Selecting Appropriate Water Policies

Water is a key component in many economic activities including agriculture, power, transportation, commercial fishing, and industry. So it is not surprising that an inadequate supply of acceptable quality water constrains economic development in many countries. Water demands continue to increase as populations and economic activity grow. Thus, it is now essential that we treat water resources as an economic good and not one that is "free" for unlimited use.

Water Resource Problems

The importance of water, and the interdependence of its many uses, keep water resource problems high on the agenda of policymakers. We can group these problems into four categories: inefficient water use, fluctuations in water availability, increasing scarcity, and declining water quality. We note that these problems are not independent as improving water quality also increases usable water supplies.

Inefficient Water Use

Given the growing demand for good and reliable quality water, countries cannot afford inefficient use. Many will need to devise demand management strategies that give consumers incentives to conserve water (Spulber and Sabbaghi 1994). Such strategies should be sensitive to the needs of low income groups but also recognize that most consumers have a high willingness to pay for good quality water.

"Several studies show that the urban poor pay high prices for water supplies and spend a high proportion of their income on water....In Jakarta, Indonesia...only 14% of the households receive water directly from the municipal system. Another 32% buy water from street vendors, who charge about $1.50 to $5.20/m3" (World Bank 1993).

To promote efficiency and still meet the needs of the poor, Istanbul adjusts water prices depending on the amount consumed and type of user. For water to meet basic health requirements (7.5 m3/month), the city charges households a modest $0.26/m3. In contrast, industry pays almost five times this rate.

Fluctuations in Water Availability

The second problem concerns the highly variable and unreliable nature of water supplies (rainfall and stream flow) combined with varying demand. Droughts or floods plague many parts of the world (box 1). And countries such as Bangladesh and China sometimes experience both floods

and droughts in the same year. Water demands that generally are highest during the dry season accentuate these problems.

Box 1. African Drought

Varying rainfall and water supplies afflict many areas. Drought has plagued Africa, particularly since the first half of the 1970s when the Ethiopian drought and famine claimed the lives of 150,000 people. A second drought 10 years later, combined with war, claimed even more lives.

The Sahelian countries experienced similar devastation in the 1970s and 1980s, with Mali alone losing more than half its cattle. In 1993, Southern Africa, including the Republic of South Africa, had the worst drought on record. Agricultural output in Zimbabwe, previously a major exporter of agricultural produce, declined by almost 80%. It had to import grain to satisfy internal demand. The situation was also critical in Malawi, where maize production dropped 40%.

A country s ability to deal with fluctuations in water supply will partly depend on the supply flexibility built into its water system. Does the system have excess capacity? Can a country reallocate water from low value to critical uses during drought?

Increasing Scarcity

The third problem involves the increasing scarcity of water with several important concerns. One is "an absolute decline in available supplies." This is caused by water diversions outside the basin, pumping that depletes the groundwater, or human- induced climate change.

For example, Manila, Mexico City, and Bangkok are rapidly depleting their groundwater supplies. Some countries, even in the Middle East, use scarce groundwater resources to irrigate low value crops. When more than one country uses the same water source, the political complexities multiply, making it even more difficult to find solutions.

Another concern involves the "increasing cost of new sources." The cost of a cubic meter of water provided by a new project can be two or three times the current cost for many major cities [Note 1. Cost excludes treatment and distribution. Current cost refers to cost at the time data were gathered. Future cost is a projection of cost under a new water development project. Source: World Bank (1992:102).] The same cost trends occur for irrigation water in many major irrigated areas, including India, Pakistan, and the United States.

A final concern is that population and economic growth are causing "a growing demand for water." Projections are that the world population will grow from 5 billion today to 8 billion by

2025. Not only will these people need water for household uses, but they also will need food, some of which must come from newly-irrigated lands.

Declining Water Quality

The fourth problem involves "a general decline in water quality." Besides the critical health concerns highlighted in box 2, widespread economic and ecological impacts arise from inadequate sewage treatment. Worldwide, people face growing problems of inadequately-treated industrial waste and pollution from agricultural chemicals. Another leading contributor to water pollution is soil erosion, caused by poor land-use practices in agriculture, forestry, mining, and urban areas. This pollution combined with the loss of wetlands has caused a serious decline in aquatic resources and habitats.

Box 2. Waterborne Illness

Polluted water used for drinking and bathing represent the principal pathway for infectious diarrheal diseases. They annually kill more than 3 million people, mostly children, and make more than a billion others sick. Other diseases from polluted water include roundworm, which inflicts nearly one billion people. Another 500 million suffer from the eye disease, trachoma, and 200 million more from schistosomiasis transmitted by liver flukes.
Source: The World Bank (1992).

