

Major Dam Companies Caught in African Bribery Scandal

by Lori Pottinger

In July, it was revealed in a respected South African newspaper that a dozen major international dam-building companies involved in the World Bank-funded Lesotho Highlands Water Project (LHWP) in Southern Africa had lavishly bribed at least one top official on the project, allegedly giving nearly US\$2 million in bribes over ten years. The list of corrupt companies reads like a who's who of the dam-building industry.

At press time, the World Bank had indicated that its anti-corruption guidelines may not apply in this case, saying that the firms involved would not face any rebuke from the bank unless funds it specifically lent for the project were involved in the bribery.

The LHWP corruption story first appeared in the South African newspaper *Business Day*, as the Lesotho government's court case against the corrupt official, Masupha Sole, drew near. The charge sheet states that Sole "did unlawfully, intentionally and corruptly accept bribe moneys, over the period February 1988 to December 1998, from Lesotho Highlands Water Project contractors." Sole, appointed CEO of the LHWP in 1986, was suspended in December 1994 and dismissed from his position in 1995. One source told *Business Day* that contractors paid bribes directly into Swiss and French bank accounts in Sole's name.

Project Background

The LHWP is Africa's largest infrastructure project, involving five dams (one of which is built and another underway), miles of tunnels through the Lesotho mountains, and a small hydropower component. The project delivers Lesotho's water to South Africa's biggest urban area, which includes Johannesburg and Pretoria.

Controversial from the start, the project was initiated without critical environmental studies on erosion and downstream impacts, despite the impacts of diverting water on the project's massive scale. The poor in South Africa's townships, who suffer from water inequity dating back to apartheid, will for the most part not be able to afford the project's expensive water.

The project's social impacts in Lesotho have been especially hard on the rural Highlands communities who have lost fields and grazing lands due to the project. Despite decade-old promises, their livelihoods have not been re-established and poor people have been pushed further to the edge in their struggle for survival.

Widespread corruption on the project is thought to be one reason that the social fund intended to help affected communities undertake development projects has accomplished virtually nothing. A September letter on the corruption scandal by Lesotho NGOs

who represent dam-affected people highlighted problems plaguing the project's social programs. "The fund has been and continues to be a tool of opportunistic politicians," wrote Motseoa Senyane of Transformation Resource Centre and Thabang Kholumo of the Highlands Church Solidarity and Action Centre. "Although the committee designated to select projects to be supported by the social fund has not met even once yet, money from the fund has been used to support ill-conceived projects built by workers hired according to political party affiliation. In Lesotho, we see the same stretch of road repaired; torn up the next week; repaired again the following week; and then torn up once more at the end of the month." The letter goes on, "Punishing the corrupt multinationals involved with the LHWP and closely monitoring the implementation of the project's social fund would reassure us of the World Bank's concern."

The World Bank's Role

The World Bank has lent more than \$150m for the project. As the project's problems have accumulated over the years, Bank officials have taken to pointing out that its

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The Tally Sheet of Bribes

The following list of companies and the reported bribe amounts paid was published in the July 29, 1999, edition of Business Day (South Africa). All figures in US dollars.

- ABB (Swedish/Swiss): \$40,410
- Acres International (Canadian): \$185,002
- Impregilo (Italian): \$250,000
- Spie Batignolles (French): \$119,393
- Sogreah (French): \$13,578
- Dumez International (French): \$82,422
- Lahmeyer Consulting Engineers (German): \$8,674
- ED Züblin (German): \$444,466
- Diwi Consulting (Germany): \$2,439
- LHPC Chantiers (international consortium): \$63,959
- Highlands Water Venture (international consortium, including Impregilo, the German firm Hochtief, the French firm Bouygues, the UK firms Keir International and Stirling International, and South African firms Concor and Group Five): \$733,404
- Lesotho Highlands Project Contractors (international consortium which includes Balfour Beatty, Spie Batignolles, LTA, Züblin): \$57,269.

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s the stories in this issue reveal, the simple act of providing water to people is becoming increasingly controversial due to a broad range of factors – from the growing trend toward the privatization of water supply to the grandiose scale of water projects, both of which are worsening the growing divide between “water haves” and “have-nots.” Water managers still subscribe to the entrenched belief that large-scale engineering can save the day. The resource is also increasingly of poor quality, because those with the means to secure a steady supply of cheap water have over the years polluted it with industrial and agricultural runoff.

Water use has grown exponentially in modern times. The first 80 years of this century saw a 200 percent increase in the world’s average per capita water use, which coupled with population growth accounted for a remarkable 566 percent increase in withdrawals from the world’s freshwater resources. Mounting pressures on water resources – growing populations in need of water supply, the fear of drought, and the possibility of water conflict between nations – are increasingly being used to justify new water-supply dams and river diversion projects. But dams and pipelines do not create new water, they merely move it from one set of users to another – usually from the poorest to the richest. In fact, dams can reduce potable water supplies through evaporation from reservoirs and by harming water quality. In case after case, large water projects have exacerbated political tensions rather than eased them. Such projects tend to lead to greater water inequity, and turn water into a resource to be owned rather than shared as needed. Despite a century of unprecedented dam building, by the early 1990s more than 1.3 billion people remain without access to fresh water, and more than 1.7 billion lack adequate sanitation.

What would a more sustainable approach to water management look like? It would be smaller in scale, for one – relying not on large dams and long-distance pipelines, but rather locally manageable solutions such as micro-dams, shallow wells, low-cost pumps, water-conserving land-management methods and rainwater harvesting. Such methods are less wasteful, more cost-effective and less disruptive to local communities than large-scale water projects. Many of these techniques are gaining ground around the world, but the international financial institutions have been very slow to catch on.

A more sustainable approach to water will not tolerate waste. There is no new water in the world today than there was when the world’s population was just a fraction of today’s 6 billion people. In her new book *Pillar of Sand* (reviewed on page 5), water expert Sandra Postel says, “We need to get twice as much benefit from each liter of water if we are to have any hope of fulfilling the water requirements of 8 billion people and protecting the natural ecosystems on which economies and life itself depend.” Such an approach will require being very frugal and very smart about water management.

As described on page 8, technologies and methods are now available which could cut water demand between 40-90 percent in industry, 30 percent or more in cities, and between 10-50 percent in agriculture without reducing economic output or quality of life. Reducing the water demands of all these sectors is possible right now, but it will take political leadership to make these changes – leadership which at this time seems to be lacking in most parts of the world. Hence, the need for a strong peoples’ movement on sustainable water management to push politicians in the right direction.

The new water world must be based on democratic models, with full participation by people in the watershed. Watershed-level approaches represent the most promising path to sustainable water management. When local communities have a decisive voice in how their watershed is used, they will not likely approve of projects that could do the kind of lasting harm to natural resources that a large dam or polluting industry will.

Certainly, a more sustainable approach will recognize that all creatures depend on water, and will work to protect the intricate webs of life sustained by healthy rivers. For the past 50 years, the status quo has been to take as much water as possible for human needs, ignoring drastic impacts on fisheries, wetlands, forests and aquatic life. Environmental impacts have inevitably affected people as well. Efforts are underway in many communities to repair years of damage by allotting the environment a baseline of water from dammed and diverted rivers. This is a positive development which needs to be replicated elsewhere. But our future depends on our ability to recognize the limits imposed by the natural world, and learning to live within them.

Lori Pottinger

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International Rivers Network is an affiliate organization of Friends of the Earth International.

Experts Find Serious Deficiencies in San Roque Dam Studies

by Aviva Imhof

An independent panel assessing the environmental and social impacts of the US\$1.2 billion San Roque Dam in the Philippines has found serious deficiencies in the quality and scope of the project's environmental impact assessment (EIA). The panel reviewed the sedimentation, water quality, flood control and seismicity aspects of the EIA and associated documentation, at the request of the local indigenous people's organization.

The 345-megawatt hydropower, irrigation and water supply project is being funded by the Export-Import Bank of Japan (JEXIM) and built by a private consortium including Sithe Energies of the US and Marubeni of Japan. Thousands of indigenous Ibaloi peoples living around the proposed reservoir area will be affected if the dam is completed as planned.

JEXIM has already given a \$302 million loan to the private consortium building the dam. Despite the project's many unresolved issues, JEXIM approved an additional \$400 million loan to the National Power Corporation in September.

The independent panel found that the reservoir could fill with sediment much faster than the EIA predicts, thus greatly shortening its lifespan and affecting its economic viability. The accumulation of toxic sediments could poison the water in the reservoir and downstream. The dam could be more prone to failure from earthquakes than the EIA predicts, and the project could exacerbate rather than alleviate flooding.

"Given the seriousness of the deficiencies in the National Power Corporation's EIA, we call on the government to order a stop to the ongoing construction of San Roque Dam, and for JEXIM to halt all funding until a comprehensive and impartial review and evaluation has been undertaken," said Joan Carling, Secretary-General of the Cordillera People's Alliance.

Dr. Sergio Feld, an environmental scientist, found that "the sedimentation rates used in the EIA studies are unreliable and each one of its components is underestimated. Sediment accumulation in the San Roque reservoir could occur at rates two or three times faster than predicted and the project life may be 35 to 65 percent shorter than anticipated by project proponents." If the life of the dam is shorter than projected, the economic viability of the project will be affected. He also found that sedimentation may cause increased flooding along the

upstream portions of the reservoir, inundating indigenous Ibaloi people's lands.

