MUMBAI

American Center Bulletin

APRIL

2006

WATER: PROBLEMS AND SOLUTIONS

BY KEVIN DOUGLAS

In their best-selling treatise, "India 2020: A Vision for the New Millenium," authors A.P.J. Abdul Kalam and Y.S. Rajan applied their copious talents to one of the simplest, yet momentous, of questions: what would it take for India to fully develop as a nation? Their resulting book – an encyclopedic survey of India's real-world accomplishments and aspirations – was a tour-de-force. India, the authors argued, lacked neither talent nor resources. The crucial ingredient, they concluded, was imagination: "A nation's progress depends upon how its people think."

Giving full credit to the breadth and boldness of Kalam and Rajan's analysis, a reader might yet wonder at the scant mention of a resource proving critical to India's present and future: water. No one will deny the importance of this most basic resource. The maker and breaker of civilizations in times past and today, water policy in India is on the verge of crisis. How it manages its resources in this area will affect its prosperity for decades to come. How big is the problem and what can be done?

The Problem

A few numbers will suffice. According to India's Ministry of Water Resources (MOWR), the total water resource potential of the country is estimated to be 1,953 billion km^3. Of this amount, only 1,122 billion km^3 can be utilized under current economic and technological conditions. At present, the amount derived from water resources which have been actually developed is only about 644 billion km^3 (about 57 percent of utilizable potential). If one thinks of the water supply as a bank, the last sum would be the amount someone could draw from.

India, at present, uses all of the water resources it has developed. As the size of the Indian economy increases, demand for India's water resources is expected to increase at a faster rate. According to the best MOWR estimates: India will require water resources in the amount of 694-710 billion km^3 by the year 2010; 784-850 billion km^3 by the year 2025; and 973-1180 billion km^3 by the year 2050. It's quite possible these estimates will prove too low.

Such numbers are troubling. As it developed, India's need for water increased geometrically. Per capita water availability, 5,277 $meters^3$ per year in 1955, is now around 1,600 $meters^3$ per year and still falling. At current rates of projected increase, India risks entering the territory of under 1,000 $meters^3$ per year by 2015 (the benchmark recognized by international organizations as "scarcity conditions"). The paradoxical situation is reminiscent of the riddles Akbar would pose Birbal. A modern-day emperor might ask his trusted advisor: "What policy might I undertake to prevent the nation's development from hastening its underdevelopment?"

A River Runs Through It

This challenge fortunately, has been taken up. Action to resolve India's water crisis is coalescing around three broad solutions. India is blessed with many rivers – as many as 12 are classified as major. The mightiest, the Ganga-Brahmaputra-Meghana system, accounts for more than 40 percent of the nation's water resources. Because the geographical distribution of India's surface water resources is wildly uneven (per capita water availability in the Brahmaputra and Barak basin is 16,589 $meters^3$, well beyond the needs of that region's population), India's water challenge, the advocates of one school argue, is simply to move resources from where they are not needed to where they are.

The Interlinking Rivers Project – a scheme to link India's many rivers and distribute these resources – would be one of the most ambitious water management projects ever attempted. The MOWR has completed feasibility studies which have identified over 30 points of possible connection. Its canals and aqueducts, if constructed, would run over 1,500 kilometers and connect rivers throughout the country (the California aqueduct, by contrast, is around 715 kilometers long). Vast amounts of water would be transported from areas of surplus to drier parts of the country.

If one simply applied the test proposed by Kalam and Rajan, one would readily concede the imagination and audacity of this plan. Judging by the politics surrounding the scheme during the past few years, however, its sheer boldness might prove to be its biggest nemesis. Water policy in India is set not just by MOWR but by 28 States and seven Union territories. Cost estimates on the low end have been placed at $100 billion (on the high end, twice that). The amount of time for completion has been estimated at between 10-50 years.

