

Sardar Sarovar to be Raised 12,000 People at Risk in 2003 Monsoon

by Patrick McCully

Indian authorities on May 14 gave permission for the Gujarat government to increase the height of the Sardar Sarovar Dam by five meters. The lowest part of the dam wall is likely to be raised from 95 to 100 meters before the start of the monsoon in late June. The final height of the dam, under construction across the Narmada River since 1987, is planned to be 139 meters.

The Narmada Control Authority, which includes representatives from the four states involved in the project as well as the central government, last gave permission to raise the dam – also by five meters – in May 2002.

Every meter added to the dam increases the area of crops lost and number of homes flooded during the monsoon. According to the Narmada Bachao Andolan (NBA - Save the Narmada Movement), 12,000 people are at risk of submergence once the dam reaches 100 meters.

Medha Patkar, leading activist for the NBA, said the decision spelled “disaster, destruction

and human tragedy.” Patkar also said that the decision is “a clear violation of the Supreme Court order and the Narmada Water Disputes Tribunal Award. It seems governments have now stopped caring for people.”

The Supreme Court’s 2001 ruling on Sardar Sarovar and the 1979 legal framework for building the dam both require that families must be resettled and given replacement land six months before the dam is raised to a height that threatens to submerge their homes.

The Madhya Pradesh government has admitted that it does not have enough land for the 33,000 families that will need to be resettled in the state for the dam. Madhya Pradesh is now trying to force affected families to accept cash compensation in place of the new land to which they are legally entitled.

Another state where many of the soon-to-be-submerged live, Maharashtra, admitted to the Narmada Control Authority (NCA) on May 14 that it has not completed the resettlement of displaced people affected at

100m. The NCA accepted the state’s promise that it would do so before the monsoon, and directed the state governments to make contingency arrangements to “safeguard” the project-affected families against any “untoward” incident during the flood season.

The previous government in Maharashtra appointed a joint task force with the participation of the Narmada Bachao Andolan to assess the status of resettlement in the state. The task force’s report, issued in 2002, showed that hundreds of families at risk of flooding at 90m had still not been resettled and rehabilitated. The report concluded that there was insufficient land available for resettlement and that no resettlement plan had been developed.

Sushilkumar Shinde, Chief Minister of Maharashtra, told the NBA in a meeting on May 8 that the state would only allow the NCA to give permission to raise the dam when all families to be affected were resettled according to the law. This promise was disregarded when the NCA met on May 14. ■

SPECIAL FOCUS: ENGINEERING RIVERS

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Huge Water Transfer Scheme Would be Death Warrant for India's Rivers

by Himanshu Thakkar

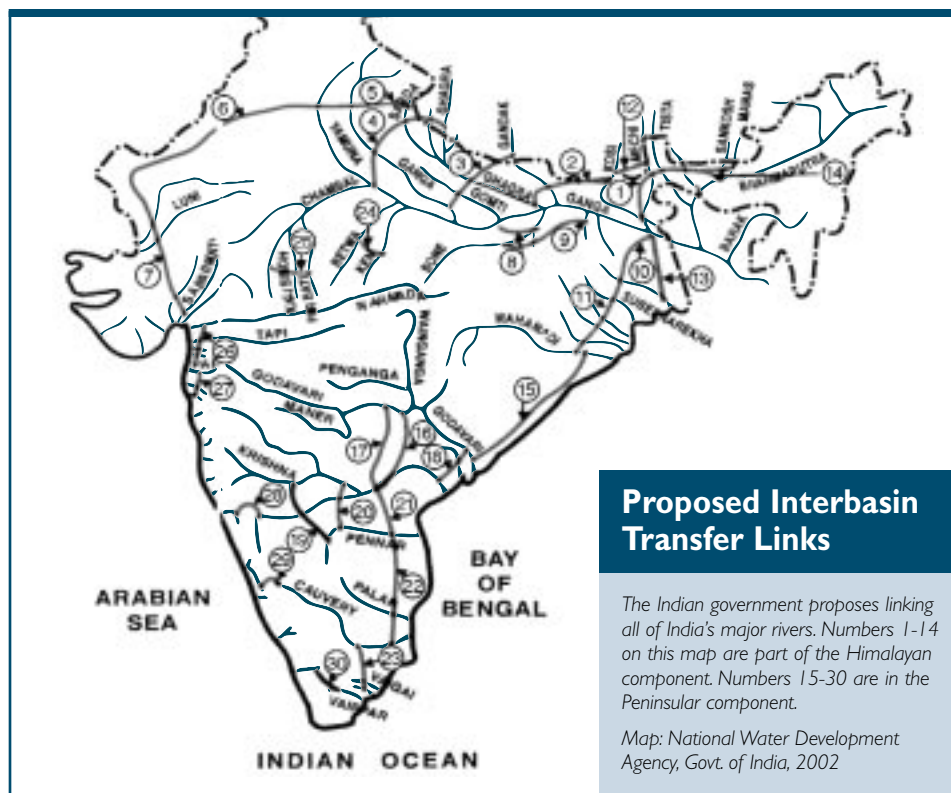
The Indian Government, led by Prime Minister Atal Behari Vajpayee, has out of the blue declared it wants to proceed with an engineering scheme to link all of India's major rivers by 2016. Next year is an election year and Vajpayee's Bharatiya Janata party seems to be using the proposal to win votes, seemingly oblivious to the fact that the massive scheme will be a death warrant for India's rivers.

