

202.3 03WA



THE WORLD BANK

**The Water
Resources
Sector
Strategy:
An Overview**

Managing and
Developing Water
Resources to
Reduce Poverty

FEBRUARY 2003

202.3-03WA-17852

This Water Resources Sector Strategy is the third World Bank statement on water resources management. The first, the 1993 Water Resources Management Policy Paper, outlines the principles governing the World Bank's work in water resources. The second, the 2001 assessment by the World Bank's Operations Evaluation Department (OED) of experience in implementing the Policy Paper (Bridging Troubled Waters), concludes that the Policy Paper remains valid and germane, but that ambition and the pace of implementation must be tailored to the wide variety of circumstances in the countries that borrow from the World Bank. This Strategy builds on the principles of the 1993 Policy Paper and the lessons learned in the OED study, and focuses on how to translate principles into action.



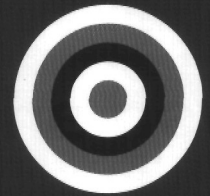
The new water resources strategy

Many developing countries face daunting water resources challenges. The needs for water supply, irrigation, and electric power grow steadily. Water becomes more scarce, and its quality declines. Environmental and social concerns increase. And the threats of floods and droughts are heightened by climate change. Because of these challenges, there is a high and increasing demand for World Bank engagement in water management and development. Lending for water resources development and water-related services, about 16 percent of all World Bank lending over the past decade, is expected to grow substantially in the next several years.

In 1993 World Bank Executive Directors endorsed a Water Resources Management Policy Paper. A major 2002 review of implementation of that strategy by the Operations Evaluation Department concluded that the principles in the 1993 Policy Paper were appropriate, but that improving water management practice everywhere was difficult

and slow. Over the past three years the Bank held 22 consultations with a wide variety of stakeholders, mainly in the field with people and governments in developing countries. The early rounds elicited views on the challenges of water management, what the Bank has done, and how the Bank might do better. The later rounds reviewed drafts of the Strategy. At all stages the results were posted on www.worldbank.org/water, open for public review and comment.

The Water Resources Strategy was agreed without objection by the World Bank's Board (comprising the representatives of the 180 countries that own the Bank) and posted on the Web on February 28, 2003. The new Strategy complements the 1993 Policy Paper, focusing more explicitly on the role of water in poverty reduction, on the need for both management and development, on the challenges of implementation, and on areas where Bank practices need to change.



Messages

There is a high and increasing demand for World Bank engagement in water management and development.

LIBRARY IRC
PO Box 93190, 2509 AD THE HAGUE
Tel.: +31 70 30 689 80
Fax: +31 70 35 899 64
BARCODE: 17052
LO: 262.3 03WA



Messages

What developing countries need is both management and development. The Bank has a comparative advantage in dealing with complex water issues, and there is strong demand for Bank engagement.

The main messages

- Water management and development are essential for growth and poverty reduction.
- The principles of the Bank's 1993 Water Resources Management Policy Paper remain relevant and applicable—this strategy focuses on putting those principles into practice and on areas where Bank practice must change.
- What developing countries need is both management and development.
- The main water management challenge is not vision but the application of principles in a pragmatic, prioritized, and patient manner—depending on specific circumstances and needs—and incremental improvement.
- The main water development challenge is that most developing countries have inadequate stocks of hydraulic infrastructure (such as dikes, canals, dams, and interbasin transfers) and face daunting financial challenges in developing adequate stocks.
- The World Bank needs to assist countries in developing and maintaining appropriate stocks of well-performing infrastructure.
- The Bank needs to use a new business model for engagement with "high-risk/high-reward" infrastructure, one that emphasizes rewards and risks to people in developing countries and that produces transparent, predictable, and time-bound decisions.
- The Bank has a comparative advantage in dealing with complex water issues, and there is strong demand for Bank engagement.
- The Bank's water assistance will be tailored to country circumstances and will be consistent with the country assistance strategies that guide government-Bank partnerships.

The essentials



Water management and development are essential for growth and poverty reduction

Effective water resources development and management play a fundamental role in sustainable growth and poverty reduction, through four different mechanisms, as illustrated in figure 1.

First, broad-based water resources interventions (Type 1), usually including major infrastructure such as dams and inter-basin transfers, provide national, regional, and local benefits from which all people, including the poor, can gain.

Second, because it is usually the poor who inhabit degraded landscapes, poverty-targeted water resources interventions designed to improve catchment quality and provide livelihoods for the poor (Type 2) are of major importance.

Third, broad-based water service interventions (Type 3, aimed at improving the performance of utilities, user associations and irrigation departments) benefit everyone, including the poor.

And fourth, poverty-targeted water service interventions (Type 4, such as water and sanitation and irrigation services for the unserved poor) play a major role in improving the lives of the poor. In most developing countries growth-oriented, poverty-reducing water resources strategies will involve action in all four areas.

The corollary is that the World Bank must be available as a "full service partner" to assist development of integrated and consistent action in all four areas.

The World Bank must be available as a "full service partner" to assist in all four areas:

- **Type 1: Broad nationwide water resource interventions**
- **Type 2: Broad water service delivery reforms**
- **Type 3: Targeted water resource interventions**
- **Type 4: Targeted water services.**

A typology of water interventions

	Broad interventions	Poverty-targeted interventions
Interventions affecting water resources, development and management	Type 1: Broad nationwide water resource interventions. For example, multi-purpose river basin development and aquifer management.	Type 2: Targeted water resource interventions. For example, watershed management in designated areas with poor farmers.
Interventions affecting water service delivery	Type 3: Broad water service delivery reforms. For example, reform of water supply utilities and water user associations for irrigation management.	Type 4: Targeted water services. For example, rural water supply and sanitation projects.



Messages

This Strategy focuses on the difficult and contentious areas where there is a need for a change in approach.

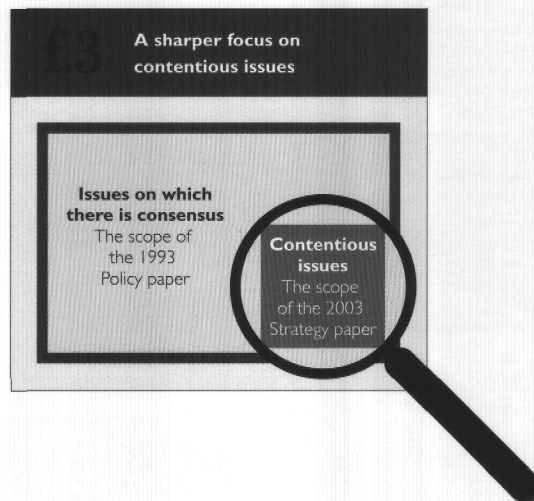
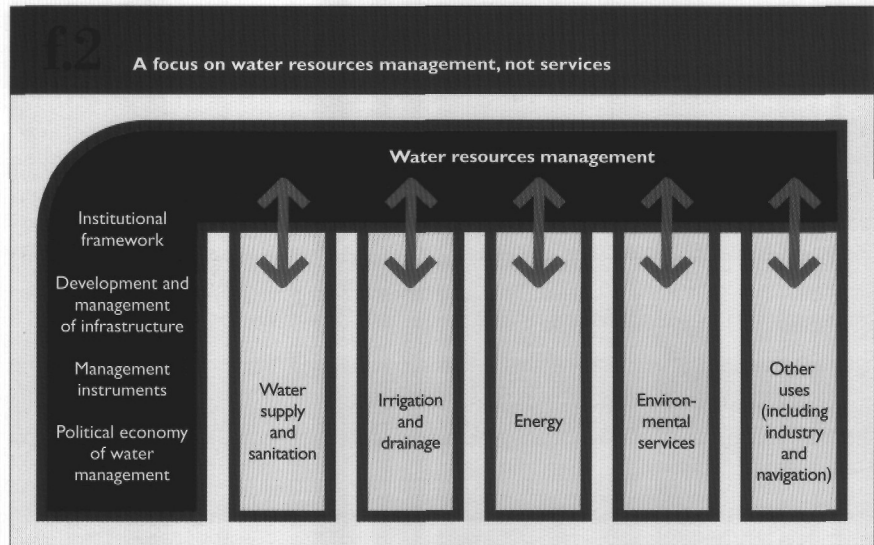
What the strategy adds

Water-related projects account for about 16% of World Bank investments, with substantial regional variations.

While this Strategy elucidates the guiding principles for the Bank's work on all water-related activities, the Strategy does not focus on water-using sectors (addressed in other World Bank sector and business strategies, including energy, environment, rural development, irrigation and drainage, and water supply and sanitation). It focuses instead on water resources management and the con-

nections between resource use and service management (figure 2).