(Continued on page 2)

The American Center
4 New Marine Lines, Mumbai 400 020
Tel: 2262-4590; Fax: 2262-4595
E-mail: MumbaiPublicAffairs@state.gov
Website: http://mumbai.usconsulate.gov
Office Hours: 8:30 a.m. to 5:00 p.m.
(Monday through Friday)

HOLIDAYS

April 14: Dr. Babasaheb Ambedkar Jayanti/Good Friday

A WORD FROM THE CENTER

It wasn't easy finding suitably "water-themed" movies to screen at the Center this month. Films dealing with murder, robbery, piracy, violent weather? Sure. Infection, mental illness, wild animal attacks, alien abduction? No problem. I'd have had my pick.

As scourges and afflictions go, it seems that "water" doesn't really rate. After all, you turn on the tap; it's there. Where's the dramatic tension? But what happens when the tap turns and nothing comes out? If I were pitching it to a director, I'd start like this: Imagine that every person on the planet is an addict, a scant three to six days from the next "fix" or from a gruesome death. It's a lifelong condition, without the possibility of a cure. As global supplies of the drug dwindle, panic, riots, and even wars break out. Now *that's* a horror film.

Fortunately, governments are cooperating to ensure that this plot stays in the realm of science fiction. In addition to the USAID projects Kevin Douglas describes, the International Visitor Leadership Program has, for several years running, sent Indian experts in water resource management to the U.S. for learning about, and collaboration on, this global challenge. "Crisis No One Knew About Averted" isn't a title that's going to win any Oscars – but it's a goal well worth working for.

Ruth Bennett
Deputy Director

(Continued from page 1)

Lastly, critics have argued that large-scale changes in the courses of rivers will affect climate systems, water quality, soil fertility, etc. Without weighing in on these disputes, it's enough to note that such controversy, and its resolution, might take some time. The complete scheme risks becoming the greatest water management project never attempted (and, once started, proponents will admit the effects of this grand project won't be realized for decades – well after the effects of India's water scarcities have started to be felt).

Technology Will Save Us

A second school of water management stresses humbler devices but has similar aspirations. Irrigation and agriculture still accounts for 87 percent of all water use in India. Much of this water is drawn from a steadily declining aquifer. In many regions, groundwater levels have fallen as much as 1-3 meters per year, to levels 70 meters or more below those of 30 years ago. Nearly 12 percent of India's aquifers are severely overdrawn. A mix of inefficient pump distributions – those which don't distinguish between drinking and irrigation purposes – has intensified this decline. Alternate technology is available. Our modern Akbar might tell his Birbal: "Let technology solve the problem."

The Distribution, Reforms, Upgrades, and Management Program (DRUM), a part of the United States Agency for International Development (USAID), is focused today on just these sorts of innovations. One such USAID-funded program was begun in Doddaballapur Taluk, Bangalore Rural District, Karnataka. Assisting the local utility, this program replaced 860 irrigation pump sets used by local farmers. Regular pumps now go in early and take water from the filter for purposes such as drinking water. High-capacity pumps are used to lift water from deep underground levels. In addition to improving pump efficiency, authorities support local farmers by introducing water-saving irrigation techniques, identifying water-efficient crops, and improving general management of water resources for over 2,700 households.

A second technological approach relies upon one of the world's oldest water management strategies – the harvesting of rainwater. The hydrological environment of India is shaped by the South-West and North-East monsoons. Three-quarters of India's rainfall occurs during four months. This unequal seasonal distribution is surpassed by an even more unequal geographical distribution – annual rates of precipitation vary from 150 mm per year (in the extreme Western desert) to 11,000 mm per year (in the Assam mountains) – the highest in the world.

With the support of USAID, India's Jal Bhagirathi Foundation helped communities in Rajasthan's drought-stricken Marwar region design, build, and manage systems for catching rainwater which use johads (small earthen check-dams). Since the program began, 82 water harvesting structures have been built which provide water resources to 17,000 residents in more than 200 villages. This has raised the groundwater level, increased vegetation and food production, and, in some areas, increased economic production by 300 percent.