Dr. Robert Moran, a geochemist and hydrogeologist, stated that the accumulation of toxic sediment in the dam as a result of mining operations in the watershed area "could make water unsuitable for intended agricultural and water supply purposes" and "could also make both the reservoir and downstream river waters toxic to sensitive species of aquatic organisms." Dr. Moran states that the project "has the potential to create an environment within the impounded waters that may increase dissolved concentrations of trace chemicals like cyanide, uranium, lead, mercury, arsenic" and other toxic chemicals.

Earthquake Safety Lacking

Tiziano Grifoni, a civil engineer, found that the dam may not have been designed to withstand the highest possible earthquake for the area. He states that an earthquake more severe than that which the dam has been designed for could cause large landslides, huge waves which could overtop the dam, and possible dam break. The potential for occurrence of reservoir-induced earthquakes

"has not been evaluated," a stunning revelation given the immense public dangers involved should the dam fail. Reservoir-induced seismicity is a common phenomenon that occurs under some new reservoirs. When the reservoir fills, an earthquake may be prematurely triggered by either the change in stress within the earth due to the weight of water, or by the weakening of the earth due to increased ground water pore pressures.

Dr. Peter Willing, a hydrologist, found that the San Roque reservoir was only designed to contain a relatively small flood expected to occur once every five years. The dam "will not contain larger floods," and "losing the whole dam is conceivable." He goes on to state that offering flood control for the small but frequent five-year flood will give people downstream "a false sense of security" resulting in far more devastating damage when larger floods occur.

One of the purported benefits of the dam is flood control.

In response to the panel's findings, Senator Gregorio Honasan has filed a resolution before the Philippine Senate requesting the Committee on Environment and Natural Resources

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San Roque Resettlement Off to a Bad Start

People already resettled to make way for the construction of San Roque Dam are unhappy with their lot and maintain that they had a better life where they came from than in the temporary relocation sites assigned to them, according to a fact-finding mission organized by a coalition of Philippine NGOs in early August.

"Here one has to buy every leaf (vegetable), but where we came from, if there is no money, you can just go out and pick your food," said one resettler.

More than 160 families have been living in a temporary resettlement site for over a year while waiting for the permanent relocation site to be completed by the National Power Corporation. Some families stated they did not want to be relocated but were forced to move. Trucks and bulldozers arrived to move their houses and belongings, and military forces were seen in the distance.

Most of the relocatees are poor peasants or tenant farmers who engaged in

subsistence farming and gold panning. NPC promised to give priority for employment to members of the displaced families. But people said they were given semi-skilled and unskilled work for only 3-6 months, after which they were laid off.

This system has made the people dependent on the P5000 (\$125) monthly compensation payment from NPC. NPC has said that they will stop this payment as soon as people are transferred to the permanent relocation sites that NPC is currently building.

In the resettlement areas there is no source of long-term livelihood or income for the families. There is no land to till, and livelihood projects and other options being offered by the NPC have not succeeded. NPC has prevented people from gold panning and fishing along the Agno river. There is no school or health clinic in the vicinity.

Aviva Imhof

California Dam Proposal Plays on Drought Fears

by Susanne Wong

Five years ago, Dan Beard, then head of the world's largest dam building agency, shocked the dam industry by announcing "The dam-building era in the United States is now over." Last year, Bruce Babbitt, head of the US Department of the Interior, went on a nationwide "Sledge hammer tour" to celebrate the removal of a number of dams. Clearly, dams in the US are on their way out. So why does California, one of the most over-plumbed places in the world, keep trying to build more concrete dinosaurs?

The west's legacy of unsustainable water practices seems to be a hard habit to break. For example, the phoenix-like Auburn Dam continues to come before the Legislature, despite its obvious drawbacks. This project is intended to increase flood protection to the Sacramento area, but is unlikely to solve the region's perennial flood threat because of continuing urban sprawl into a floodplain. Then there is the always-lurking Peripheral Canal, a water transfer project that would siphon off water from the north to the south. Now, a new water project is proposed for the golf-course-studded Monterey region.

The still-growing central coast region hopes to bolster its unsustainable water use by building a new 282-foot-high dam on the Carmel River. Just a few years ago, the \$127 million dam was packaged as a solution to meet increasing water needs in one of the state's fastest-growing counties. Today, however, growth is a dirty word locally, and the project is now being sold as the solution to the region's frequent droughts.

"Projects like these, labeled as being for drought protection, come up time and time again. However, once these reservoirs are built, the water won't go for drought protection but for growth," says hydrologist Phil Williams. "So these projects just exacerbate the situation – when drought does come along, all the water is already spoken for, and you have more people who will be impacted by droughts. It's a vicious cycle."

The proposed dam would flood 266 acres (including 24 acres of federally protected wilderness areas) and inundate 27 Native American cultural and historical sites, including many sacred sites of the Esselen tribe. It would affect steelhead migration by blocking access to the upper reaches of the river. Siltation also poses a serious threat to the long-term viability of the reservoir's proposed 24,000-acre foot storage capacity. Siltation has reduced the storage capacity of two

existing dams on the river by more than 60 percent. As a result, the National Marine Fisheries Service, among others, is calling for removal of one of the dams.

This dam, like many other large water schemes in the state, keeps surfacing despite widespread public sentiment against it. In 1995, voters rejected a ballot measure which would have authorized the district to build the dam. Only months later, the project resurfaced. Formerly known as the New Los Padres Dam, the project was reintroduced by California-American Water Company (Cal-Am), as the "no growth" drought-protection Carmel River Dam, in an effort to appeal to residents concerned about expanded real estate development on the Monterey Peninsula. The Carmel River Dam would be "physically identical" to the previous project, according to the environmental impact report. District officials admit that no demand-side management studies have been undertaken recently to determine how conservation measures could meet water needs more sustainably.

The project has been supported by the Monterey Peninsula Water Management District and Cal-Am, which was forced to look for alternative water sources after the company was caught illegally taking nearly 11,000 acre-feet of water from the Carmel River in 1995. The State Water Resources Control Board ordered Cal-Am, a for-profit utility that generates income by selling water, to obtain permits for unlawfully diverted water or find alternative sources. The Board also required that Cal-Am reduce diversions from the river by 20 percent in the near term and 75 percent in the long term.

Recently, the district's board of directors voted "to evaluate water available for growth from this project." According to the Monterey water district's project manager for the dam, Henrietta Stern, the board faced significant pressure from community groups and development interests upset that the huge water project would not provide water for development projects which have been stalled due to lack of water.

The dam builders' persistence to build the project has been met with resistance from Native Americans, environmental groups, politicians and other community members. "We have little if any funds to spend to defend our sacred sites which the dam will destroy," wrote Esselen Tribe member Tom "Little Bear" Nason in a letter to

**Frankly, my dear,
I don't want a dam.**

CAWS, P.O. Box 1426, Carmel Valley, CA 93924
Citizens for Alternative Water Solutions

Secretary of the Interior Bruce Babbitt. "One of them, the Birthing Rock, they even plan to grind up for crushed rock. The water district and water company have not lived up to their agreements with the Army Corps of Engineers to protect us and our sites. They will not listen to us with such a small voice."

Project proponents have argued that building the dam will save endangered fish by restoring flows to the lower part of the river. For the past decade, increasing water withdrawals from the Carmel River have caused the once-perennial river to dry up each summer. Dam promoters have exploited the fact that the president of a group called Save Our Carmel River has come out in favor of the dam.

The National Marine Fisheries Service rebuts these claims, stating that the survival of fish and the riparian corridor requires more natural, not unnatural conditions. John Williams, a former director of the water district, says, "The Water Management District thinks that the dam will do great things for steelhead and other species in the Carmel River. It thinks that adult and juvenile steelhead can successfully be moved around the dam, and it thinks increased summer flows below the dam will make up for the miles of river that will be drowned by the reservoir. These claims are dubious."

Looking at Alternatives

NGOs and local lawmakers recently succeeded in forcing Cal-Am and the California Public Utilities Commission (PUC), which must give its approval for projects that increase rates, to examine alternatives to the dam. These studies are underway.

Threatened with stiff fines if it exceeds state-imposed water production limits, Cal-Am has worked with the district to develop an expanded water conservation and standby rationing plan. According to the *Los Angeles Times*, voluntary conservation has helped Cal-Am cut consumption by 20 percent. The seven-stage conservation and rationing plan calls for establishing landscape water budgets for large water users, reducing distribution

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California's Potential for Conserving Water Unknown

by Dana Haasz

Key to addressing problems of water use in California today is understanding the potential for demand management to balance the state's limited supply with the needs of a population that is expected to grow by 15 million over the next 20 years.

Managing demand, rather than supply, allows us to stretch the usefulness of the water that we already have and helps ensure future reliability without requiring expensive and environmentally damaging new infrastructure. Reducing per-capita water requirements – through methods such as installing ultra-low-flow toilets, adopting efficient irrigation techniques and modest changes in cropping patterns, and redesigning industrial processes – can offset the requirements of a growing population.