Because this Strategy complements, but does not replace, the 1993 Bank's comprehensive Water Resources Management Policy Paper, it does not repeat the many recommendations of that Paper, which are being implemented well, and about which there is a broad consensus. Instead, this Strategy focuses on the difficult and contentious areas where there is a need for a change in approach (figure 3).



The two challenges

Developing countries need both better management and development of infrastructure

The World Bank's client countries confront two major water resources challenges.

First, all countries face major challenges in developing the laws, regulations, and institutions to manage water resources in ways that are economically productive, socially acceptable, and environmentally sustainable. Better resource and demand management therefore has a high priority for the World Bank and many of its borrowers. The details have to be tailored to the historical, cultural, environmental, social, economic, and political circumstances of each country.

Second, all countries face a major challenge in developing and maintaining an appropriate stock of water infrastructure, including dikes, canals, dams, and interbasin transfers. Developed countries have largely com-

pleted their investments in major water infrastructure, but the developing countries have not. For example, Australia and Ethiopia have similar degrees of climatic variability, but Australia has 5,000 cubic meters of water storage capacity per person, Ethiopia 45 cubic meters. The United States and Nepal have roughly equivalent economically exploitable hydropower potential. Installed hydropower capacity in the United States is about 70,000 MW—in Nepal it is less than 600 MW.

Infrastructure-rich developed countries focus appropriately on management reforms, but developing countries must simultaneously improve the way in which water and water services are managed—and invest in developing priority infrastructure.



Messages

Developing countries must simultaneously improve water management and invest in developing infrastructure.



Messages

Practice in the richest countries is still very far from ideal. And the gap between principle and practice is wide in developing countries, especially for sound economic management.

Principled and pragmatic reforms

The main management challenge is not a vision of integrated water resources management but a principled (providing guidance on what needs to be done) and pragmatic (understanding that the art of reform is the art of the possible in specific circumstances) approach for improvement

The "Dublin Principles," forged for the 1992 Earth Summit, are widely accepted for sound water management. They state that water resources should be managed holistically and sustainably—ensuring participation and treating the resource as an economic good.

Despite agreement on these principles, practice in the richest countries has improved only slowly—and is still very far from ideal, especially for managing water as an economic good. And the consultations done for this Strategy showed that the gap between principle and practice is wide in developing countries, especially for sound economic management of a scarce resource.

The Strategy accordingly focuses on the basic economic principles. Sound resources management requires that users take into account both the financial costs of supplying services and the costs that their use of water imposes on others ("opportunity costs").

Financial costs

Pricing to cover financial costs is essential for two reasons. First, it provides the user with information on the cost of providing the service, inducing more considerate use than if it was free. Second, revenues from tariffs are the basis for maintaining existing and building new infrastructure.

Water and water services have traditionally been underpriced, resulting in inefficiency (and an inability to attract new investment) and inequity (since the poor are inevitably excluded). The political economy of pricing is quite different for local, non-tradable services (such as urban water supply) and for services (such as irrigation water) that are inputs into products traded globally. Market structures are severely distorted, primarily by the more than \$300 billion a year in subsidies that rich countries provide to their agricultural producers.

In urban water supply there is a clear movement toward broad application of the user pays principle, with positive results in efficiency, accountability, and the ability of utilities to serve the poor. In irrigation, too, there is movement toward modern forms of organization and financing, in which user payments become the centerpiece for transparent, accountable relations between providers and users. As distortions in global agricultural markets are reduced, the impetus for development of "normal" arrangements in irrigation services will increase.

Opportunity costs

The use of water, however, entails not only financial costs. It also means that when one person consumes water, other potential users may be denied the opportunity and

value of such use. In ensuring that water is allocated and used efficiently, it is essential that there be institutional arrangements for ensuring that these "opportunity costs" are taken into account. Here the central challenge is the development of a legal and enforceable system of water rights. Once established, such rights give rise to a series of fundamental and healthy changes.

First, those requiring additional resources (such as growing cities) will frequently be able to meet their needs by acquiring the rights of those who are using water for low-value purposes.

Second, there are strong incentives for those using water for low-value purposes to voluntarily give up their rights, making reallocation both politically attractive and practical.

Third, establishing formal water rights gives rise to strong pressures to improve the data required to manage the resources.

Fourth, establishing formal water rights reduces the pressures of a "race to the bottom," since those who have rights have a powerful interest in sustaining the resources.

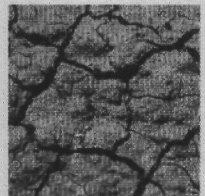
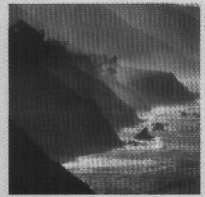
There is no unanimity on the concept of water rights, for some see it as an unhealthy commodification of a public good. Nor is it simple to introduce rights-based systems for a fugitive resource in administratively weak environments with deep cultural implications. But there has been substantial progress in

recent years (in Brazil, Chile, Mexico, and South Africa). And there are local pressures (villagers who store rainwater in Rajasthan) and international pressures (between the United States and Mexico) to define the rights to use an ever-scarcer resource.

Progress in implementing the Dublin Principles takes place one step at a time, heavily conditioned by broader political and economic realities. Accordingly, this Strategy reaffirms the Dublin Principles (ecological, institutional, and economic) but moves the focus to implementation—to developing realistic, sequenced, and patient reform processes adapted to local realities.

A commitment to principled pragmatism

Principled pragmatism means, first, that economic principles such as ensuring that users take financial and resource costs into account when using water are very important and, second, that solutions need to be tailored to specific, widely varying natural, cultural, economic, and political circumstances. The art of reform is in picking the low-hanging fruit first, not in making the best the enemy of the good. It recognizes that the broader economic and fiscal and governance reforms often trigger reform opportunities in the water sector. It also recognizes that reform processes are always political and thus that politicians who are willing to lead reform processes must be supported.





Messages

Developing countries need to make large investments in infrastructure of all scales, ranging from local rainwater harvesting structures, to major infrastructure such as dikes, canals, dams, and interbasin transfers. These investments need to follow good technical, economic, social, and environmental practice.

Investing in infrastructure

Most developing countries have inadequate stocks of hydraulic infrastructure, such as dikes and dams, and face daunting financial challenges in developing such stocks. The World Bank needs to assist countries in developing and maintaining appropriate stocks of well-performing infrastructure.

The historical challenge of water resources management has been the reconciliation of human needs for predictable and regular flows of water with the variable patterns of precipitation and streamflow. The challenge is greatest where average flows are especially low and where variability is high.

Societies have long developed structural and non-structural mechanisms for attempting this reconciliation, with two main lessons. First, infrastructure (dams, levies, and canals) is critical. Second, infrastructure investments need to be complemented by previously neglected nonstructural investments (in watershed management, land use planning, information and systems management). The emphasis in infrastructure-rich industrial countries is now heavily and appropriately focused on non-structural solutions.

Major challenges

First, many developing countries have stocks of water infrastructure that are a small fraction of those in climatically similar industrial countries (figure 4). Developing countries need to make large investments in infrastructure of all scales, ranging from local rainwater harvesting structures, to major infrastructure such as dikes, canals, dams, and interbasin transfers. These investments need to follow good technical, economic, social, and environmental practice.

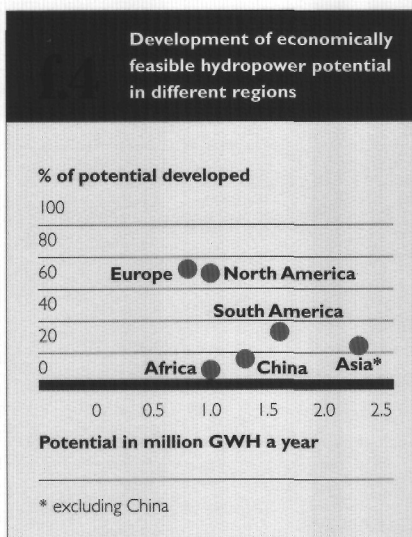
Second, they also have to invest simultaneously and heavily in non-structural management solutions. Most developing countries have understood this and are now doing so. Such efforts range from the massive efforts at watershed management in the Upper Yangtze catchment in China to the development of improved hydrology data in India, to elimination of water-using invasive alien plants in South Africa.

Third, global change accentuates the underlying imbalances between human demands and natural hydrologic patterns, making the task of developing an integrated package of structural and non-structural tools more urgent.

World Bank investments

World Bank investments in non-structural solutions are increasing rapidly. For example, Bank investments in watershed management, are projected to reach about \$300 million a year in the next few years. But World Bank involvement in major hydraulic infrastructure has declined substantially over the past decade, in large part due to concerns about social and environmental impacts.

