies for water recycling, groundwater recovery, and seawater desalination. MWDSC's water rate structure includes a "water stewardship charge" to collect revenue to subsidize individual retail agency programs that benefit the region. Incentives can include rebate programs for low-flush toilet installation, water audits for residential landscapes and mobile lab services for increasing on-farm water use efficiency at no charge to customers, or other innovative programs

Water Market Policies

Water Code sections 1725 through 1732 were adopted to facilitate short-term water transfers. Prospective buyers benefited from the reduced the cost of obtaining State Water Board approval, the length of time for approval, and the risk of denial of approval. These buyer benefits translated into increased opportunity costs to prospective sellers by encouraging those buyers to participate in the market and giving them the ability to offer higher payments. DWR and the State Water Board have taken actions to both facilitate and encourage water transfers. USBR ran water banking operations during the 1976-77 drought period. In 1992 and 1992, DWR operated the Drought Water Bank and currently operates the dry year water purchase program on behalf of the State Water Project contractors. DWR has also developed procedures to wheel water market purchases through the California Aqueduct for both its contractors and other parties. In 2009, DWR will operate a water bank to coordinate water transfers between willing sellers and willing buyers in response to drought conditions.

Potential Benefits of Economic Incentives

A major purpose of economic incentives is to promote water management practices that meet statewide, regional, and local policy goals. Incentives may produce environmental or social benefits, or avoid or delay construction of new water supply projects by promoting water use efficiency, for example. When water costs increase, for example, customers have a choice to either pay the higher water bill or find ways to use less water, such as using a broom or blower to clean sidewalks instead of a hose. Residential customers might install smart irrigation controllers or change to drought tolerant landscaping. Agricultural users may shift crop types, change their irrigation technology, or reduce the acreage they irrigate.

Water use efficiency is a policy goal that can be facilitated by economic incentives. A water management system becomes more efficient when users act as if the cost of the last increment of water they use (i.e., the marginal cost of water) is equal to its opportunity cost (i.e., the amount of economic value that water would generate in its best available alternative use). If more water is to be made available, users should act as if the cost were equal to the opportunity cost of the resources needed to make it available (e.g., the land, labor, and materials needed to construct a recycling plant, a reservoir, or to institute a conservation measure).

If water agencies make management decisions as if their customers faced these costs, including the decision to invest in new supplies, then water use efficiency more likely will be improved, even if the prices actually seen by their customers do not fully reflect those costs. This strategy applies to decisions by State and federal agencies to provide financial incentives to local water agencies and to decisions to develop statewide water supplies.

Policies that promote social well-being (e.g., preservation of agricultural production in economically disadvantaged areas dependent on its existence and for food security) and environmental well-being (e.g., preservation of wetland habitat and streamflows for fish) will, of course, put constraints economic efficiency as a sole criterion. The economic cost of those policies should be evaluated whenever possible to facilitate informed decision making by policy makers, including the public.

It should also be made clear that improving water use efficiency may not necessarily result in reduced use because of the increased productivity of water (i.e., its marginal value is increased). If water cost or availability was a constraint and depending on the demand for the product, production could increase and result in the same amount of use, for example.

Economic incentives that produce more efficient water management practices, like lining canals, can result in costs to the environment by reducing supplies to wetlands dependent on subsurface flows, for example. Conversely, water rate policies that lower the cost of surface water during wet cycles, apparently promoting inefficiency, can encourage storage in groundwater basins, promoting conjunctive use and greater overall efficiency. Water quality improvements resulting from economic incentives can help farmers meet drainage water goals as well as lower treatment costs or provide health benefits to urban users in addition to benefiting the environment.

Marginal cost pricing is one strategy to help promote more efficient water use. With marginal cost pricing, instead of being based on average unit costs, the volumetric rates to all customers would be based on the unit cost to the water purveyor of the last, and probably most expensive, source of supply. In a much milder form, marginal-cost pricing for “new” customers (e.g., residents of new subdivisions) might reflect the average cost after factoring in the cost of the additional supply needed for those customers. This price would be higher than that for existing customers.