But in order to properly incorporate demand management into the equation, we need a detailed account of the how and where the state's water is being used, as well as the economic, social, and environmental characteristics of water in each region. Unfortunately, the lack of adequate information has seriously inhibited the demand

management discussion. State water planners cannot be expected to come to informed decisions regarding water-related problems without a good estimate of current demand. This information is necessary to adequately define and quantify the potential for water efficiency statewide.

There appears to be very little information about the potential for comprehensive demand management programs statewide, but based on what we do know, it seems clear that this potential is quite high. A report by the Pacific Institute in 1995 estimated that the state's urban per capita demand could be reduced 46 percent by increasing efficiency and using more reclaimed water. Agricultural water demand could decline by 3.5 million acre-feet with modest changes in cropping patterns and improvements in irrigation efficiencies. To put this in perspective, Shasta Dam can provide 4.5 million acre-feet of water, while Hetch-Hetchy can hold 360,000 acre-feet. The problem remains that these options will not be appropriately factored into state-wide decision making processes if there is no reliable assessment of how

much water can actually be saved by reducing demand.

In an attempt to rectify this situation, the Pacific Institute recently began a research project that will evaluate as comprehensive a set of demand-side management options as possible. These would include improved agricultural efficiency efforts, more aggressive urban-efficiency options, industrial water-use efficiency actions for high water-using sectors, and the potential for more widespread water reuse and recycling. We plan to define, quantify, and compare these options to current baseline estimates of demand-side management potential offered by state water agencies. Our goal is to identify a broad set of possible demand management options in the urban and agricultural sectors and to quantify the potential of these options for meeting current and future demands. ■

For more information on this effort, contact the California-based Pacific Institute for Studies in Development, Environment and Security; Ph: 510.251.1600; Fax: 510.251.2203; email: dhaasz@pacinst.org; web: www.pacinst.org.

Book Review

More Crop Per Drop

Pillar of Sand: Can the Irrigation Miracle Last? by Sandra Postel (W.W. Norton & Worldwatch Institute, 1999). Paper, US\$13.95.

In this follow-up to her excellent book *Last Oasis* (1992), Sandra Postel paints a picture of an impending crisis in irrigated agriculture that hangs over us like a sword of Damocles. Soils are being destroyed on an unprecedented rate by poor irrigation practices, groundwater levels are falling precipitously, reservoirs are filling with silt and urban centers are greedily eyeing agricultural water allotments to meet their growing demands. To top it off, we don't have the water necessary to produce enough food for the world's population 25 years from now – we'd need an additional 24 Nile Rivers or 110 Colorado Rivers just to feed the expected population in 2025.

So it is not surprising that Postel is proposing drastic solutions. The premise of this book is simple, if daunting: "We need to get twice as much benefit from each liter of

water if we are to have any hope of fulfilling the water requirements of 8 billion people and protecting the natural ecosystems on which economies and life itself depend," she states. "Meeting this challenge will involve making irrigation leaner and smarter – substituting knowledge and better management for water. It will involve spreading the whole spectrum of water-thrifty technologies that enable farmers to get more crop per drop. And it will require fixing a flagrant flaw of the modern irrigation age – the failure to provide technologies and methods that allow the smallest and poorest farmers to share in irrigation's benefits." This last aspect is crucial to overcoming large pockets of chronic hunger in the developing world.

History reveals that most irrigation-based civilizations have failed; this book lays out ways in which we might reverse that trend.

It describes in an easy-to-read style ways in which agriculture can get by on less water and do more with what it has, through various technical, managerial and agronomic means. It describes problems in policy and governmental priorities, and the barriers to institutional change. For example, Postel says one of the most pressing problems in the policy arena is the lack of protection for groundwater resources; this will require new laws and strategies for balancing pumping with recharge levels.

Irrigation is something that many modern people take for granted. We do so at our peril. Growing enough food with limited water resources is perhaps the biggest challenge facing the world today. This book should be required reading for anyone interested in where our food and water will come from in the next millennium. ■



Blue Gold

The Global Water Crisis and the Commodification of the World's Water Supply

by Maude Barlow

We'd like to believe there's an infinite supply of fresh water on the planet. But the assumption is tragically false. Available fresh water amounts to less than one half of one percent of all the water on Earth. The rest is sea water, or is frozen in the polar ice. Fresh water is renewable only by rainfall, at the rate of 40,000-50,000 cubic kilometers per year.

Global consumption of water is doubling every 20 years, more than twice the rate of human population growth. According to the United Nations, more than one billion people on earth already lack access to fresh drinking water. If current trends persist, by 2025 the demand for fresh water is expected to rise by 56 percent more than is currently available.

As the water crisis intensifies, governments around the world – under pressure from multinational corporations – are advocating a radical solution: the commodification and mass transport of water. Proponents of commodification, and subsequent privatization, say that such a system is the only way to distribute water to the world's thirsty. But in fact, experience shows that selling water on the open market does not address the needs of poor, thirsty people. On the contrary, privatized water is delivered to those who can pay for it, such as wealthy cities and individuals and water intensive industries such as agriculture and high-tech. As one resident of the high desert in New Mexico observed after his community's

water was diverted for use by the high-tech industry: "Water flows uphill to money."

The push to commodify water comes at a time when the social, political and economic impacts of water scarcity are rapidly becoming a destabilizing force, with water-related conflicts springing up around the globe. For example, Malaysia, which supplies about half of Singapore's water, threatened to cut off that supply in 1997 after Singapore criticized its government policies. In Africa, relations between Botswana and Namibia have been strained by Namibian plans to construct a pipeline to divert water from the shared Okavango River to Namibia. Much has been written about the potential for water wars in the Middle East, where water resources are severely limited. The late King Hussein of Jordan once said the only thing he would go to war with Israel over was water because Israel controls Jordan's water supply.

Meanwhile, the future of one of the earth's most vital resources is being determined by those who profit from its overuse and abuse. At the annual World Economic Development Congress, which follows the annual International Monetary Fund/World Bank meeting, corporations and financial institutions met with government representatives from more than 84 countries to attend panels on such subjects as "Overcoming Obstacles to Water Investment" and "Navigating Transparency and Banking Regulation in Emerging Capital Markets." The

agenda was clear: water should be treated like any other tradable good, with its use determined by market principles.

At the same time, governments are signing away their control over domestic water supplies by participating in trade treaties such as the North American Free Trade Agreement (NAFTA) and institutions such as the World Trade Organization (WTO). These agreements effectively give transnational corporations the unprecedented right to the water of signatory countries.

Already, corporations have started to sue governments in order to gain access to domestic water sources. For example, Sun Belt, a California company, is suing the government of Canada under NAFTA because British Columbia (B.C.) banned water exports several years ago. The company claims that B.C.'s law violates several NAFTA-based investor rights and therefore is claiming US\$220 million in compensation for lost profits.

With the protection of these international trade agreements, companies are setting their sights on the mass transport of bulk water by diversion and by super tanker. "Water is the last infrastructure frontier for private investors," says Johan Bastin of the European Bank for Reconstruction and Development.

Several companies are developing technology whereby large quantities of fresh water would be loaded into huge sealed bags and

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Water Index

Increase in world's population between 1900-95: +375%

Increase in global freshwater withdrawals in that time: +700%

Examples of per capita water withdrawal per year, in cubic meters:

US: 2,071
Spain: 1,174
Singapore: 84
Pakistan: 2,053
Ghana: 20
South Africa: 377
Brazil: 212
Chile: 1,625

Portion of irrigation in US that is achieved by pumping groundwater faster than it can be replenished: 21%

Percent of US freshwater fish in danger of extinction: 37%

Average drop in Chinese water tables in past 5 years: 7.5 meters

Percent of China's rivers too degraded to support fish: 80%

Average amount of leakage through municipal water systems in the developing world: 50%

Amount South Africa has allocated for water planning: US\$44 million

Amount South Africa has committed to water conservation and demand management: \$2.6 million

Portion of world's water that is too salty to drink: 97%

Amount of potable water that can be created by desalination plants by top three producers in the world: 9.9 million cubic meters per day

Potential reduction in runoff in Nile River Basin because of global warming: -25%

Amount of water contaminated by one liter of oil: 900,125 liters

Portion of South Africa's water consumed by power generation: 2.3%

Sources: IUCN: *The Freshwater Challenge*; *The World's Water* (Pacific Institute), *Blue Gold* (IFG), South Africa Wind Power Association.

towed across the ocean for sale. The US Global Water Corporation, a Canadian company, has signed an agreement with Sitka, Alaska, to export 18 billion gallons per year of glacier water to China where it will be bottled in one of that country's "free trade" zones to take advantage of cheap labor. The company brochure entices investors "to harvest the accelerating opportunity ... as traditional sources of water around the world become progressively depleted and degraded."

Selling water to the highest bidder will only exacerbate the worst impacts of the world water crisis.

Who owns water? Should anyone? Should it be privatized? What rights do transnational corporations have to buy water systems? Should it be traded as a commodity in the open market? What laws do we need to protect water? What is the role of government? How do we share water in water-rich countries with those in water-poor countries? Who is the custodian for nature's lifeblood? How do ordinary citizens become involved in this process?