In developing the new Strategy, it was apparent that this de facto withdrawal needed to be reconsidered, for four reasons.



First, there have been improvements in recent decades in the way in which the social and environmental aspects of dams and other major water infrastructure have been addressed, and developing countries are committed to continuing improvement.

Second, major water resources projects often form the basis for broad regional development, with significant direct and indirect benefits for the poor (and others). In India, for example, only 26% of people living in districts that have benefited from such projects are poor, in contrast to 69% in districts that do not so benefit.

Third, as water scarcity becomes more acute in many countries, the costs of water infrastructure are rising rapidly. Many countries are having to invest in inter-basin transfer schemes, with price tags of billions and even tens of billions of dollars. An analysis of World Bank "repeater" water supply projects shows that the cost of bulk water for the future project is often two to three times greater than that for the previous project. The World Commission on Water has estimated that investments in water infrastructure in developing countries need to increase from the current level of about \$75 billion to \$180 billion a year over the next 25 years.

Fourth, among the governments of developing countries there is now a broad consensus that while public funds have been and will remain indispensable, the required water infrastructure cannot be built with public

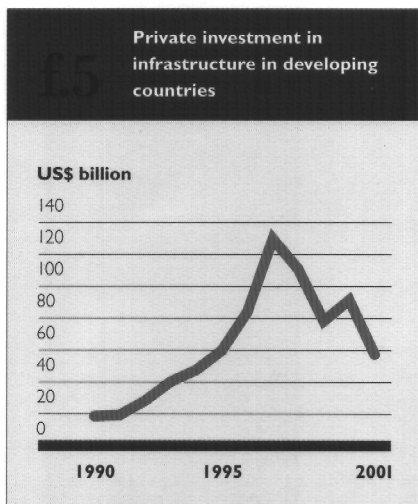
funds alone. The private sector has an important complementary role. The Monterrey Conference on Development Financing highlights "a need for the relevant international and regional institutions to increase their support for private foreign investment in infrastructure." Over the past decade there has been a major change in the role of private financing of infrastructure in developing countries. Starting from a low base in 1990, the private sector has invested up to \$130 billion a year in infrastructure in developing countries over the past decade.

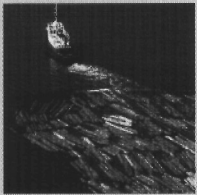
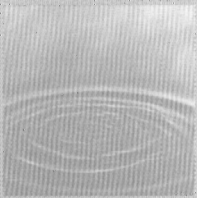
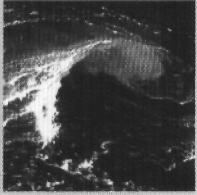
A closer look shows that levels of private investment have declined dramatically in recent years (although the overall annual level remains three times that of annual World Bank lending for all sectors). Furthermore, only a small proportion of private investment in infrastructure went into water-related infrastructure—about 5 percent into water and sanitation and another 5 percent into hydropower, concentrated in low-risk economies in East Asia and Latin America.

Attracting private investment will remain very important for many developing countries, and facilitating such investment will remain an important task of the World Bank. But most financing of water infrastructure will continue to come from public sources.

Why the Bank must be engaged

As water challenges grow in scale and complexity, the Bank is perceived as one of the few institutions that can provide integrated support on the macroeconomic, financial, technical, social, and environmental dimensions. Borrowers find that the Bank is unique in performance, knowledge, convening power, and relations with almost all riparian countries. It combines knowledge and financial resources. It can engage at all scales—local watershed, city, irrigation district, river basin and aquifer, country, regional—with the ability to integrate them. The World Bank, the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA) are also indispensable in attracting much-needed investment by the private sector.





By disengaging from difficult, complex issues, the Bank could be losing its credibility as a full-service investment and knowledge partner. If the Bank is to remain a credible knowledge institution, it must engage in a full range of water infrastructure and management activities in countries that have investment choices since it is often experience in these countries that is relevant to poorer countries.

**Affirmative engagement with risk—
a new business model**

Affirmative engagement with risk has emerged as a major challenge for the World Bank in water, forestry, mineral resources, and other areas. Consultations in the course of this and other strategies have shown that there are strong concerns from governments, the private sector, and many Bank staff that when development risks are high and Bank engagement is particularly valuable and important. The Bank must ensure that it is a risk mitigator, not a risk multiplier. There is also a concern that the Bank has focused

largely on "errors of commission" (risks of engagement) and paid less attention to the vital "errors of omission" (risks to people of non-engagement by the Bank).

A central part of the new Strategy is that the World Bank will re-engage with high-reward/high-risk hydraulic infrastructure, using a more effective business model. This new business model, to be followed by both the Bank and IFC, puts development impact first. It assesses the development impact of both engagement and non-engagement by the Bank. It considers the rights and risks of those directly and indirectly affected by such projects. It ensures that the objectives of the safeguard and other operational policies are respected, while focusing attention and resources on safeguards that are material in particular circumstances. It gets buy-in from all levels of Bank management by treating such projects as corporate projects from the start. It rewards and supports staff who manage such projects. And it aims at transparent, crisp, time-bound, predictable decisions.

Programs of support

Tailoring the 1993 Policy and the 2003 Strategy to country circumstances

The 1993 Policy Paper and this Strategy provide broad principles for World Bank engagement, not inflexible prescriptions. What is appropriate in any particular country or region will involve adaptation of these general principles to specific economic, political, social, cultural and historical circumstances.

An important new instrument in this Strategy is the "Country Water Resources Assistance Strategy," which will pull together three strands.

- The specific water resource challenges and development opportunities in a particular country at a particular time.
- The Country Assistance Strategy that the government and the World Bank have agreed on as a framework for overall engagement.
- The broad principles articulated in the World Bank's 1993 Policy Paper and in this Strategy.

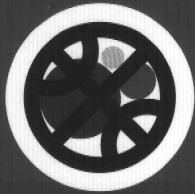
The resulting Country Water Resources Assistance Strategy will provide an explicit program of Bank lending and non-lending support in water. That program—consistent with the country's Poverty Reduction Strategy (where relevant) and the Country Assistance Strategy—will govern the Bank-country partnership in water for the next three years.

The following examples show how this Strategy and the central idea of "principled pragmatism" are likely to influence the Bank's activities in water resources management. They show that the challenges facing different countries and regions vary widely—and that the appropriate Bank support for management and development also varies widely.



Messages

“An important new instrument in this Strategy is the “Country Water Resources Assistance Strategy,” which will provide an explicit program of Bank lending and non-lending support in water and will govern the Bank-country partnership in water for the next three years.



Country applications

What leading politicians and professionals in Brazil want is World Bank engagement—sometimes through advice, sometimes through lending too—in the difficult issues now facing Brazil. The World Bank is really needed for its ability to link the technical issues with the macroeconomic, financial, environmental, and social ones, and for its ability to mobilize knowledge gained from global experience.

Brazil

The eighth largest economy in the world, Brazil has strong domestic capacity in managing water services and resources. During the past decade the country has adopted unprecedented reforms in the legal and institutional framework for water resources management at the federal and state levels. These reforms, based on the Dublin Principles, were passed by Congress after broad consultation with civil society and political representatives. The World Bank has been a key partner of the government in advancing the reform agenda and has a country strategy that builds on its comparative advantage and value added.

Leading politicians and professionals in Brazil emphasize that the value of the World Bank is not in dealing with the routine and the mundane. What they want is World Bank engagement—sometimes through advice, sometimes through lending too—in the difficult issues now facing Brazil. These include major hydraulic infrastructure projects, such as the proposed interbasin transfer out of the São Francisco River in the Northeast, the “water highway” up the Paraná River that is vital for exporting agricultural products from the interior, and the further development of hydroelectric power in the Amazon Basin. It is here, in the eyes of many leading Brazilian thinkers, where the World Bank is really needed—for its ability to link the technical issues with the macroeconomic, financial, environmental, and social ones, and for its ability to mobilize knowledge gained from global experience.

The World Bank and the government are refining their cooperation strategy (in the form of a Country Water Resources Assistance Strategy) in light of the main messages emerging from the Water Resources Sector Strategy. While the process is not yet complete, the main lines are clear. They include:

- Providing continued, demand-driven support through investment and advisory services to cutting-edge programs for water resources management in states undertaking water reforms. Efforts will concentrate on

the Northeast, which is both dry and poor, with an emphasis on defining rights and licenses and managing these at both state and federal levels.

- Supplying continued support through dialogue, sector work, and lending to complete reforms in the legal and regulatory framework for water and sanitation services, improve the efficiency of utilities, expand coverage to the poor, and reduce the alarming levels of water pollution in selected urban river basins.