Many of India's rivers are already in grave condition after an onslaught of over 4,000 large dams and diversions completed in the India in the last 55 years and over 400 under construction. Moreover, as early as 1980 the Central Pollution Control Board declared that water from all of the rivers in nation's plains is too contaminated to drink. The quality since that time would have only gone down.

The Proposal

The project would link 37 rivers, transferring water from so-called "surplus" to "deficit" basins. The two main components are the Himalayan section, with 14 links, and the Peninsular section, with 16 links. The claimed benefits include irrigation for an additional 35 million hectares, new power generation capacity of 34,000 MW, flood protection, navigation and so on. The government has given little in the way of details, including which areas will get irrigation, or how there can be a net increase in power generation when pumping water across mountains and over great distances will require a large amount of power. There are also international dimensions, as two of the main basins in question are shared with a number of countries.

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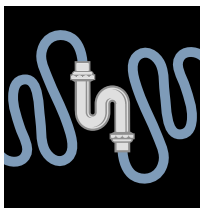


As former secretary to India's Ministry of Water Resources said at a meeting in New Delhi on May 17, the river linking proposals did not figure in India's Five Year Plans for 1997-2002 or 2002-07. There was no mention of them when the Prime Minister released the new National Water Policy in April 2002. The sudden appearance of this huge scheme – the costliest project ever undertaken in India, at an estimated US\$124 billion – raises questions about why such a massive scheme is needed at this time.

Much of the proposal is speculative at best. The government admits that it has

completed feasibility studies of only eight of the 30 river links proposed under the scheme. Detailed project reports, including environmental and social impact assessments, are not available for any of the schemes. None of the reports completed so far are available in public domain, and numerous NGO letters to the various government agencies working on plans for the scheme remain unanswered. In fact, none of the studies under the Himalayan component were made available even to a National Commission on Integrated Water Resources

continued on page 7



Pork Barrel: A government appropriation designed to ingratiate legislators with their constituents.

Nothing says power quite like a massive engineering project. Gargantuan river-diversion schemes such as those proposed by governments in Spain, India and China (all described in this issue) are surely as much about exhibiting political control as they are about water resources management. In fact, they are often more successful at the former than the latter.

The projects described herein are truly mind-boggling in their scale, cost and political hubris. India's government would link 37 of the nation's major rivers, at an estimated cost of US\$124 billion. China plans to move the waters of the Yangtze River more than 770 miles. And Spain plans to use 120 dams and hundreds of miles of channels to divert the Ebro River to urban areas and agribusiness. These projects will result in large-scale forcible resettlement and the loss of livelihoods for people, and diminished health for the engineered rivers.

The purpose of these projects is ostensibly to correct a mistake that nature or God imposed the world over: some watersheds have "too much" water, while others have "too little." Not only is the assumption questionable, but these hugely expensive schemes rarely solve the problems they set out to fix. In fact, they create new problems, for the rivers that lose water, the rivers that receive it, and the people and animals they support.