As Georg Wurmitzer, mayor of the small town of Simitz in the Austrian Alps, states: "It is a sacred duty to help someone who is suffering from thirst. However, it is a sin to transfer water just so that people can flush their toilets and wash their cars in dry areas ... It makes no sense and is ecological and economic madness."

The next World Water Forum is being held in The Hague in March 2000. Chaired by World Bank Vice President Ismail Serageldin, this meeting is part of the continuing activities of the World Water Council, formed by governments, international agencies, and private sector in 1997 after the first World Water Forum held in Marrakesh, Morocco.

The World Water Council has formed various partnerships with private corporations including the Global Water Partnership and Business Partners for Development. The web sites and reports of these organizations make it clear that some of the largest water privateers are taking the lead in developing water policies of international organizations and governments.

Instead of allowing this vital resource to become a commodity sold to the highest bidder, we advocate that access to clean water for basic needs is a fundamental



human right. Each generation must ensure that the abundance and quality of water is not diminished as a result of its activities. Greater efforts must be made to restore the health of aquatic ecosystems that have already been degraded as well as to protect others from harm. We believe that the following ten principles will help to protect water:

1) Water belongs to the earth and all species.

Decision-makers must represent the rights and needs of other species in their policy choices and actions. Further generations also constitute "stakeholder" status. No decisions about water use should ever be made without a full consideration of impacts to the ecosystem.

2) Water should be left where it is wherever possible.

Tampering with nature by removing vast amounts of water from watersheds has the potential to destroy ecosystems. While there may be an obligation to share water in times of crisis, it is not a desirable longterm solution for either the ecosystems or the peoples of any region of the world to become dependent on foreign supplies for this life-giving source. We need to learn the nature of water's limits, and live within them.

3) Water must be conserved for all time.

Each generation must ensure that the abundance and quality of water is not diminished as a result of its activities. The only way to solve the problem of global water scarcity is to radically change our habits, particularly when it comes to water

conservation. Key to maintaining sustainable groundwater supplies is to ensure that net extractions do not exceed recharge. Some water destined for cities and agribusiness will have to be restored to nature. Planned major dams must be put on hold and some current river diversions must be reoriented to reflect a more natural seasonal flow or else be decommissioned altogether. Infrastructure improvements must become a priority to stem the huge loss of water through aging and broken systems. Government subsidies of wasteful corporate water practices must end.

4) Polluted water must be reclaimed.

The human race has collectively polluted the world's water supply and must collectively take responsibility for reclaiming it.

5) Water is best protected in natural watersheds.

Water flow does not respect nation-state borders. Watershed management offers a more interdisciplinary approach to protecting water, and is a way to break the gridlock among international, national, local and tribal governments that has plagued water policy around the world for so long.

6) Water is a public trust to be guarded at all levels of government.

Water should not be privatized, commodified, traded or exported in bulk for commercial purposes. Water should immediately be exempted from all existing and future international and bilateral trade and investment agreements. Governments must ban the commercial trade in large-scale water projects.

7) An adequate supply of clean water is a basic human right.

Adequate supplies of clean water for people in water-scarce regions can only be ensured by promoting conservation and protection of local water sources.

8) The best advocates for water are local communities and citizens.

Local stewardship, not private business or expensive technology, is the best protector of water security.

9) The public must participate as an equal partner with government to protect water.

Processes must be created whereby citizens, workers and environmental representatives are treated as equal partners in the determination of water policy.

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The author is the chair of the IFG Committee on the Globalization of Water, and National Chair of the Council of Canadians. This is an excerpt from a new report published by the International Forum on Globalization (IFG).



Making Water Go Farther

by Lori Pottinger

The following is an excerpt from River Keepers Handbook: A Guide to Protecting Rivers and Catchments in Southern Africa, a new report by IRN. This section describes some of the many alternatives to water supply which can help human society flourish without undermining the integrity of the ecological systems we depend on.

Using water more efficiently can in effect create a new source of supply. According to Sandra Postel, an expert in international water scarcity problems, technologies and methods are now available which could cut water demand between 40-90 percent in industry, 30 percent or more in cities, and between 10-50 percent in agriculture without reducing economic output or quality of life. In developing countries, the potential benefits of water demand-side management programs are huge in terms of money saved and ecological damage avoided, as well as freeing up water supply to extend coverage to the unserved.

Demand management includes several approaches to conserve water, including economic policies, notably water pricing; laws and regulations, such as restrictions on certain types of water use; public and community participation, to ensure that solutions are workable and have public support, and technical solutions, such as installing water flow restrictors. Reducing the amount of water consumed is key to cutting water expenses. Demand management cannot be thought of only from a technical angle. Water-saving technical measures always have economic, legal, institutional and political aspects that must be considered as well.

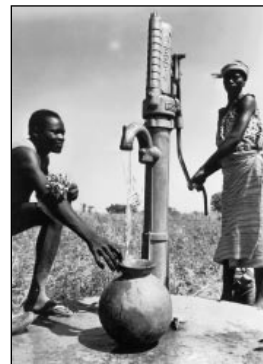
Modified Agricultural Practices

Since agriculture accounts for nearly 70 percent of the world's fresh water withdrawn from rivers, lakes, and underground aquifers for human use, the greatest potential for conservation lies with increasing irrigation efficiency. By reducing irrigation by 10 percent, we could double the amount available for domestic water worldwide. This can be done by converting to water-conserving irrigation systems; taking the poorest and steepest lands out of production; switching to less-thirsty crops (which may require changes to government subsidies for certain crops); implementing proper agricultural land drainage and soil management practices, and reducing fertilizer and pesticide use.

Typically, governments provide water to large commercial farmers at greatly subsidized rates, decreasing the need for conser-

vation and promoting wasteful practices. Studies show that just 35-50 percent of water withdrawn for irrigated agriculture actually reaches the crops. Most soaks into the ground through unlined canals, leaks out of pipes, or evaporates before reaching the fields. Although some of the water lost in inefficient irrigation systems returns to streams or aquifers, where it can be tapped again, water quality is invariably degraded by pesticides, fertilizers and salts that run off the land. This is in fact another way that commercial agriculture "uses" water: by polluting it so that it is no longer safe to drink.

Switching to conserving irrigation systems has the biggest potential to save water. Experts say drip irrigation could potentially save 40-60 percent of water now used for agriculture. Conventional sprinklers spray water over crops, not only irrigating more land than is needed but also losing much to evaporation. Drip irrigation, however, supplies water directly to the crop's root system in small doses, where it can be used by the plant's roots.



This keeps evaporation losses low, at an efficiency rate of 95 percent.

Although by 1991 some 1.6 million hectares were using drip irrigation worldwide, this is still less than one per-

cent of all irrigated land worldwide. Some countries have made drip irrigation a serious national priority, such as Israel, which uses drip irrigation on 50 percent of its total irrigated area. But clearly it is the exception, and most dry countries have a long way to go.

Another conserving practice is to reuse urban wastewater on nearby farms. Today, at least half a million hectares in 15 countries are being irrigated with treated urban wastewater, often referred to as "brown water." Israel has the most ambitious brown-water program of any country. Most of Israel's sewage is purified and reused to irrigate 20,000 hectares of farm

land. One-third of the vegetables grown in Asmara, Eritrea, are irrigated with treated urban wastewater. In Lusaka, Zambia, one of the city's biggest informal settlements irrigates its vegetable crops with sewage water from nearby settling ponds.

New Sources for Water

Although demand-management should always be examined first when additional water is needed, conservation will not always preclude the need for new sources of supply.

There are many sustainable ways to get water which cause less damage to ecosystems and communities than the large-scale infrastructure projects currently in favor with planners.

Rainwater Harvesting: Around the world, more communities are returning to small-scale water harvesting, usually using a system that collects water from house rooftops. A South African group, Association for Water and Rural Development (AWARD), teaches people how to collect water from the roof of a house, school or other building. The group calculates that for every 30mm of rain falling, a house with a 50m² roof designed to funnel it into a water tank could collect 1200 liters. AWARD estimates that this could save a person 16 trips to the local water-collection source.

Desalination: Some 70 percent of the earth's surface is water, but most of that is undrinkable seawater. By volume, only 3 percent of all water on earth is fresh water, and only about 1 percent is easily accessible surface freshwater. Water desalination is a process used to remove salt and other dissolved solids to create fresh water.

Desalination is an attractive water source for many reasons, especially because the supply is virtually limitless and unaffected by drought. For coastal countries, desalted water is not vulnerable to political changes, unlike water supply from shared rivers.



Desalting technologies can be built in stages to meet demand, unlike most large-scale water infrastructure projects. Desalination projects also do not lead to the displacement of indigenous peoples, changed agricultural lifestyles or serious ecological impacts.

In most cases, desalted water is not the sole source of a community's water supply (though this may change as the cost of desalted water goes down); it is usually combined with water from less expensive sources. In 1991, desalting plants in approximately 120 countries worldwide had the capacity to produce 4.1 billion gallons a day.