Policy Choices

Policymakers dealing with these water problems need to make difficult choices between alternative actions and institutional arrangements. For example, in a country facing growing urban water demands, decisionmakers must choose whether to build a new reservoir, transfer water out of irrigated agriculture, or develop a demand management program. This program could include actions such as water metering, volumetric water charges, and education about water conservation (box 3).

Box 3. Demand Management Programs for Municipal Water Supply

To limit the need for increased water supplies, many municipalities have employed demand management programs.

Bogor, Indonesia, faced high investment costs in developing additional water supplies. Municipal authorities decided to cut domestic and commercial water consumption substantially. They increased water fees by about 30%. This decreased consumption by 29%. The city then used a campaign to reduce water use further, particularly among consumers with more than 100 m3/month.

Consumers received advice and the necessary devices to reduce consumption. Three months later, average monthly water use decreased another 29%.

To cut water use per capita by one-sixth, Mexico City replaced 350,000 toilets with smaller six-liter models. This saved enough water to meet the household needs of 250,000 residents.

Beijing charges for the actual volume used. New administrative regulations set quotas on consumption and authorize fines for excessive use.

Water-saving devices, leak detection and repair, and more efficient irrigation in its parks helped Jerusalem reduce its use of water per capita by 14% from 1989 to 1991.

A water conservation program in Waterloo, Canada, included higher prices, education, and the distribution of water-saving devices.

The program reduced water use per capita by nearly 10%.

Source: Adapted from The World Bank (1993).

Another area may suffer from highly variable surface water supply. Those decisionmakers may choose whether to increase storage capacity, encourage farmers to change the mix of crops grown, or restrict groundwater use to drought years when surface water is scarce.

Institutional Setting

Policy design and action take place within a social and institutional framework. This includes organizations, customs, laws, rights, responsibilities, regulations, and informal rules that guide and influence the success or failure of a particular policy or action. Effective policy implementation may require changing certain institutions or organizations as well as developing policies to guide these changes.

Institutional arrangements specify who can benefit from water use and establish incentives that guide water use. Well-designed and functioning institutional arrangements can set up water markets and/or administrative control over water use. However, inadequate institutional arrangements can impede efficient water use.

Institutional arrangements also establish the interface between government and private sector water management. Management usually involves a mix of government and private sector activity.

The mix will depend on the country's objectives, existing institutional arrangements, and on the technical, political, and management capabilities of the public and private sectors.

Most countries have many public agencies and commissions with various responsibilities for water management. Often each agency is responsible for only one aspect of water resources, such as irrigation, water supply, or hydropower.

To integrate water policies, governments may need to alter roles, functions, and responsibilities of agencies and change the way agencies relate to one another. Policymakers should encourage water agencies to exchange information, communicate regularly, engage in joint planning and coordinated operations.

An Integrated Approach

An integrated approach should consider water demands across all sectors and assess supplies available. However, many water management decisions can be done effectively at a lower level. This often means a more limited role for central governments and a greater reliance on the private sector, local government officials, financially independent utilities, and water user associations.

If so, the central government can then focus on:
* developing a comprehensive strategy for water resources planning;
* resolving conflicting interests;
* minimizing adverse impacts;
* supplying technical assistance to local groups;
* fostering complementary institutional arrangements by developing appropriate legal, regulatory, and incentive systems; and
* preventing monopoly pricing.

Even in an integrated approach, governments should divide water resource management so that oversight and enforcement functions are separate from operations. This separation will reduce conflicts of interest and opportunities for bribes and other illegal payments.

Some countries, such as Mexico, Chile, and Tunisia, are already implementing water policies that emphasize integrated planning and decentralized management. Yet to initiate such policies effectively, countries need to design the policies based on their water resource conditions and management capabilities.

Selecting Actions and Policy Instruments

Table 1 shows a partial list of policy actions and related instruments to help resolve different water problems and improve water management [Note 2. The policy instruments and actions discussed here relate closely to those adopted in a watershed management plan, compare with Brooks, Kenneth N., Peter F. Ffolliott, Hans M. Gregersen, and K. William Easter. 1994. Policies for Sustainable Development: The role of Watershed Management. U.S. Agency for International Development, Environmental and Natural Resources Policy and Training Project/Midwest Universities Consortium for International Activities Policy Brief 6. Arlington,

Virginia.]. Not all actions are appropriate for each country. Sometimes a combination of policy actions and instruments may be more effective than the use of a single action or instrument. An example is a rapidly growing city faced with very expensive new water supplies. Instead of choosing the costly option of increasing water supplies, a water agency could select a much smaller and less costly expansion of water supply combined with a program of higher water fees and water conservation assistance for users (box 3).