- Providing major support for developing effective institutional arrangements and financing priority investments in a few stressed river basins. The support will probably focus on the multistate Paraíba do Sul River in the Southeast (where the main challenges are controlling pollution and protecting drinking water quality) and the multistate São Francisco River in the Northeast (where the primary challenges are managing quantity, managing the cascade of dams down the river, and dealing with the issue of interbasin transfers out of the river). Major issues will include the role of the federal and state governments, participation in the basin agencies, and allocation and management of consumptive and nonconsumptive water rights.

- Supporting the new National Water Agency (ANA) in a number of ways, including:
 - Linking support to ANA with support to reforming states as part of a “parallel track strategy” of federal and state initiatives.
 - Supporting ANA in identifying roles for states and the federal government in defining and administering water rights.
 - Supporting ANA and the states in developing the information and human resources required for more effective management of water resources in priority basins.
 - Helping to pilot the “output-based aid” model for pollution control. This will include collaboration with ANA in monitoring experience and improving business practices in this innovative program.
 - Supporting ANA in developing its strategic planning and business management approaches.

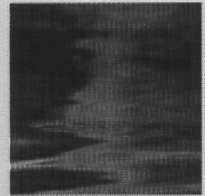
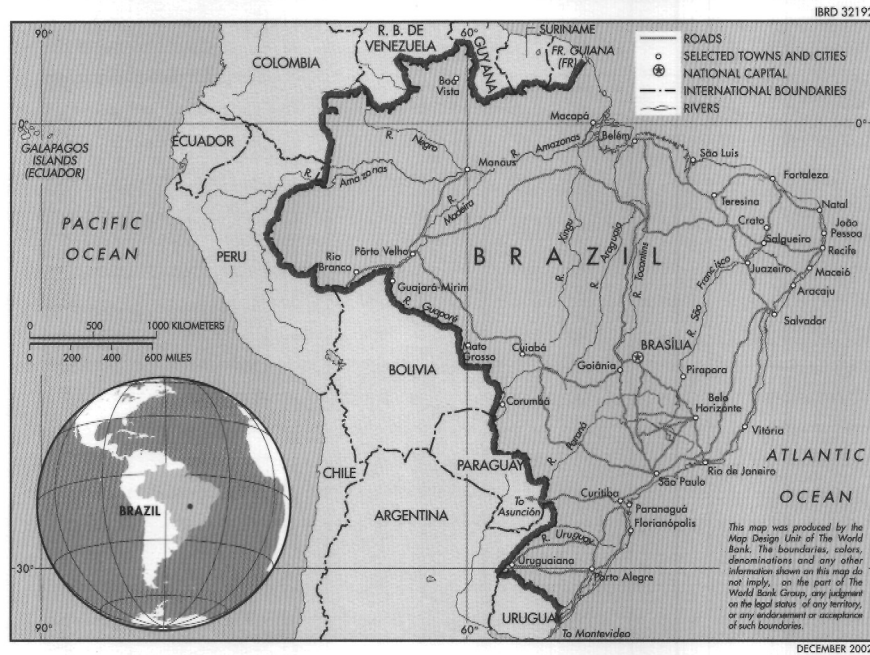
The World Bank's experience in Brazil, like that in the other countries featured here, helped shape the main messages of the Water Resources Sector Strategy. This successful experience highlights the importance of:

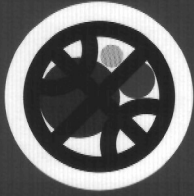
- Developing sequenced, prioritized approaches to dealing with the daunting set of challenges in managing water services and resources.
- Giving priority to acting where there is a strong demand for change and supporting political reformers willing to implement that change.

- Starting with the low-hanging fruit and then, with credibility and experience, moving on to bigger challenges.

The experience in Brazil also brings to the fore the issues of development risk and reputational risk—and the imperative that the World Bank stay engaged, even in middle-income countries, in the twin challenges of management and development.

Brazil





Country applications

The challenges of managing and developing water resources in Central Asia are daunting, and the solutions do not lie in the water sector alone. Progress will require concerted, integrated action across a wide range of areas—water-related sectors but also social sectors, governance, and macroeconomic and fiscal policy. To be an effective partner, the World Bank must use both analytic and investment tools.

Central Asia

The countries of Central Asia face water scarcity. Two rivers, the Amu Darya and Syr Darya, serve as the principal sources of water, especially for the downstream countries of Uzbekistan, Turkmenistan, and (southern) Kazakhstan, which have largely desert climates. Irrigation has been practiced in Central Asia for millennia, but the irrigated area almost doubled between 1950 and 1980, diverting large amounts of water from the rivers and reducing the water flow into the Aral Sea by about 80 percent.

About 35 million people depend in one way or another on irrigated agriculture. But the effects of irrigation on the Aral Sea, whose surface area has declined by more than 50 percent over the past 40 years, have meant economic losses for the 3.5 million people living near the sea—from declining fisheries, loss of wetlands, and the health effects of blowing salt and highly saline shallow groundwater.

The countries of Central Asia face a unique set of challenges in developing and maintaining an appropriate stock of water infrastructure. For the most part the problem is that there is more infrastructure than can be maintained. In irrigated areas the World Bank has thus worked with borrowers in applying immediate “band aids” to critical infrastructure, but also on medium-term strategies for “triage”—to determine which infrastructure (both supply and drainage) can and should be maintained, and which abandoned.

Recent analysis suggests that rehabilitating systems, along with managing demand, could reduce crop water requirements by more than 30 percent. It also shows that most serviced areas can be irrigated economically, even if users pay the operation and maintenance costs for water and drainage infrastructure. But water prices can be increased only when water delivery is reliable and when farmers can receive a fair market price for what they produce. Agriculture is now effectively taxed, with price and trade restrictions on several important commodities. So

the key is to see water pricing reforms as part of a larger package of institutional reforms and infrastructure investments, with attention to sequencing, prioritization, and mechanisms for effecting transitions.

Urban water and sanitation utilities also face unique infrastructure challenges, inherited from the former Soviet Union. Domestic water supplies were heavily subsidized, and per capita use was extraordinarily high (typically around 400 liters per capita a day) and wasteful. As a result, both water supply and wastewater treatment plants were often overbuilt. As water use (and sewage production) has fallen to about 100 liters per capita a day, large overcapacity in treatment has emerged, and major pieces of infrastructure need to be mothballed or even abandoned.

For dams, the primary challenge is again to maintain the existing stock at a safe and serviceable level. The World Bank has been working and will continue to work with countries to ensure the safety of dams, including that on Lake Sarez in Tajikistan, now the highest dam in the world. Another challenge is monitoring and disseminating data on river flows, precipitation, and temperature. With the decline in public funding in the past decade, hydro-meteorological equipment has become outmoded and data systems are no longer reliable. Existing data series suggest that Central Asia will be affected by climate change, with temperatures, precipitation, and net evapotranspiration rising and extreme weather events becoming more frequent.

So the challenges of managing and developing water resources in Central Asia are daunting, and the solutions do not lie in the water sector alone. Instead, progress, as slow and difficult as it will be, will require concerted, integrated action across a wide range of areas—water-related sectors but also social sectors, governance, and macroeconomic and fiscal policy. To be an effective partner, the World Bank must use both analytic and investment tools. And it must foster

internal and external partnerships, to promote consistency in the actions of multiple partners.

Reflecting all this, the World Bank's work in Central Asia includes:

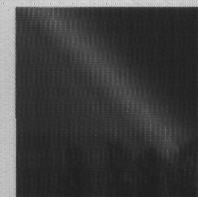
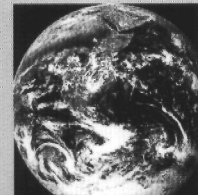
- Work on a regional water strategy, building on the World Bank's Water Resources Sector Strategy and regional experience.
- Subregional analytic and advisory work in Central Asia focusing on the energy-water nexus, water and salt strategies, water and wastewater strategies in industrial areas, and the social, economic, and environmental feasibility of rehabilitating irrigation.
- Gradually increased lending for the rehabilitation of irrigation and drainage infrastructure, while staying within the Central Asian countries' macroeconomic and borrowing constraints.
- Support for restoring wetlands, grasslands, and fisheries in the delta areas.
- Continuing work to mitigate the effect of the Aral Sea environmental catastrophe by improving living conditions and reducing poverty for the millions living near the sea.
- Support to water user associations for managing on-farm irrigation and drainage infrastructure and to efforts to strengthen the financial management of water delivery

institutions and increase its transparency.