New Resource for Africa

"Southern Africa is, by and large, a dry place. Water is one of the region's most precious resources, and

yet the region's life-giving sources of water – the catchments that funnel water to rivers, wetlands and lakes – are increasingly under threat. To avoid irreparable harm to these essential natural systems will require a regional "catchment protectors" movement, a critical mass of people who make the protection of water resources their top priority. Such a movement will require citizens who understand the complex workings of their catchments, and their own place within these systems."

River Keepers Handbook: A Guide to Protecting Rivers and Catchments in Southern Africa takes a step toward creating a broad movement of people devoted to protecting their watersheds (or "catchments") in Southern Africa. The 52-page report is full of information that will help activists, communities, educators and individuals become informed river advocates, able to ask the right questions about river-development schemes and press for better alternatives. The report is available for US\$15 from IRN (email von@irn.org, or visit our web site: www.irn.org), or in South Africa for R60 from the Environmental Monitoring Group, P.O. Box 18977, Wynberg, South Africa 7824; Email: liane@kingsley.co.za; Ph: +2721.761.0549; Fax: +2721.762 2238.

The most common concerns about desalination are that the process is too expensive and consumes too much energy. In some places, desalinated water costs many times more than conventional water sources. However, technical breakthroughs are beginning to lower the price (although still not to the artificially low levels that agribusiness is used to paying). Cost comparisons for desalted water are often made to existing water supplies which did not include a full, fair cost-benefit analysis when they were developed. To be fair, comparisons should be made to the cost of developing other new sources (including environmental and social costs in the analysis).

The amount of salt to be removed greatly affects the cost of desalting, as does the method used to remove salts. The most significant factor in desalinated water is energy. Energy for most current technologies amounts to about 30-40 percent of the total cost.

There have also been recent breakthroughs that are expected to reduce the costs for desalination, primarily by cutting back how much energy is required. For example, in 1998 the Singapore-based company AquaGen International announced that it has developed a cheaper, portable water desalination plant that can be assembled anywhere quickly. AquaGen says the modular system of its plant makes installation easy. The unit can produce 100 cubic meters (25,000 gallons) of water for less than US\$300,000. The company says that its plants are up to three times more energy efficient than those now in use. The plants are relatively small, producing up to 5,000 cubic meters of drinking water per day (compared to up to 327,000 cubic meters/day for the big plants in the Middle East). AquaGen is doing a feasibility study for a plant that can process 45,000 cubic meters.

Israeli, Palestinian and US scientists are embarking on an ambitious desalination program that is intended to create a "New Desalinated Middle East." One of the program's goals is to build solar-powered desalination machines that can fit on a truck, then teach villagers to use them and even make them. The program will also look at how water is affected by salt and pollutants. The fully self-supporting desalination system was being evaluated in early 1999 by Al-Azhar University in Gaza, Palestine. The system can desalinate up to 600 liters of brackish water a day. It is being designed with irrigation in mind, and the plan is to develop micro-irrigation systems in parallel. The units require little maintenance, as they have few moving parts.

New developments in alternative energy may prove to be a boost for desalination as

well. Solar thermal power and fuel cells may provide good sources of power for desalination plants. Since places with good solar power potential are usually the places most in need of water, there is a huge potential to link the two.

Recycling Waste Water: A largely untapped source of water for irrigation and groundwater recharge is treated municipal wastewater. Recycling this "waste" product into a reliable water supply has huge benefits. It makes use of the nutrients in sewage to feed crops and keeps them from polluting waterways. It postpones the need to enlarge and update costly new sewage discharge systems, and eliminates the problems from discharging wastewater into rivers and oceans. It protects freshwater ecosystems by reducing the amount of water extracted from rivers and lakes. Recycled wastewater can also be used to help restore aquatic ecosystems harmed from over-extraction. Using recycled wastewater instead of importing water from hundreds of kilometers away can also result in significant energy savings.

Israel has the most advanced system of waste water recycling. Currently, 70 percent of sewage is treated and used for irrigation. Officials predict that by 2010, one-fifth of the nation's total water supply will come from recycled waste water. Israel uses many different treatment schemes for its many water-reuse projects. One method relies on algae-activated organisms to treat the waste water. The waste water is initially stored in a series of ponds in which the anaerobic and aerobic treatment is sufficient to irrigate crops.

Calcutta, India, channels much of its raw sewage into a system of natural lagoons, where fish are raised. The city's 3,000 hectares of lagoons produce about 6,000 metric tons of fish a year for urban consumers. The fish are safe to eat because the complex biological interactions in the lagoons remove harmful pathogens from the sewage.

As the technology to treat wastewater has improved, so have the applications for the use of the water. A small but growing number of cities are beginning to use highly treated wastewater to supplement drinking water supplies. Windhoek, Namibia, for example, was the first city in southern Africa to use recycled waste water in its public supply and has been doing so for more than 15 years.

Highly treated wastewater cannot be piped directly into a water supply. Most commonly, wastewater is used to augment the drinking-water supply by adding it first to a lake, reservoir, or underground aquifer. The mixture of natural and reclaimed water is then subjected to normal water treatment

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Okavango Pipeline Not Needed, Research Shows

by Steve Rothert

The Okavango River and Delta has been threatened for three years by a proposed pipeline that would divert water from its rich inland habitat to Namibia's parched capital, Windhoek. Now, alternative solutions have been put forth that could give the Okavango a new lease on life. A new report by IRN and Conservation International, based on data gathered by the water department and other agencies in Namibia, reveal that the pipeline is not as practical as a combination of less expensive, more sustainable measures which could meet growing demand and sustain the country through a future drought.

In 1996, after several years of inadequate rainfall and rising water use, it appeared that Namibia could run out of water within 18 months even with emergency restrictions in effect. The government began planning for the urgent construction of a 250-kilometer-long pipeline to pump water from the Okavango River, which cuts through Namibia's far northeastern corner, to existing water supply canals.

Then it rained. The rains were enough to fill Namibia's empty reservoirs and prompt the government to temporarily shelve plans to construct the pipeline. But semi-arid Namibia's water shortfalls have been coming more frequently this decade, and poor rains in 1999 raise fresh concerns about future water emergencies and the fate of the Okavango. Researchers who have studied the Delta fear the pipeline's diversions could harm the rich wetlands fed by the Okavango's seasonal floods, and the communities and wildlife that thrive on this unique ecosystem.

In a good year, Namibia's water supply can meet demand comfortably. But as the drought that ended in 1997 showed, rainfall can fall far short of average in this dry part of the world. In fact, only 5 of the last 15 years have seen average or above precipitation, and global climate change experts believe rainfall in Southern Africa will diminish further, making droughts more common and more extreme.

The major concern of Namibian water planners is the central area, which includes Windhoek and 80 percent of the country's economic activity despite having only 15 percent of Namibia's population. In a good rain year, the annual water demand for central area's population of 260,000 is approximately 45 million cubic meters, while the

network of dams, boreholes, canals and pipelines can supply nearly 50 million cubic meters. (By comparison, people living in California's San Francisco Bay Area use approximately the same amount of water per capita). The central area's supply includes nearly 5 million cubic meters recycled from Windhoek's wastewater treatment plant – one of a number of strategies that makes Windhoek Southern Africa's most water-wise city.

At the height of the most recent drought, water planners estimated the central area supply would fall short by 18 million cubic meters by 1998 when the reservoirs ran dry. This is the volume of water the government planned to extract from the Okavango through the pipeline before the plan was shelved. In a future drought, the potential supply deficit would actually be reduced to approximately 15 million cubic meters because of two new supply sources (expanded recycling of Windhoek's wastewater and conversion of an abandoned mine into a groundwater storage system) and the closing of one large water user (a mine). The IRN-CI study, called "Meeting Namibia's Water Needs While Sparing the Okavango," reports that several research projects conducted over the past two years by the Department of Water Affairs, NamWater and the Windhoek municipality indicate that the 15 million cubic meter gap could be filled by a number of creative measures, some of which were discovered during the last drought.

The average cost of water produced by the alternatives described in this report is less than half the cost of Okavango water, and many of them could be implemented more quickly than the two-year construction time on the Okavango pipeline. The most elegant and perhaps most promising option is "water banking" – storing surface water underground until needed during a drought, thereby reducing evaporative losses. Namibia has among the highest evaporation rates in the world, a fact which severely compromises above-ground water storage. In 1996, for example, dams in the Windhoek area supplied the city with 14 million cubic meters, but more than 45 million cubic meters evaporated in the same period. Using the option of storing water underground could save as much as 8 million cubic meters per year – almost half of Windhoek's annual demand, at approximately one-fourth the cost of piping water from the Okavango. The city of

Windhoek obtained successful results from water-banking trials in 1998, and hopes to expand the program soon.

Another promising supply option discussed in the IRN-CI report is water demand management and conservation – a strategy that has already proven successful in Namibia, but which experts believe could be expanded. Over the past 10 years, Windhoek's population has doubled, while water consumption has remained virtually the same because of the city's efforts to curb demand and consumption. The architect of the city's water conservation campaign, Ben van der Merwe, believes consumption can be



Photo: Steve Rothert / IRN

These boys would be affected by the Okavango pipeline.

reduced significantly more. "If all the [demand management and conservation] projects are implemented the city of Windhoek can reduce consumption by one-third," said van der Merwe. Implementing water demand management in all towns in the central area, therefore, could save more than four million cubic meters, at less than one-fifth the cost of Okavango water.