Upon hearing of this tool kit, our modern-day Akbar might rejoice. Our Birbal, however, might remind him that India is a land of eight million electric and 4.4 million diesel pump sets. Who will pay for these new devices? In urban areas, rainwater harvesting is limited to new buildings of a certain size. The impact of such technology, if unaccompanied by other reforms, would be the proverbial drop in the bucket. At this point, our Akbar might throw his hands into the air and declare India's burgeoning water crisis inevitable.

It's Not the Water…

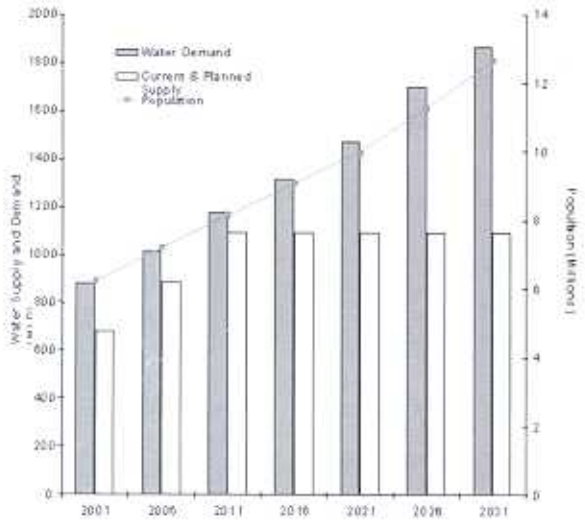
Up until this point we've approached the question of water scarcity as a problem of resources and end users – for so many km^3 of liquid there are so many people who can use them. When water becomes a resource of fixed supply, the only solution to scarcity becomes fixing demand. But how realistic is this assumption? Instead of pondering the collection of water resources and their transportation, might the examination of other parts of the supply chain yield different solutions?

The Water and Energy Project (WENEXA), a USAID-run technical assistance program, was founded in 2001 on the premise that the causes of India's water problems have little to do with the sources and uses of, well, water. Public conceptions of "water as a public right," and antiquated laws on water rights, have led water authorities to engage in below-cost pricing. Levels of system loss from "unaccountable" or "non-revenue" water in urban areas are often as high as 50 percent. Poor quality power supply leads farmers to pump when power is available rather than when crops need water. This in turn leads to over-extraction of groundwater and stressed aquifers. Lowered water tables force farmers to use high-capacity pumps (which require more energy) to lift water from deeper levels. WENEXA has dubbed the above "the vicious cycle." The goal of water reform should be to stop the vicious cycle at its source.

Much potential lies in water reuse. The city of Hyderabad, one of the crown jewels of India's IT industry, expects its population to double during the next 30 years. Demand for water resources is expected to grow even more. The Hyderabad Metro Water Supply and Sewer Board (HMWSSB), assisted by technical advice from WENEXA, is investing heavily in water reuse as a way out of the zero-sum box. By constructing four new advanced wastewater treatment plants, the HMWSSB plans to intercept raw sewage and provide treatment for the majority of wastewater generated in Hyderabad. This treated water will then be diverted for use in irrigation – freeing up both fresh water and electricity which can be used for other purposes.

(Continued on page 3)

(Continued from page 2)



Current and projected water supply and demand in Hyderabad (Source: **USAID**)

How will utilities afford such improvements? An ambitious program started in the Bangalore area suggests one solution. In June 2005, the Karnataka Urban Infrastructure Development Finance Corporation (KUIDFC) issued a $23 million pooled municipal bond to fund water and sanitation improvements in eight municipalities around the city. This second pooled bond in India, backed by a USAID guarantee, was listed on the Bombay Stock Exchange and sold to banks, insurance companies, and investors. The KUIDFC is leveraging these funds with others from government and donors by a factor of three. What is being imagined here is an urban financing scheme similar to the state bond model which operates in the U.S.

What are the implications? What our Birbal might tell his Akbar is that the solution to problems of water scarcity in India need not come from improvements in supply and transportation (as welcome as both would be). The solution to India's water crisis might be the direct result of reforms in other sectors, which, in some sense, have been ongoing since the 1990s. Market-based pricing creates incentives for efficient use. As India develops – as Indians adopt the practices and techniques of an evermore sophisticated economy – the ethic of doing more with less will take over.