It is difficult to quantify benefits provided by economic incentives since the incentives influence decisions on other management strategies that produce their own benefits. Economic incentives can be used to influence development of water supply augmentation or demand reduction programs that promote regional self-sufficiency. For example, grant funds from a State agency can help promote recycling by reducing its cost to local agencies. Similarly, a wholesale water agency might make financial assistance available to retail water purveyors to encourage implementation of projects or programs that would benefit the region. Financial assistance can also be used to achieve beneficial changes in water system storage, conveyance, and treatment operations. The willingness of a water agency to participate in water marketing can also be influenced by economic incentives.

Water market policies that promote willing buyer/willing seller water transfers by increasing opportunity costs to potential sellers tend to move water from areas and activities where it produces less economic value to areas and activities where it produces higher economic value. This can occur on a shortage contingency or long-term basis. With appropriate compensation and mitigation for adverse impacts, the overall economic well-being of the state can be increased without additional water development and without imposing undue hardship.

Potential Costs of Economic Incentive Policies

One financial cost of an incentive program to a water purveyor or government agency is the cost of its creation and administration, including the costs of arranging bond funding or low interest rate financing. Grant programs include the cost of obtaining and repaying grant funds born by the agency. Other costs would be associated with the adoption of water management strategies or water use behaviors—including foregoing some water use—that may result. The costs of the economic incentives will depend on how the incentives are integrated with other management strategies. As with other management strategies, economic incentives must be specific to the circumstances and water management goals of each individual water agency.

Another type of cost can arise from the possibility that an incentive will result in actions not aligned with policy goals or incentives will operate at cross purposes (i.e., have unintended consequences). To the extent that resources are misallocated, a loss in economic, social, and/or environmental well-being will be incurred compared to a better allocation of resources.

Major Issues Facing Additional Economic Incentives

Selecting Appropriate Water Rates

A major consideration is determining what rates to charge customers while ensuring that costs of delivering the water and treating the wastewater are recovered. Also managing water rate changes during water shortages can be challenging since incremental costs of supply can both increase dramatically and change rapidly, making it more difficult to recover costs. If regulations against collecting revenues in excess of costs remain in effect, some agencies would have to reduce their lower tier prices in order to charge higher costs at the higher tiers. This would tend to increase use by the lower tier customers, an undesirable result from a water use management standpoint.

If surface water rates are set too high, and the option is available, agricultural users or urban water users may choose to pump groundwater instead of paying for surface water. This would discourage groundwater recharge or in lieu recharge.

A recent California Supreme Court decision on interpreting Proposition 218, *Bighorn-Desert View Water Agency v. Verjil*, seems to limit the water charges levied against a particular water agency customer (i.e., connection) to the actual costs to the water agency of serving that customer. Tiered water rates would have to be justified by specifically identifying those water agency costs would be increased as a result of higher water use by a specific customer and by how much in relation to volume. Because of fixed capital costs and a fixed component to O&M costs, supplying higher volumes generally results in lower unit costs of delivery, implying a reverse tiered rate.

Funding for Loans and Grants

The availability for State funding can be intermittent. Funding methods that require direct legislative appropriation or approval of new water bonds could require years lead time before funds are available.

State Funding for Private For-profit Purveyors

With few exceptions, State bond-funded grants and loans have only been made available to public agencies and non-profit organizations. In 2004, in response to a query from the Governor's Office, the Attorney General issued a finding that bond funds cannot be awarded to for-profit purveyors unless the bond language specifically makes them eligible. In addition, it was determined that such language could require the issuance of bonds at a substantially higher cost to the state's taxpayers.

Criteria for Loans and Grants Funding Approval

Historically, requests for loans and grants have exceeded available funding. Deciding which strategies and which agencies receive loans and grants requires setting of priorities for funding.