In addition to these non-structural measures, which together could reduce the possible supply shortfall to less than 5 million cubic meters, the central area has several groundwater sources that could sustainably yield significantly more water. Three mines north of Windhoek have recently closed down, and these mines together used to pump more than 6 million cubic meters out of the ground each year to keep mine shafts free of water. NamWater believes these mines could serve as longterm sources for the central area, and during emergencies produce 15 million cubic meters per year for two years. Because these mines are located near existing water supply canals, and are already arranged

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Harvesting Rain Offers Hope for Dry Delhi

by Kum Kum Das Gupta, Indira Khurana and Saravanan V S

The city of Delhi, India is at the mercy of its riparian neighbors for water. Experts now say that water harvesting might be a step in the right direction toward achieving self-sufficiency in this precious resource.

Every summer, discussions in Delhi revolve around water or rather the lack of it. Citizens lash out at the incompetence of the government to provide clean, potable water. The government promises the sky. While charges and counter-charges are traded, concrete steps are put to the back burner. Now, experts are proposing sustainable systems like rainwater harvesting to mitigate this problem.

The need to harvest water in Delhi is manifold. First, surface water in the capital suffers in terms of quality and quantity. This has increased pressure on groundwater resources, leading to a marked decline in the water table. The average decline of water table during the last decade was about 0.4 meter per year. The groundwater is also brackish. The Yamuna River, a major source of freshwater to Delhi, is contaminated with toxics, some of which are known to cause cancer.

The capital receives an average annual rainfall of 611 millimeters, but 80 percent is lost as runoff. If this water were harvested, it could meet up to half of the region's needs. Delhi also receives 772 million liters of water per day from the Yamuna, as monsoon season allocation. If this water is conserved, Delhi will have a surplus and can even supply nearby regions.

Catching rainwater through community and household-based water harvesting sys-

tems makes ecological, financial and political sense. The experiences of Chennai, where water harvesting has proved to be effective, show that such systems can work.

The Chennai water supplier, Metro Water, altered its strategy from extraction-based supply to a more sustainable conservation-based water supply system. Chennai's Rotary Club has started the process by reviving temple tanks to store water.

Metro Water was quick to realize the importance of saving coastal aquifers and other groundwater zones in and around the city. An act to regulate and control extraction, use or transportation of groundwater was passed in 1987. Following the 1993 drought in Chennai, Metro Water took initiatives to harvest rainwater. At the macro level large-scale recharging of water sources like injection wells and check dams were undertaken to overcome seawater intrusion. At the micro level, it made rainwater harvesting structures compulsory for multistoried buildings. It is estimated about 500 complexes in Chennai now have rainwater harvesting systems.

NGO Efforts

The Center for Science and Environment (CSE) has investigated the possibility of rainwater harvesting at a number of sites in Delhi. Pilot projects would harvest water from the rooftops of large buildings and store it in underground tanks. The excess water will be used to recharge wells. Water collected in the underground tanks will be used for low-quality usage. If found accept-

able, the water will also be used for drinking. Other proposals including tapping surface runoff through ponds for groundwater recharge, and diverting storm water drains for recharging abandoned wells.

CSE has also harvested water on its own office premises. Rainwater is collected in underground tanks and used to recharge borewells. From about 20 mm of rain water on June 21 and July 5, the center harvested about 2,800 liters which was stored in their tank.

In March, INTACH (an NGO that has worked on dam issues in India) tabled a blueprint on water augmentation through water harvesting and recycling within Delhi. According to the report, water harvesting will yield 675 million liters a day (mld) while water recycling will yield 2,205 mld. This amount is sufficient to close the projected demand-supply gap at affordable costs. INTACH proposes to augment water supply by 9.8 trillion liters per year through rooftop water harvesting and other harvesting techniques. They also plan to use old channels, village ponds and local eco-parks to harvest water. The NGO Pani Morcha has proposed to treat sewage water that will be pumped into the river Yamuna. ■

This article is excerpted from the August 1999 issue of Down to Earth, the magazine of Centre for Science and Environment (New Delhi). For more information, contact CSE: Ph: +91.11. 6433394 Fax: +91.11.6441711; email: cse@gn.apc.org; web: www.cseindia.org.

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for groundwater extraction, connecting them to the central supply system would be relatively straightforward, and the cost is estimated to be less than two-thirds of the Okavango pipeline water. The only caution water planners have is that the mine water might need extra treatment to reduce mineral content before it could be consumed.

Further north from the abandoned mines lies a complex of aquifers that have not been significantly tapped to date. The Department of Water Affairs believes that these aquifers could yield as much as 15 million cubic meters per year on a sustainable basis, and another 10 million during droughts. While over-pumping groundwater is a concern in some parts of Namibia, the Department of

Water Affairs believes central area aquifers can safely sustain higher pumping rates for at least two consecutive years. The computer modelling conducted for the Okavango Pipeline feasibility study concluded that it is highly unlikely that emergency pumping would be required for more than two consecutive years, even in extreme possible drought scenarios. Developing these aquifers would take longer and cost more than the other alternatives, but it would still be less than Okavango water.

The IRN-CI report concludes that together these options represent a better alternative to meeting the central area's long-term and emergency water needs than diverting the Okavango River. The technical and

financial requirements of exploiting abandoned mines and tapping unused aquifers are not insignificant, but are certainly less challenging than constructing a 250 km pipeline to the Okavango River. It remains to be seen if the Namibian government will extend the Okavango's new lease on life by moving soon to advance these more-sustainable strategies before the next drought tests its nerves. ■

"Meeting Namibia's Water Needs While Sparing the Okavango" was presented to the Namibian and Botswana governments' water departments in September, as well as local NGOs working on water issues in the region. The text of the report is available on www.irn.org.

Land Yes, Dams No!

World Commission Hears Latin American Opposition to Dams

by Patrick McCully

The depth of grassroots opposition to dams in Brazil was strongly demonstrated at a World Commission on Dams (WCD) public hearing held in São Paulo in August. More than 800 people, the great majority of them members of Brazil's Movement of Dam Affected People (MAB), packed into the meeting hall for the two-day meeting. Eighteen busloads of MAB supporters came to the hearing from dam-threatened communities in the Ribeira Valley in Sao Paulo state. The Ribeira communities are made up of the descendants of escaped slaves, and are determined to protect their distinct cultural identity and their lands from the aluminum companies who want to dam their river. Two busloads had travelled overnight from the valleys of the far south of Brazil. Others endured days of gruelling overland travel from the Amazon and other remote regions.

Banners hung in the meeting hall emphasized MAB's call for a moratorium on new dams in Brazil until a satisfactory solution is found for the nation's 30,000 families who have lost their livelihoods to dams and are still waiting to be properly resettled. Sadi Baron, Executive Coordinator of MAB, demanded that every dollar spent on planning or building dams should be matched by a dollar spent on research and implementation of alternative power sources.

The atmosphere in the hall was especially charged during the panel on indigenous and ethnic minorities and dams. A presentation by Carlos Chen, an Achí Mayan from the community of Río Negro in Guatemala, provoked cries of outrage and horror. Chen's wife, children and sister were among 400 people murdered by paramilitaries due to their opposition to the Chixoy Dam, a project funded by the World Bank and Inter-American Development Bank (IDB). "The government took their money to build the dam," said Chen, "and used it to kill my people." The panel ended with chants of *Terra Sim, Barragens Não!* ("Land Yes, Dams No!") from the hundreds of MAB supporters.

The WCD hearing was a unique chance for Latin Americans to give first-hand testimony about their experiences with dams. The hearing included panels on issues such as future energy scenarios, resettlement, environmental impacts, and decision-making processes. Each panel was roughly divid-

ed between pro- and anti-dam perspectives, with presenters from throughout Latin America representing governments, electric utilities, research institutes, and indigenous, environmental and human rights groups.

Nine of the 12 WCD commissioners were present to listen to the presentations and question the presenters. The Chair, Kader Asmal of South Africa, missed the hearing due to his post-election ministerial duties. Medha Patkar from India was unable to attend because of her commitment to face the monsoon-swollen waters behind the Sardar Sarovar Dam on the Narmada River. The day before the hearing began, Patkar was dragged out of waist-deep water by police and arrested after having spent 15 hours in the rising water (see the August issue of *WRR*). Shen Guoyi from China's Ministry of Water Resources was also unable to attend.

The anti-dam presentations tended to be very much grounded in actual experience, with often emotional descriptions of the suffering caused by dam projects and angry denunciations of the corruption and dishonesty which surrounded their construction. The presentations in favor of dams, by contrast, were more abstract and tended to emphasize future forecasts for factors such as population growth, energy demand and water supply and to imply that these trends would necessitate the building of more dams.

Pro-dam presenters were mostly prepared to admit that mistakes had been made in dam-building in the past but claimed that in future problems would be avoided by building smaller and less environmentally and socially destructive dams. Afonso Moreira Santos from the recently created Brazilian energy regulatory agency ANEEL claimed that future reservoirs would have to be smaller since "private sector investors which Latin governments are seeking to build power projects don't want to deal with social and environmental problems."