- Lending for improved soil and water conservation and watershed protection in rain-fed agricultural areas, rangelands, and forested areas.
- Continued assistance to address the legacy of water pollution from mining and industrial wastes.
- Assistance in restructuring water utilities in major urban areas, to improve service and move toward financial viability.
- The use of advisory and investment tools to facilitate benefit sharing on international rivers.

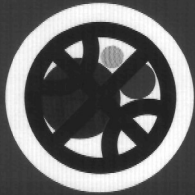
The World Bank's ongoing and planned work in Central Asia both supports and feeds into the main themes of the Water Resources Sector Strategy. In Central Asia, as elsewhere, the challenge is to use both management and infrastructure instruments, with the second largely confined to developing and implementing a strategy for maintaining an appropriate stock of infrastructure.

The task, in the economy and in water management, is not just to identify where to go, but to identify a set of policies and actions that can help manage the very difficult transition in Central Asian countries.



Central Asia





Country applications

An integrated river basin approach to water management is a central principle in the Indian National Water Policy and in the water policy of most Indian states. It is a task that will take decades of persistence to complete, as well as a sequenced, prioritized program of actions tailored to the political realities as they evolve. The World Bank is a central partner in advancing this ambitious and vital agenda, providing both advice and investments.

India: Andhra Pradesh

Investments in managing and developing water resources have done much to promote development, food security, and poverty reduction in India. They have led to an enormous increase in the production of food and food grains, benefiting the many poor people who are net food purchasers. They have helped reduce poverty, with poverty rates in irrigated districts only about a third those in nonirrigated districts. And they have had large multiplier effects in the economy.

In the state of Andhra Pradesh the challenge is to assist the state in its efforts to improve the management and development of its water resources. An emerging global software center, Andhra Pradesh has made good advances in collecting data, but lags behind in interpreting and using those data for decisionmaking. The challenge includes developing a legal, regulatory, and institutional basis for making reallocation of water more flexible and voluntary and thus calls for careful attention to the sensitive issue of users' water rights. It also means developing an approach to incorporating ecological requirements (for example, water releases into estuaries to sustain mangrove swamps and fisheries).

These are key elements of an integrated river basin approach to water management, a central principle in the Indian National Water Policy and in the water policy of most Indian states. This approach fits well with the SMART (Simple Moral Accountable Responsive Transparent) philosophy of the government of Andhra Pradesh. But it is a task that will take decades of persistence to complete, as well as a sequenced, prioritized program of actions tailored to the political realities as they evolve. The World Bank is, and is likely to remain, a central partner in advancing this ambitious and vital agenda, providing both advice and investments.

Many of the infrastructure challenges in India relate to the need to use existing infrastructure more effectively and to ensure the environmental and financial sustainability of that

infrastructure. That said, challenges remain that relate to the development of new resources, as in Andhra Pradesh. The waters of one of the state's two major rivers (the Krishna) are fully developed, but the other major river (the Godavari) has lots of water. The problem is an elevation separation of about 300 meters from the place where the water is available to the place where there is land and a major demand for water (with entitlement issues going back to preindependence and with water scarcity contributing to security issues).

A simple economic analysis tells the state (and the World Bank) that developing these water resources for irrigation and hydropower is not the best use of limited financial resources. But the political and security imperatives are great. So while the state has decided not to build major dams (because of forest submersion and resettlement issues), it will probably proceed with some form of lift irrigation from the Godavari River. The World Bank can and probably should work with the state in exploring options (new technologies, staged development, pilot schemes) that will meet the real political and security needs while maximizing sustainability and limiting damage to the state treasury.

The World Bank is actively engaged in providing knowledge and advisory services in Andhra Pradesh—for the water components of the state's *2020 Vision*, on benchmarking and options for irrigation reform, on utility reform, groundwater management, water rights administration, and ecological flows. While further investment support has yet to be discussed, a "next generation" package might include:

- A sectoral adjustment-type approach in which the World Bank finances part of the government's program of reforms and investments.
- A strong emphasis on a carefully sequenced and prioritized program of institutional reforms, efficiency enhancements, and resource management measures both

within the principal sectors (irrigation, water utilities) and for overall water resources management.

- A package of high-priority, well-justified (but not narrowly justified) investments that would include modernization of major irrigation systems and some new investments, including possibly a phased, piloted lift scheme for the Godavari.

The World Bank's experience in India powerfully illustrates the central messages of the Water Resources Sector Strategy:

- Water resources infrastructure can provide the basis for sustainable economic growth and poverty reduction and can even play an important part in improving relations among riparian countries.

- Development of water resources must be accompanied by management reforms.

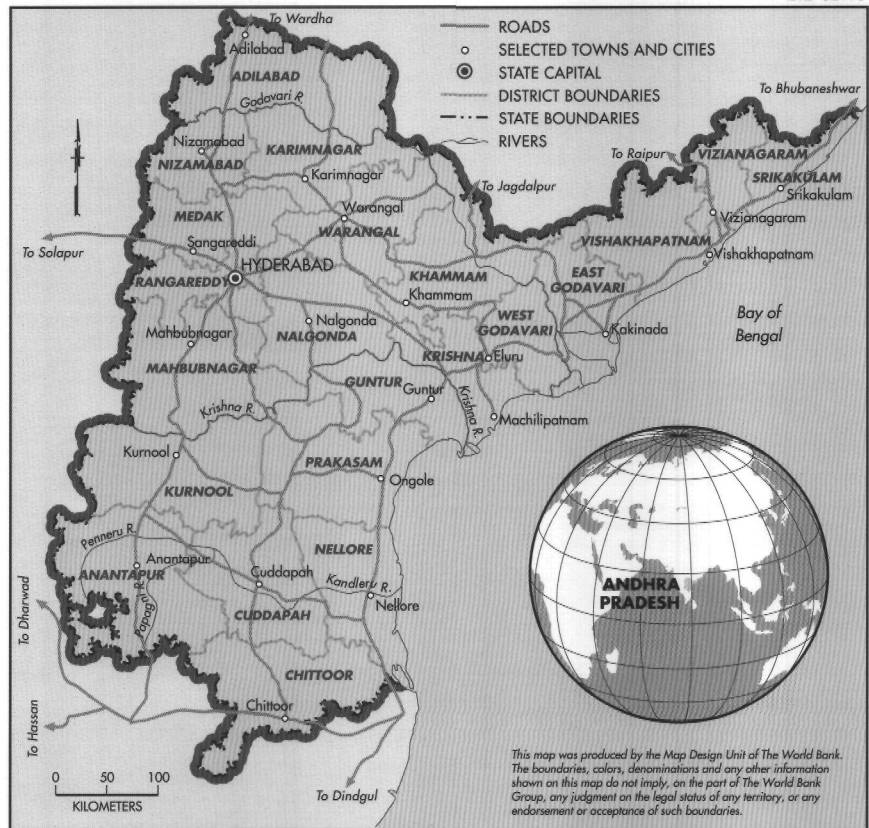
- Reforms are difficult and can be undertaken only when there is demonstrated local political leadership.

- When there is such leadership, the World Bank can play a vital role by bringing new ideas to the table and investing in ways that make the reforms durable.

- Reforms are neither simple nor achieved in a day. The art of reform is defining a sequenced and prioritized set of reform actions, picking the low-hanging fruit first, not making the best the enemy of the good, and ensuring an appropriate incentive system for political leaders who take the risks inherent in reform.

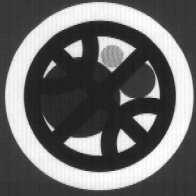
Andhra Pradesh, India

IBRD 32198



FEBRUARY 2003





Country applications

The World Bank has developed a multitrack strategy of engagement that can be considered in many ways a best practice application of the main strands of the new Strategy. The first track involves helping Nigeria to move rapidly to address the most politically visible issues in innovative ways. The second track involves addressing a series of less politically explosive water service challenges. The third track involves laying the groundwork for solutions to the longer-term water management challenges.

Nigeria

The World Bank disengaged from Nigeria during its years of military rule in the 1990s. But with the return of democracy the World Bank has reengaged. This reengagement opens a special and daunting set of challenges for the World Bank, one in which the two-way link between water and politics (a link present everywhere) is particularly prominent. In the water sector the most immediate and visible problem is that of urban water and drainage services, especially in Lagos.

Water institutions—the agencies for managing irrigation, domestic and international rivers, and urban and rural water supply and sanitation—have performed extremely poorly in recent years. And as the population grows and urbanizes, the challenges in the coming decades will be immense.