Table 1. Water Resource Problems and Policy Actions

Policy Instruments
  Policy Actions for Specific Problems

Fiscal incentives
  Shortages and Inefficient Use
    * Use opportunity cost pricing**
    * Legalize water markets
  Variable WaterSupplies
    * Use peak load pricing
    * Legalize water markets
  Declining Water Quality
    * Make polluter pay for damages
    * Use tradeable pollution permits

Regulatory mechanisms and institutions
  Shortages and Inefficient Use
    * Promote water user associations
    * Establish river basin entities
    * Impose restrictions on use
  Variable WaterSupplies
    * Ration water deliveries
    * Establish priorities for water use in droughts
  Declining Water Quality
    * Set water quality standards
    * Establish land use zoning around streams and in watersheds

Direct public investments
  Shortages and Inefficient Use
    * Transfer water from surplus regions
    * Install water meters
  Variable WaterSupplies
    * Public groundwater development
    * Expand reservoir storage
  Declining Water Quality
    * Install waste treatment plants
    * Install aerators on polluted rivers

** basing prices on the value of the highest alternative use

Assessing Impacts

Selecting appropriate policy actions and instruments is an interactive adjustment process. It often depends on assessment of the economic, social, and environmental impacts of each proposed activity.

These assessments must also be part of ongoing management activities so that administrators can take corrective actions when needed.

Implementing Policies

Policymakers need to develop policy actions that take advantage of social, institutional, economic, and political conditions in their countries.

Policymakers should promote water management procedures that are transparent, decentralized, and responsive to users' requests (ISPAN 1993). They can do this by fostering formal or informal water-user associations that have a strong sense of owning the water resources.

This ownership can grow out of users' direct involvement in project planning, construction, and management. It can also occur through granting water rights to water-user associations and/or direct user involvement in financing water structures. Other options include water management by financially independent water utilities or concessional management contracts with private firms.

Policymakers need to develop clear lines of accountability and responsibility. Who is responsible and accountable for delivering water to a consumer or a water-user association? What actions can be taken against those responsible if the water does not arrive on schedule? If users pay water fees, who will make sure those funds are efficiently used to maintain and operate the water system?

Accountability is much easier to establish when management depends on users for its finances. Thus, private firms and financially independent utilities have more incentive to provide good service than a centrally-funded water agency using tax money (World Bank 1994).

Policymakers need to develop and use a system of data collection, monitoring, and information delivery. Water managers must have information about water supplies and demands. Users must know about likely supplies so they can plant the right crops for the water available. Timely information can improve decisions at both levels. Without such information and monitoring systems, it is difficult to assign responsibility for inappropriate water management decisions.

Policymakers must change incentives so water managers gain from efficient and equitable water distribution. There are several ways to set up these incentives. One is to give users more responsibility for water delivery and allocation. Another is to give water users tradeable water rights and let them actually employ the water managers. A third alternative is to have the managers' salaries depend on the efficiency of water delivery and/or the percentage of fees collected from users. In the Philippines, for example, managers receive a bonus when 90% of farmers paid their water fees. The important point is to have some strong link between those using water and those managing it.

A key factor in carrying out all these policy actions is the political will of the country involved. Donor help can facilitate such policy actions only when a country has made the necessary commitments. Yet donor help may be necessary to initiate incountry discussions of appropriate policy actions.

For example, in many water-scarce areas, such as the eastern Mediterranean and sub-Saharan Africa (where all major rivers are international), external assistance, like that provided India and Pakistan, will probably need to occur for more efficient and sustainable use of water resources (see box 4).

Box 4. International Water Resources

It is more difficult to establish an integrated approach to water resource management when the water resource is the boundary between countries or crosses national boundaries. For example, a river may flow through two or more countries or a lake or aquifer may cross national boundaries. In such cases, countries often adopt policies that conflict with those of other countries using the same water resource.

To help resolve such conflicts, technical and financial assistance may be necessary for an extended time. For example, resolving the water conflict between India and Pakistan, over their northern rivers, required outside assistance for nine years. They finally signed the Indus Water Treaty in September 1960.