Conclusion

So which solution is best? Our Birbal would also note that the three schools aren't mutually exclusive. Someone who fills a glass from a tap in India 20 years from now might be drinking water which first fell in a monsoon in the Himalayas, then traveled long distances as part of a great river, was diverted through a concrete aqueduct, past containers that catch rainwater, and then used for industrial purposes in one of India's many growing cities. Said water might then have been used captured, treated, and reintroduced into a river or aquifer, continuing its journey, and ending, ultimately, in the person's glass.

I return to the words of Kamal and Rajan: "A nation's progress depends upon how its people think." India's progress, to no small degree, will depend upon how its people *drink*. While an ambitious water policy won't ensure India's arrival into the ranks of fully-developed nations, a skillful one will lead the way.

Kevin Douglas is an American writer living in Mumbai.

NOTES FROM THE AIRC

A Select Webliography on Water Resource Management

http://www.americanrivers.org/site/PageServer
American Rivers

http://www.awra.org/
American Water Resources Association

http://www.h2ouse.org/index.cfm
California Urban Water Conservation Council – Water Saver Home

http://www.cleanwateraction.org/
Clean Water Action

http://www.fao.org/countryprofiles/water/default.asp?iso3
Food and Agriculture Organization of the United Nations – Water and Food Security Country Profiles

http://www.globalpolicy.org/security/natres/waterindex.htm
Global Policy Forum – Water in Conflict

http://www.icid.org/index_e.html
International Commission on Irrigation and Drainage

http://www.metrokc.gov/health/water/index.htm
King County – Drinking Water Program

http://www.nalms.org/
North American Lake Management Society

http://www.usbr.gov/waterconservation/
U.S. Department of the Interior – Bureau of Reclamation – Water Conservation Field Services Program

http://www.epa.gov/ow/
U.S. Environmental Protection Agency – Office of Water

http://water.usgs.gov/programs.html
U.S. Geological Survey – Water Resources Programs

http://www.unesco.org/water/
United Nations Educational Scientific and Cultural Organization – Water

http://www.doi.gov/water2025/
Water 2025: Preventing Crises and Conflict in the West

http://www.waterconserve.info/
Water Conserve – Water Conservation Portal

http://www.water-ed.org/
Water Education Foundation

http://www.wef.org/Home
Water Environment Federation

http://www.worldwater.org/index.html
Pacific Institute for Studies in Development, Environment, and Security – The World's Water.

Note: *Internet sites included in this listing, other than those of the U.S. Government, should not be construed as an endorsement of the views contained therein.*

DID YOU KNOW?

Laugh at Work Week (April 1-7)

Laughter and humor are an important part of the workplace. Benefits of laughing at work include improved productivity, teamwork, communication, stress relief, job satisfaction and employee retention. This week, which begins on April Fools' Day, focuses on the very serious business of humor.

Daylight Savings Time Begins (April 2-October 29)

Daylight Savings Time begins at 2:00 a.m. in the U.S. and Canada. The Uniform Time Act of 1966 (as amended in 1986 by Public Law 99-359), administered by the U.S. Department of Transportation, provides that Standard Time in each zone be advanced one hour from 2:00 a.m. on the first Sunday in April until 2:00 a.m. on the last Sunday in October (except where state legislatures provide exemption, as in Hawaii and parts of Arizona and Indiana). Prior to 1986, Daylight Savings Time began on the last Sunday in April. Many use the popular rule "spring forward, fall back" to remember which way to turn their clocks.

National Library Week (April 2-8)

A nationwide observance sponsored by the American Library Association. Celebrates libraries and librarians, the pleasures and importance of reading and invites library use and support.

(Source: **Chase's Calendar of Events 2006**)

Edited and designed by Sanjay Mehta and Lalita Bhavnani
Copy edited by Eva Doctor
Printed by Colorpoint, S. J. Marg, Lower Parel, Mumbai 400 013