In response to these challenges, the World Bank has developed a multitrack strategy of engagement that can be considered in many ways a best practice application of the main strands of the new Water Resources Sector Strategy. The first track involves helping Nigeria to move rapidly to address the most politically visible issues in innovative ways. The performance of public utilities has come to symbolize the poorest aspects of governance in Nigeria. Lagos is the test case; neglected and close to collapse, the publicly run Lagos State Water Supply Corporation holds the dubious distinction of having the highest recorded level of unaccounted-for water in the world. Only 4 percent of its water production capacity goes toward the creation of revenue.

The second track of the World Bank's strategy for water management in Nigeria involves addressing a series of important, though less politically explosive, water service challenges. These include developing sustainable solutions for the formidable problems in urban sanitation and rural water and sanitation and following up on the World Bank's successful family-based, *fadama* groundwater irrigation project. The Bank might also address the large public sector

irrigation projects run by the "river basin development authorities," where less than 10 percent of the command area of 400,000 hectares actually gets regular supplies of irrigation water.

The third track involves laying the groundwork for solutions to the longer-term water management challenges in Nigeria. This includes working with the federal government on rationalizing institutions, reforming legislation, and developing capacities for strategic planning in water resources management. It also includes supporting the development of modern stakeholder-based institutions for river basin management.

As in other countries, this work will require starting where there is a strong demand for reform. One place might be the conjunction of irrigation, urban water supply, and ecological flows for floodplain agriculture in the Hadeija Jamaare Basin. Another important area is micro-watershed management, where the World Bank has recently initiated an innovative first project with a strong focus on poverty. Yet another is the set of international water issues relating to the management of the Niger and Benue rivers and the Lake Chad Basin, where the World Bank is already playing an important facilitating role (with the assistance of funding from the Global Environment Facility). All these endeavors have appropriately focused on raising awareness and building capacity.

The political realities in Nigeria pose big challenges in designing and implementing World Bank activities, especially those involving investment in infrastructure. Such investments raise complex environmental, social, and governance issues and thus create high reputational risks. If the World Bank engages in such activities and "cuts corners," there will inevitably be mistakes and blots on its reputation—all the more likely in a country with many institutional limitations and a history of corruption. But if the World Bank chooses to require full comfort before engaging, progress would be slow, and the opportunity cost in delayed development benefits for

Nigerians would be great. And the World Bank might miss the window of opportunity to contribute in the critical areas where the effectiveness of civilian rule will be judged.

In the past few years the World Bank has dealt with the challenges in Nigeria imaginatively and, in many ways, courageously. Its strategy for engagement with Nigeria largely represents best practice under extremely challenging circumstances, because the World Bank:

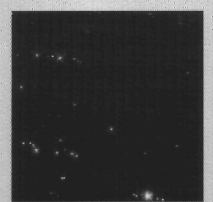
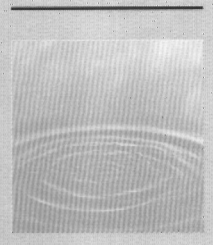
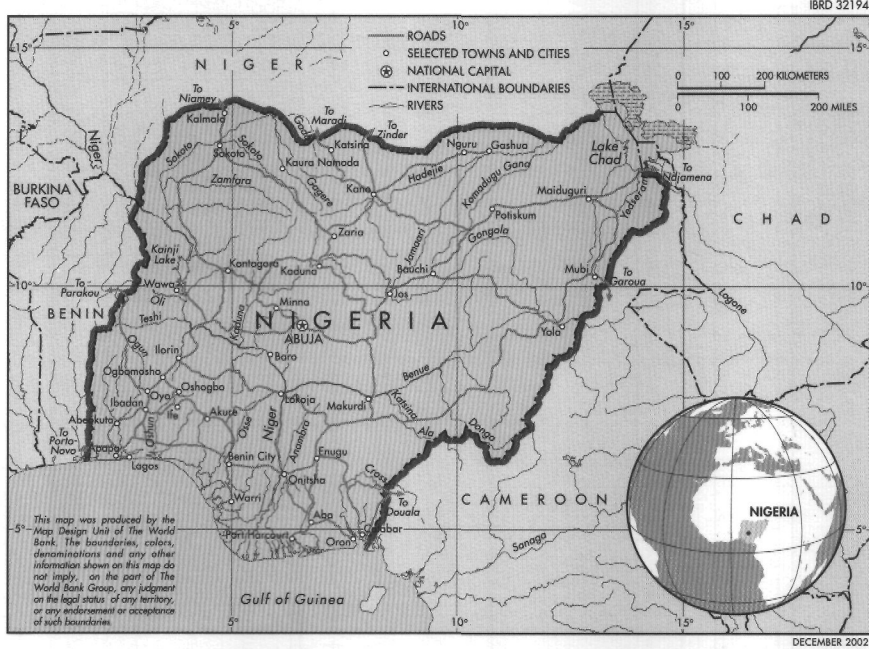
- Has developed a prioritized, sequenced, and multitrack approach.
- Has proceeded, where possible, by building on the formidable grass-roots capacities available (for example, in the *fadama* irrigation project and the watershed management project).

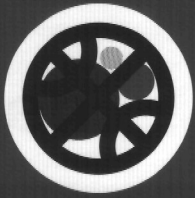
- Has realized that without fundamental building blocks—sound institutions at the service level—there can be no progress on the more difficult resource management issues.

- Has realized that the best must not be the enemy of the good—and therefore proceeded with some radical changes, such as through the concession contract for Lagos. Meanwhile, it has remained aware of the significant room for improvement in governance and regulatory conditions, and ready to support the government in identifying and managing the risks that will emerge in executing the contract.

- Has proceeded on parallel tracks in building the knowledge and institutional base for dealing with the longer-run resource management challenges in Nigeria and in the international basins of which Nigeria is a part.

Nigeria





Country applications

Yemen faces one of the most dramatic water management challenges in the world. Groundwater is being pumped at a rate approximately four times that of natural recharge. The World Bank needs to be realistic about the nature of the challenge in Yemen and about what change is possible in what time frame.

Republic of Yemen

Yemen faces one of the most dramatic water management challenges in the world. Most of the population lives in highland areas and depends almost entirely on groundwater for domestic, agricultural and industrial supplies. Over the last twenty years a groundwater revolution has taken place, with the widespread adoption of tubewell technology. This revolution has brought prosperity to rural areas but is not sustainable. Groundwater is being pumped at a rate approximately four times that of natural recharge. This situation has dramatic short-term results, with some previously productive valleys already abandoned, with pumping depths already great and increasing constantly, and with a sharp rise in conflict between users competing for disappearing resources. But in the long term the situation is even more daunting, for there is simply no way people can live where they do unless water is managed more sustainably.

Compelling as the demographic and hydrological imbalance is, the odds are heavily stacked against effective action. This is so for several reasons. First, groundwater management is a classic "open access resource management problem," which poses major difficulties even in the best of institutional environments. In arid parts of developed countries, for example, where there is excellent hydrogeological information, where decision support systems are available, where property rights are clearly defined and enforced, and where there are strong local organizations, it still often requires the heavy hand of the courts to force actions that will lead to sustainable groundwater management.

In Yemen none of these "prerequisites" are in place. The notion of "national management and national legislation" is an unrealistic one in a country where there are severe capacity constraints in all sectors. This means that groundwater management necessarily has to be done aquifer by aquifer, at the local level. And here, too, the situation is difficult. Hydrogeology is a complex and frequently misunderstood subject. Clear, accurate, and practical information on the hydrogeological conse-

quences of different actions is available in only a few select settings in Yemen. And where some information is available, the situation presents a set of formidable challenges, including inequitable use of existing resources (with a handful of large landowners typically responsible for most of the abstractions), an absence of formal property rights, and a lack of local institutional structures for managing the new type of conflicts that the tubewell has created.

Over the past decade the World Bank, together with other donors, has come to play an important role in the massive task that lies ahead of Yemen. The starting point for the World Bank, following the 1993 Policy Paper, was the formulation of a region-wide Water Sector Strategy for the Middle East and North Africa, a task that was completed in 1995. The next steps included the formulation of a country water strategy for Yemen.

Given the hydrological, political, economic, and social complexity of water management in Yemen, this strategic view was of particular importance and value. The water strategy also succeeded in highlighting the role of water in the government's development plans and, consequently, in the World Bank's Country Assistance Strategy.

Coincident with the formulation of the Yemen water sector strategy, the World Bank supported a set of pilot activities on key issues. These activities were undertaken with a sense that they would be first steps in a long process of learning and adjustment. These first-generation pilot projects included efforts at:

- Improving the efficiency of water use in agriculture (in particular, a focus on reducing real losses—water lost through evapotranspiration, rather than paper losses—water that percolates down into the aquifer).
- Reinforcing strong, traditional, community-based management systems for managing flash flood flows in the coastal rivers.
- Improving the efficiency of urban water supply.