Jaime Millan from the IDB explained that natural gas was currently the fuel of choice for new power projects in Latin America and that few large hydropower projects were attractive to private investors. Natural gas is "the bridge to the clean, low-cost energies of the future" according to Millan. "Hydropower is no longer what it used to be during the golden '70s when the whole region was



Carlos Chen giving evidence on the Chixoy Dam massacres.

involved in a dash for hydro," he added. Millan said that since 1961 the IDB had invested some US\$8.6 billion in dams but that since 1995 the public sector part of the Bank had not funded any hydro projects. Millan believes however that hydropower still has an important role in some countries and that hydro development could be boosted by receiving funds from the "carbon trading" mechanisms being promoted under the Kyoto Protocol on climate change.

Other presenters, however, challenged the promotion of hydropower as "climate-friendly." Philip Fearnside of the National Institute for Research in the Amazon stated that greenhouse gas emissions from rotting vegetation in the reservoir of Tucuruí Dam equalled the fossil fuel emissions of the city of São Paulo. Jorge Cappato from the Argentinian NGO Fundación Proteger argued that because of its massive social and environmental impacts "hydropower cannot be considered as 'clean energy' nor as 'renewable'." Cappato added that climate change would make dams less rather than more desirable, in particular because a warming climate would heighten the risk of tropical waterborne diseases associated with reservoirs – such as malaria and schistosomiasis – spreading into temperate regions.

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One of the most strongly pro-dam presentations was given by Altino Ventura Filho of Itaipú Binacional, the state company which operates Itaipú Dam, the world's largest single source of electricity. Ventura Filho described Itaipú as "one of the seven wonders of the modern world." Interestingly, however, when commissioner Göran Lindahl asked Ventura Filho whether Itaipú could be built today under a democratic system, as opposed to the military dictatorship in place when Itaipú was built, Ventura Filho said that he did not think so. Itaipú displaced 60,000 people and flooded Sete Quedas, reputed to be one of the world's most spectacular waterfalls. Göran

Lindahl is the CEO of Swiss-Swedish engineering multinational ABB, which supplied Itaipú's turbines.

Probably the most frequently raised issue at the hearing – and one on which there was general agreement among pro- and anti-dam presenters and the commissioners – was the need for affected communities to have a meaningful role in the process of deciding whether and how to build dams. Such a policy would in turn require the full release of project documentation in a timely manner, and making dam builders accountable for their promises.

The World Commission on Dams was launched in February 1998 under the spon-

sorship of the World Bank and IUCN - The World Conservation Union. It is now independent of both entities. The 12 commissioners represent both strongly pro- and strongly anti-dam perspectives. The commission's final report, which will include recommendations on future planning in the water and energy sectors as well as on the provision of reparations for those who have suffered because of past dams, is expected to be completed in late 2000. Future WCD public hearings are planned for Africa and the Middle East (in Cairo in December) and East and South-East Asia (February). ■

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system losses, establishing a new rate structure to penalize high water use, and imposing a moratorium on expanded water use. But local groups and water conservation professionals believe more could be done.

"Cal-Am and the Monterey water district are presenting the Carmel River Dam and Reservoir as the only solution to the area's water needs. This is not the case," says local opposition group Citizens for Alternative Water Solutions (CAWS). "There are better solutions – water sources that will not become obsolete before they are paid for, could be on-line providing water years earlier, are more sensitive environmentally and do not threaten cultural destruction."

The local chapter of the Sierra Club and CAWS have also put forward a set of proposed water supply alternatives that would generate enough water to meet regional needs. The groups' plan includes using existing wells from the local Seaside aquifer, injecting water from the Carmel River into the aquifer during periods of high flow, and constructing a desalination plant. Additional water could be gained by increasing the efficiency of potable water use, substituting non-potable water for existing uses of potable water, retrofitting toilets, and further reducing leaks and other losses in the water distribution system.

Environmental impact studies for the project are expected to be completed by summer 2000. Once these are finished, the district is expected to make a decision whether to approve permits for the dam. ■

For more information on this project, contact CAWS at xasauan@aol.com, or the Ventana chapter of the Sierra Club at gtaylor@redshift.com.

River Keepers continued from page 9

before it is distributed as drinking water for the community.

There is also much water to be gained by reducing that used for sewage treatment. Treating waste is a hugely water-intensive process, and the commonly used systems cannot be sustainably expanded to serve the three billion people now without access to sewage treatment. Natural water treatment systems such as using wetlands often can be an alternative to modern water treatment technologies. Recycling waste for agricultural purposes by using oxidation ponds and aerated lagoons does not require as much land as is often assumed; however, the land requirement of oxidation ponds is a stumbling block for their use – particularly in urban areas. Moreover, it decreases pollution, reduces the need for fertilizers, and often can be accomplished with small-scale, low-cost technology that is based on local traditions, is decentralized and ecologically sound. ■

Blue Gold continued from page 7**10) Economic globalization policies are not water sustainable.**

The values of unlimited growth and increased global trade are totally incompatible with the search for solutions to water scarcity. Economic globalization undermines local communities by allowing for easy mobility of capital and the theft of local resources. Liberalized trade enables some countries to live beyond their ecological and water-resources means; others abuse their limited water sources to grow crops for export. A water-sustainable society would denounce these practices. If we accept the principle that to protect water we must attempt to live within our watersheds, the practice of viewing the world as one seamless consumer market must be

San Roque continued from page 3

and the Committee on Public Works to conduct an investigation into the structural soundness of the dam, in order to prevent a huge environmental disaster in the area.

"The Japanese government needs to seriously reconsider its support for the San Roque Dam in light of these reviews," said Ikuko Matsumoto of Friends of the Earth Japan. "It is quite clear that the existing EIA should not be used as a basis for decision-making on this project, and that JEXIM should refrain from releasing any additional loans until it has undertaken a thorough and public reassessment of the economic, social and environmental impacts of this project."

The review was coordinated by IRN in association with officials of the Shalupirip Santahnay Indigenous Peoples Movement (SSIPM), the Cordillera People's Alliance, and Friends of the Earth Japan.

The San Roque Dam is to be located on the lower Agno River of Pangasinan Province on Luzon island. ■

abandoned. Building our economies on local watershed systems is the only way to integrate sound environmental policies with peoples' productive capacities and to protect our water at the same time. ■

CONTACTS

Blue Gold is available for \$12 plus shipping from IFG: Ph: 415.771.3394; Fax: 415.771.1102; email: ifg@ifg.org; web: www.ifg.org. The Council of Canadians is starting a Water Watch movement, both to protect Canadian water supply and to kick-start an international citizens' movement to protect water. For more information: Ph: 1.800.387.7177 or email: waterwatch@canadians.org.

Corruption continued from page 1

investment represents just five percent of overall project costs. But if the Bank's financial contribution to the Lesotho project is relatively small, its role in organizing the financing for the project was instrumental in getting it off the ground. The bank financed the design of the project, and set up an off-shore trust in the UK to help other donors circumvent international sanctions against South Africa's then-apartheid regime. The loan was nominally for Lesotho, a country far too poor to qualify for large loans.

According to confidential project documents, the bank was also responsible for "effective project management, human resource development and sound financial management," in addition to providing for design and construction supervision, the transfer of engineering and other technical skills to local staff, and oversight of social and environmental impacts.

The World Bank has proclaimed that fighting corruption is essential to its mission of reducing poverty and promoting environmental sustainability. But the corruption on this project will test the bank's resolve in fighting corrupt practices.

The bank's procurement guidelines state it will "declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a bank-financed contract" if the firm is found to have "engaged in corrupt or fraudulent practices in competing for, or in executing, a bank-financed contract." A bank "sanctions committee" decides on these matters, and maintains a list of ineligible firms. The listing, found on the bank's web site, includes nine relatively small companies.

First indications are that the bank believes its rules may not apply to this high-profile case, because the alleged bribes are not directly tied to bank loans on the project. A recent bank press release on the scandal states: "We will conduct an internal investigation to ensure that Bank policies and procedures have been followed on the components of the project that have been financed by the World Bank." The bank will certainly lose credibility in its war on corruption if it pursues this narrow view of its obligations.

The *Washington Post* on August 13 quoted the bank's acting general counsel, Daoud Khairallah, as saying: "We cannot eradicate corruption in all situations where we have no control ... If any of our funds have been tampered with, yes, we can debar. But not if it's something that we didn't have any control over."

Jeremy Pope, executive director of Transparency International, told the *Post*: "It's a

project the World Bank was involved in, and logic says – if you're bribing, you're bribing; and if you're unfit to be bidding for business, you're unfit."

If the Bank were to debar companies found to have bribed the Lesotho official, it could have huge ramifications for a number of river development schemes. For example, Hochtief, Impregilo and Dumez are involved in the Bank-funded Ertan Dam in China. Acres International, Impregilo, Hochtief, Ed Züblin, Spie Batignolles and Dumez all have contracts on Xiaolangdi Dam in China, the bank's largest loan to China to date. Impregilo is also working on China's Shanxi Yellow River Diversion Project, which will divert water from the already troubled Yellow River. The Italian firm is also working on the Lower Kihansi in Tanzania, and Ghazi Barotha in Pakistan. Both Acres and Lahmeyer are involved in the Bank-funded Nam Theun II project in Laos. Acres is also building the Owens Falls Extension Project on the Upper Nile in Uganda.