Social Considerations

Economic incentives can affect social equity when those incurring the costs of providing incentives through higher taxes or fees do not receive a fair share of the benefits that the incentives are expected to generate. As another example, increasing the costs for agricultural water supplies increase the efficiency of on-farm water use, but can also induce changes in crop patterns that result in lower farm employment. Communities dependent on farm production may be disproportionately affected. In the urban sector, if water rate changes reduce the use of ornamental landscaping, jobs that depend on establishing and maintaining that landscaping could be lost.

Incentives for water transfers can result in more water moving out of agricultural production and into other uses on a temporary or permanent basis. Communities supplying inputs to farm production, through farm labor; farm equipment sales and repair; crop harvesting, hauling, and storage services; and banking, legal, and farm management services may be adversely affected. This is a bigger issue in communities more heavily dependent on supplying these inputs.

Regulations

Some water agencies are not permitted to collect revenues in excess of costs. Changes in regulations may be needed to implement a water pricing policy that works best for an agency. Some water agencies have regulations that prevent the use of water metering necessary for measuring and pricing volumes of water. Typically, loans and grants are constrained by bond language to strategies that lead to capital expenditures. Most loans and grants may not be used for developing non-capital strategies such as water rate changes.

Development of Water Markets

See water transfers strategy (Subgroup Improve Operational Efficiency and Transfers, Chapter #)

Self-Served Water Users

Self-served water users are not covered by water rate policies.

Economic Modeling Tools

Responding appropriately to economic incentives requires decisions based on information from system modeling tools that correctly account for all the costs and benefits of water management strategies. Systems analysis tools are needed because interactions between water management alternatives and carryover storage and reuse, for example, and the implications of these interactions for system reliability. These types of tools can be very expensive to develop and maintain, particularly for water systems of any complexity. The cost of obtaining data, continually updating the data, and availability of that data are concerns. In addition, the technical knowledge to do this work, including running the models, may not be available in-house.

Recommendations to Help Promote Economic Incentives

The State and water agencies should consider and evaluate economic incentives as an integral part of their package of management strategies. The following recommendations recognize that economic incentives will vary widely throughout California due to differences in local conditions:

1. Institute water rates that support better water management based on the unique conditions in each water district.
 - Use volumetric pricing wherever practicable and economically efficient
 - Use tiered pricing to the extent that it improves water management, including consideration of higher prices for water in excess of agricultural and urban vegetation management requirements.
 - Recover more costs from variable charges and fewer costs from taxes and fixed water charges as is financially prudent.
 - Agencies adopting new water rates should clearly identify what they mean to water users and provide education, training, and technical assistance to water users to maximize the desired outcome of those policies.
2. Institute loans and grants that support better regional and statewide water management based on the conditions in each water district.
 - The grant and loan process should account for the fact that some water agencies have limited funds and staffing to prepare applications.
 - Agencies receiving grants and loans should make information on the success of the programs/projects that they implement available so that the experience can be used to design better incentive plans.
3. The State should provide technical assistance to local agencies in developing equitable and effective economic incentives to achieve local and statewide water management goals and objectives.
4. The State should develop guidelines and ranking criteria for grant and loan awards to water agencies that consider cost-effective water management, environmental and equity objectives. These guidelines and rankings should account for the fact that some water agencies have limited funds and staffing to prepare applications.
5. The State should explore innovative and equitable ways to provide financial incentives to private for-profit water purveyors that avoid or minimize the perception of shareholders unfairly benefiting from public funds.
6. The State should assist local agencies in using planning methods and adopting policies that promote long-run water use efficiency on a regional and statewide basis while accounting for policies on environmental and social well-being.

7. Refer to the Water Transfer Resource Management Strategy Paper for recommendations on promoting water transfers.
8. The State should invest in research to develop affordable technologies which reduce the scarcity value of water.
9. The State should provide technical expertise and funding to help local agencies develop and use water management system modeling tools that allow comprehensive economic analyses to be conducted and the model results to correctly reflect economic incentives.

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