- Starting to address the enormous task of sustainable management of selected aquifers.

One of the universal lessons of water reform is that it takes patience and persistence and is only achieved partially over the course of decades (witness the experience of developed countries). When effective management instruments are few (as is the case in Yemen), then even greater modesty, patience, and persistence are required. This is always difficult advice to convey, especially given the enormity and immediacy of the problem in Yemen.

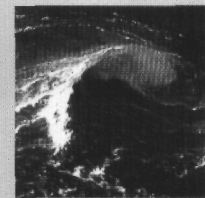
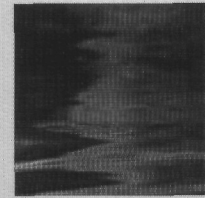
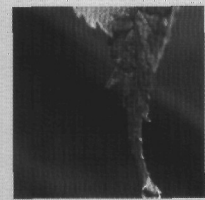
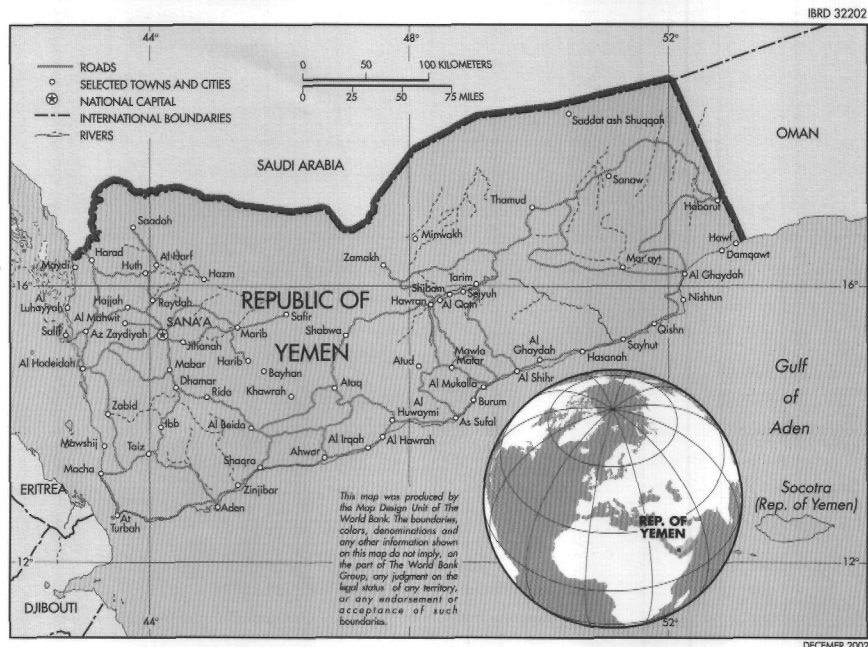
Most important, the Yemen experience has meant doing and learning and thinking and adjusting simultaneously. There has been vigorous debate within the World Bank on what can and cannot be learned from the first generation of World Bank-financed projects, and from the efforts of others. This is intrinsically a difficult process, especially for an institution with high aims and global standards, since it means acknowledging situations that are less than desirable and formulating options that may not be opti-

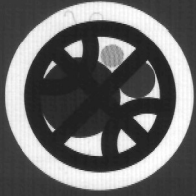
mum but correspond to the harsh realities of the country.

The water resources challenges of Yemen are an extreme case and shed unusually clear light on some of the central strategic questions that face the World Bank in the arena of water management. With respect to the central themes of this Sector Strategy, there are few issues relating to major water infrastructure, but many on minor infrastructure and, especially, the political economy of water resources management.

The World Bank needs to be realistic about the nature of the challenge in Yemen and about what change is possible in what time frame. Water management reform ideally derives from underlying factors such as participation and a market economy. While Yemen has made admirable strides in recent years, it still ranks near the bottom of the world tables for these indicators. It is therefore very unlikely that the water sector in Yemen will, in the foreseeable future, look anything like an ideal "Dublin-style" water sector.

Republic of Yemen





Country applications

When the World Bank commits to long-term, high-risk, high-reward undertakings like the Nile Basin Initiative, it must have a clear institutional mandate to fulfill the range of functions—in both policy and investment support—required by such a commitment.

The Nile Basin

Since 1996 the Africa Water Resources Management Initiative has sought to improve national water resources management through institutional and legal review and reform, emphasizing ownership and stakeholder participation, environmental sustainability, demand management, and cost-efficiency. Often the point of entry for discussions of reform has been a client's request for major investments in infrastructure. Where the perceived investment needs are vast, a review of current practices and options is generally called for.

Africa has great needs for investments in water infrastructure. The share of the population with access to potable water is lower than that in any other region. The variability in rainfall is roughly three times that in temperate regions, but many African countries have per capita water storage in reservoirs orders of magnitude smaller than that in industrial countries. And countries have low levels of water resources management capacity as well as infrastructure investment, both of which must be addressed for either to be truly effective.

Complicating matters, Africa has more international rivers than any other continent. The World Bank has received increasing requests to facilitate and support cooperative management of international water resources. These requests reflect its capacity both as a knowledge bank, with global experience in water resources management, and as an investment bank, able to underwrite the investments that will deliver the development benefits of international cooperation.

A clear example of the importance of such assistance in Africa is the Nile Basin Initiative, a cross-regional international water resources program supported by both the Africa and the Middle East and North Africa Regions of the World Bank.

Tensions over the control of Nile waters are long-standing obstacles to growth and development in the region—and conflict prevention and cooperative water resources

management are therefore central development challenges for the 10 countries sharing the Nile River.

The Nile Basin Initiative has a strategic action program guided by a shared vision "to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources." The program includes a basinwide "shared vision program" of technical assistance projects designed to lay the foundation for cooperative action and two subbasin investment programs that will promote poverty reduction, economic growth, and better environmental management. While the initiative's overarching goals are conflict prevention, poverty reduction, and environmental management—not simply the construction of major water infrastructure—the initiative's shared projects will deliver its most apparent and immediate development impacts.

The Nile Basin Initiative is led by the Council of Ministers of Water Affairs of the Nile Basin States (Nile-COM), supported by a small secretariat based in Entebbe, Uganda. At the request of the Nile-COM, the World Bank is facilitating discussions among the riparian countries, backstopping the Nile Basin Initiative's technical work, and coordinating international support for both the initiative and the investments it identifies. The World Bank has a comparative advantage in this role because of its strong working relationships with many of the riparian countries, its development focus, its technical capacity, its political neutrality, and, importantly, its capacity to finance cooperative investment programs.

If it becomes difficult for the World Bank to provide this support—for example, because of the reputational risks of financing major infrastructure in the Nile Basin—its disengagement could undermine the Nile Basin Initiative. By disengaging from investment, the World Bank could erode riparian countries' confidence that their efforts will lead to real development gains, and donors' confidence

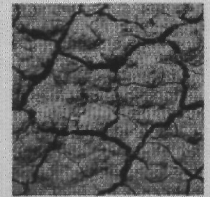
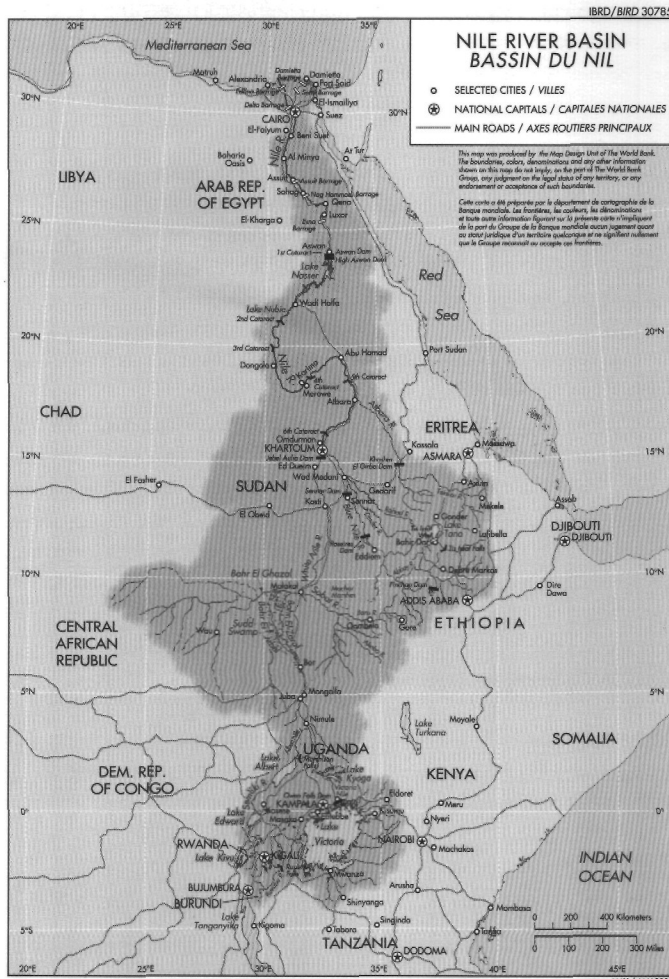
that the investments under the Nile Basin Initiative are sound.