The World Bank's fiscal oversight responsibilities on this project should have placed it in a position to uncover this corruption itself. The Lesotho official charged was fired in 1995, and yet bribes allegedly passed from the dam companies to his account as late as 1998. According to internal correspondence between the government of Lesotho and the World Bank, the bank was aware of serious management problems at least since 1994. A December 2, 1994 letter to the Government of Lesotho from the Bank's Southern Africa Department acknowledges that a management audit of the project had taken place

and that two officials, including the one who now stands accused of bribery, were suspended from their duties.

Ironically, as this mismanagement crisis began to unfold, the World Bank in this same 1994 letter voiced its support for the suspended managers, and said that the suspensions "could seriously jeopardize the progress of the project." The bank's letter even threatened to take legal action against the government for making the management changes without its permission.

Firms Deny Involvement

A number of the companies involved have denied their involvement in the bribery, despite the fact that the Lesotho government has enough evidence to bring the corrupt official to court, and this evidence has been confirmed by the Swiss government. According to reports in the Swiss newspaper *SonntagsZeitung*, an investigation by the district attorney in Zurich, Switzerland found that 12 firms had paid money directly to the Zurich and Geneva bank accounts of the accused official, or to bank accounts of third parties. The firms' names had been blacked out in the Swiss court documents, but it seems likely they correspond to the firms listed in the *Business Day* accounts. Thus far, only ABB has agreed to cooperate with the investigation.

All of the companies implicated in this scandal are from countries that have signed the Organization for Economic Cooperation and Development's convention on corruption and bribery, which obliges signatories to adopt national legislation which makes it a crime to bribe foreign public officials. ■

When Bribery is Business As Usual

The companies implicated in this scandal are no strangers to allegations of corruption. Spie Batignolles and Sogreah were involved in Kenya's Turkwell Gorge Dam which, because of bribes reportedly paid to Kenya's president and energy minister, cost more than twice what the European Commission said it should have.

Impregilo, Dumez and Lahmeyer were three of the leading firms involved in the Yacyretá Dam in Argentina and Paraguay, which Argentina's President Carlos Menem has called a "monument to corruption." Yacyretá's projected cost was \$2.7 billion; the final cost was \$11.5bn.

Lahmeyer and Impregilo also had contracts on Guatemala's Chixoy Hydroelectric Project. Various sources estimate that between \$350 and \$500 million dollars were lost to corruption on this project. "The dam was the biggest gold mine the crooked generals ever had," according to Rafael Bolanos, dean of the School of Civil Engineering at Guatemala's San Carlos University.

ABB and Dumez worked on Itaipú Dam (Brazil/Paraguay), which has been described as "possibly the largest fraud in the history of capitalism." The dam was originally projected to cost \$3.4 billion, but skim-offs brought the final cost to around \$20 billion. ABB also worked on Tucuruí Dam in Brazil, another project tainted by major corruption.

About IRN

IRN was formed in 1986 by hydrologists, engineers and environmentalists to address the worldwide prevalence of unsound, destructive river-development schemes. Our mission is to halt and reverse the degradation of river systems; to support local communities in protecting and restoring the well-being of the people, cultures and ecosystems that depend on rivers; to promote sustainable, environmentally sound alternatives to damming and channeling rivers; to foster greater understanding, awareness and respect for rivers, and to support the worldwide struggle for environmental integrity and social justice.

Reports

NEW! River Keepers Handbook: A Guide to Protecting Rivers and Catchments in Southern Africa by Lori Pottinger. 1999. 52 pp, \$15.

Power Struggle: The Impacts of Hydro-Development in Laos by Aviva Imhof, 1999. 68 pp, \$15.

The Asian Development Bank's Role in Dam Building in the Mekong Watershed by Aviva Imhof, 1997. 19 pp, \$10.

Beyond Big Dams: A New Approach to Energy Sector and Watershed Planning, edited by Juliette Majot. 1997. 126 pp. \$20. Explores small scale hydro.

Proceedings of The First International Meeting of People Affected by Large Dams. 1997. \$15.

The Relationship Between Primary Aluminum Production and the Damming of the World's Rivers, by Jenny Gitlitz. 1993. 150 pp, \$20.

Considering the Hidrovia – A Preliminary Report on the Status of the Proposed Paraguay/Paraná Waterway Project by Owen Lammers (IRN), Deborah Moore (EDF) & Kay Treakle (BIC). 1994. 60 pp, \$15.

River Dolphins – Can They be Saved? by Elizabeth Carpino. 1994. 42 pp, \$15.

Damming the Rivers: World Bank Lending for Large Dams by Leonard Sklar & Patrick McCully, 1994. 89 pp, \$20.

Lessons Unlearned: Damming the Mekong River, by Steve Rothert. 1995. 70 pp, \$15

Technical Review of the Mekong Mainstream – Run-of-River Hydropower Report, by Philip Williams & Steve Rothert, 1995, 7 pp, \$3.

The following campaign information packets are available for \$15 each: Three Gorges Dam (China) • Pangu Dam / Biobio River (Chile) • Arun III Dam (Nepal) • Nam Theun 2 (Laos) • Xiaolangdi Dam (China) • Lesotho Highlands Water Project (Africa) • Hidrovia Dossiers 1-5 (South America) • Bakun Dam (Malaysia) • Epupa Dam (Namibia)

Other Resources

World Rivers Review subscriptions are automatic for IRN members. Back issues are \$5.

Large Dams, False Promises, writer and producer, David Phinney; executive producer, Andrea Torrice. 33 min. video, \$35. Features the stories of three dams: Sardar Sarovar (India), Three Gorges (China) and Balbina (Brazil). The stories illustrate the destruction that large dams are causing to ecosystems and riverine communities worldwide.

Silenced Rivers: The Ecology and Politics of Large Dams, by Patrick McCully. 1996. 350 pp. \$20/members, \$25/non-members. This book covers the environmental and social effects of large dams around the world.

River of Words Teacher's Guide. 1996, 50 pp, \$6. Classroom and field activities on watersheds for grades K-12. Supports IRN's international environmental poetry and art contest, conducted annually in partnership with The Library of Congress.

Rowing Partners: 101 Ways to Build Community Partnerships, by Pamela Michael. 1998, 19 pp, \$5. Idea-packed booklet offers strategies and concrete steps to help create local support and enthusiasm for River of Words (or any community project).

Information Services

World Wide Web: IRN's web site has hundreds of items on river campaigns around the world, links to other sites of interest, WRR articles, maps and much else. Visit it at www.irn.org

IRN's resources are used to support the information needs of non-profit organizations as well as individuals and institutions. General research fee per hour is \$50 (\$25 minimum per request, plus photocopy and mailing charges).

For more information about IRN's activities and publications, or to order our more detailed publications brochure, contact:

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Asian Bank Breaks Promises on Lao Dam Compensation

by Aviva Imhof

“We’ve lost all confidence in the dam company. They’re not paying attention to our problems. They have not been sincere in their efforts to help us.” So say villagers affected by Laos’ Theun-Hinboun Hydropower Project on the Theun River, which has been operational since January 1998.

A recent visit by a researcher to nine villages affected by the project revealed that it is continuing to cause severe impacts to the livelihoods of a large number of rural villagers, and that villagers have received minimal compensation for their losses. These findings fly in the face of assurances by the Asian Development Bank (ADB) and project authorities that people are being compensated and that the project’s impacts are minimal.

In November 1998, after months of sustained lobbying by NGOs, the Asian Development Bank, which funded the project, admitted that the dam was having a substantial impact on the livelihoods of thousands of people in central Laos, and that they

deserved compensation for their losses. The bank outlined a process for determining and allocating compensation, which was expected to be completed by the end of May 1999. As of August 1999, negotiations with villagers still had not begun and adequate compensation had not been provided to affected communities.

Villagers downstream and around the reservoir reported major problems with drinking water supplies, as the water has become too turbid to drink. Many villages have been promised wells by the project authorities but so far none have been provided to those villages visited. As a result, villagers have resorted to buying drinking water, or collecting it from shallow wells located a considerable distance away.

All villagers reported significant declines in fish catches and loss of fishing nets due to fluctuations in water levels. Loss of dry-season vegetable gardens due to higher water levels have resulted in lower village incomes and less food for domestic consumption.

ADB claims the village of Ban Namsanam was relocating “due to reasons unrelated to the project.” However, villagers stated that they had to leave their village because of impacts caused by a road built for the project. The road obstructed natural water drainage patterns from the village, leading to sanitation problems, which in turn resulted in a cholera epidemic last year, in which two people died. After being hit with cholera, many villagers felt that it was necessary for them to move. The amount of compensation provided has been very low and unacceptable to the community. Villagers also claimed that they were promised electricity and clean drinking water at the new relocation site, but the 50 families that have already moved have not been supplied with either.

One village leader told the researcher, “Our lives are in ruins and if something is not done to improve the situation we may not be able to survive in the village for more than about three years. We may have to move away to somewhere else.” ■

SPECIAL FOCUS ON WATER SUPPLY

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