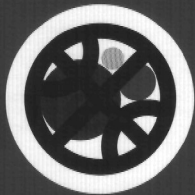
Some projects of the Nile Basin Initiative might find financing without significant donor involvement. But it is unlikely that all countries would be able to obtain funding, and the disparities in access to finance could increase tensions in the region. Moreover, the involvement of donor partners can increase the likelihood of best environmental and social practice.

Because of all these risks, when the World Bank commits to long-term, high-risk, high-reward undertakings like the Nile Basin Initiative, it must have a clear institutional mandate to fulfill the range of functions—in both policy and investment support—required by such a commitment.

The Water Resources Sector Strategy maintains an emphasis on the World Bank's knowledge-based support to water resources management and reform while reconfirming its commitment to support sound, environmentally sustainable, and cost-effective investments in water infrastructure. Implementation of the strategy will strengthen the effectiveness of the World Bank's support to water resources management in Africa—both in providing management and institutional support and advice and in financing infrastructure investments. Institutional support and investment finance are often linked in both project design and client relations.

The Nile Basin





Country applications

The World Bank needs to reengage as a partner in developing high-reward, high-risk water infrastructure, through a new approach that focuses primarily on the development risks of not being involved and that leads to crisper, more predictable decisions without compromising social and environmental standards.

What the examples show

The illustrative examples underscore the main messages of the Water Resources Sector Strategy:

- Most developing countries face simultaneous needs to improve the management of water resources and invest in developing water resources.
- Improving resource management is a task that is only partially accomplished even under the best of circumstances. It requires patience, persistence, and realism. It calls for greater attention to prioritizing and sequencing reforms. And it requires linking water sector reforms to broader political and economic reforms.
- The World Bank needs to reengage as a partner in developing high-reward, high-risk water infrastructure, through a new approach that focuses primarily on the development risks of not being involved and that leads to crisper, more predictable decisions without compromising social and environmental standards.
- Most important, better management and development of water resources are essential for environmentally and socially sustainable growth and for the reduction of poverty.

The World Bank's activities in water resources in any country will be the product of three factors: the water resources challenges in the country and the approach taken by the government, the overall framework governing the relationship between the country and the World Bank (as embodied in the Country Assistance Strategy), and the Water Resources Sector Strategy. Thus the Strategy's implications for the World Bank's work in a country will emerge only over time, in response to demand from borrowers and as part of a larger relationship.

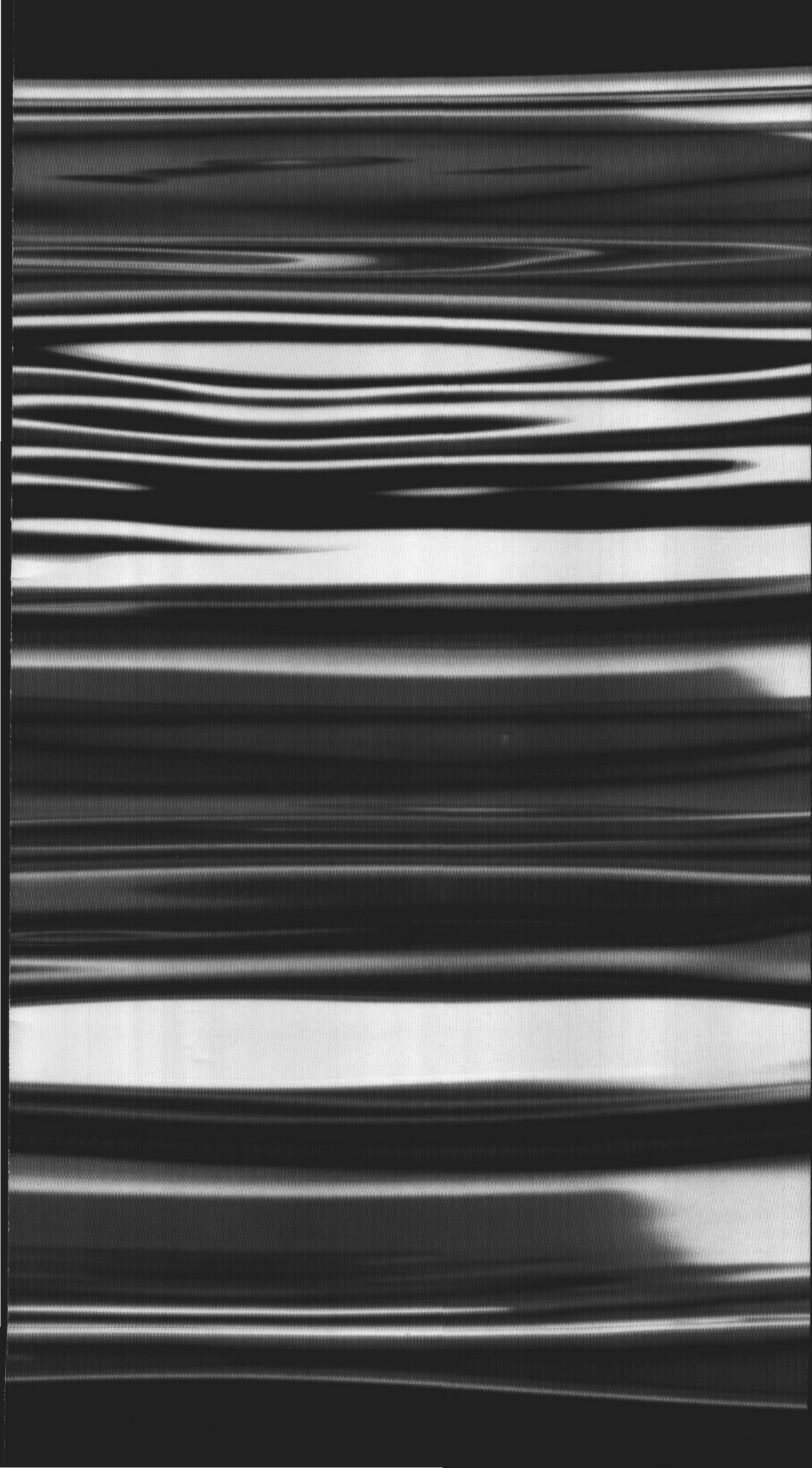
That said, the illustrative examples show how the broad themes of the Strategy are likely to play out in different contexts.

For water resources management, they show the importance of paying explicit attention to:

- The wide variation in the underlying challenges—natural, economic, political, and social—and the wide variety of starting points. It is these factors that define the appropriate ambition and pace of reform.
- The need to move away from slogans based on principles and focus directly on issues of political economy. That means close attention to prioritizing and sequencing reform actions, taking advantage of windows of opportunity opened by economic and political reforms, understanding that the best should not become the enemy of the good, and operating with patience and persistence.
- The need to see water resource reforms through an expansive lens, going well beyond hydrology to the political, social, and cultural underpinnings.
- The need to use the World Bank Group's comparative advantage by linking water reforms to broader reforms in governance, civil service, and financing.

For the development of water infrastructure, the illustrative examples show that:

- Most developing countries need to invest substantially in water infrastructure.
- The appropriate approach is not the old one of "development first, management later," or the equally unbalanced "management first, development later." What is required instead is a mix of investments in management *and* development.
- The World Bank must find more effective ways of becoming engaged if it is to have a seat at the table and to serve as a full-service advisory and investment partner to developing countries.



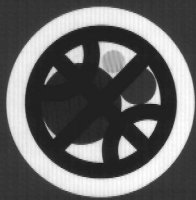
Edited, designed, and
produced by
Communications
Development Inc. and
their London design
partner; Grundy &
Northedge.

Photos from
Photodisc.



Messages

- I**
The new water
resources strategy
- 2**
The main messages
- 3**
The essentials
- 4**
What the strategy
adds
- 5**
The two challenges
- 6**
Principled and
pragmatic reforms
- 8**
Investing in
infrastructure
- II**
Programs of support



Country applications

- 12**
Brazil
- 14**
Central Asia
- 16**
India: Andhra Pradesh
- 18**
Nigeria
- 20**
Republic of Yemen
- 22**
The Nile Basin
- 24**
What the examples
show