Research into the impacts of interbasin transfer schemes is rather scarce, but the basics are known. By reducing the flow in some rivers, these engineering schemes can dry up wetlands, damage estuaries, impact fisheries and harm water quality. In the receiving rivers they can create biological chaos, as the creatures, chemicals and different-temperature waters are piped from one river system to another. And unseen things are lost as well. As Bryan Davies, a South African expert on river transfer schemes, has written, "It has frequently been pointed out by river biologists that there is no such thing as surplus water for inland aquatic ecosystems. All of the water occurring naturally in a wetland, or running wild in a river, is useful to the system – sometimes in subtle ways."*

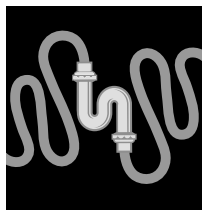
Playing God with rivers can also bring out the devil in elected officials. As our cover story notes, the Indian river-linking scheme is being hurriedly put forth in time to influence an election. It is hardly the first time that the highly visible concrete walls and channels of a river engineering scheme have been used to direct the flow of votes toward a ruling party. "Pork barrel," as such projects are known in the United States, are popular with politicians the world over. Not only are they often unnecessary, but the scale of these massive engineering works practically guarantees that corruption will take place, thus undermining poverty reduction efforts, democratic institutions and public trust in the political system.

It's not as if there are no alternatives. As the two interviews in this issue reveal, Spain and China are highly wasteful in their water use, yet are not taking sufficient steps to reduce this waste before proposing new supply-side projects. Politicians do not see great benefit from pushing widely diffuse solutions to problems, and demand-side management unfortunately falls into that category.

At issue is how to approach the kinds of problems these projects purport to fix. On thing is certain: in the end, no matter how you pipe it, the world continues to have a finite amount of water. And no matter how much we engineer it, we still seem unable, in water as well as wealth, to reduce the differences between the "haves" and the "have-nots."

Lori Pottinger

* (Vanishing Waters, UCT Press, 1998.)



SPECIAL FOCUS: ENGINEERING RIVERS

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Judgment Day for Snake River Salmon

by Elizabeth Brink

Salmon have been a cornerstone of Pacific Northwest culture for centuries, and time is running out to save them from extinction. But a recent court ruling may breathe new life into efforts to keep them from disappearing forever from at least part of the huge Columbia River Basin.

A federal judge has ruled that current government efforts to preserve runs of endangered salmon on the Snake River are insufficient. The ruling throws open the possibility of dramatic changes in government intervention to meet the requirements of the federal Endangered Species Act – including re-operation or breaching of four dams on the lower Snake River.

The ruling is a setback for the Bush administration, which pressed for mitigation measures to save the salmon rather than breach the dams. On the presidential campaign trail, Bush pounded the podium and said that the four lower Snake River dams would not be removed while he was in office. The National Wildlife Federation (the lead plaintiff), along with 15 others, hope the courts will help change his mind.

Twelve populations of salmon and steelhead in the Columbia Basin are protected under the Endangered Species Act, and several others have already gone extinct. Dams have been identified as the major culprit in their precipitous decline. For decades, the US Army Corps of Engineers has tried a number of techno-tricks to halt the species decline,

“We are not so rich that we can afford to lose our wild salmon or so poor that we must keep the Snake River dams that are killing them.”

*Carl Pope, Executive Director
of the Sierra Club*

such as hauling fish around the dams in trucks and barges. These methods have cost billions of dollars, but salmon populations continue to diminish.

The May 7 ruling is the second time in 10 years that the courts have rejected expensive federal plans to restore salmon populations without breaching the dams. The Army Corps of Engineers had acknowledged in its now-rejected plan that dam breaching might still be required to restore salmon, but the agency had postponed more fully evaluating that option until 2005. Now they have one year to change hydroelectric dam operations to better protect wild salmon.

“They have a legal duty to protect the fish. We expect them to take steps now,” said Todd True, a lawyer with EarthJustice Legal Defense Fund. Local tribes could demand tens of billions of dollars based largely on the Treaty of 1855, which guarantees them the right to take salmon in perpetuity. The

tribes, which include the Nez Perce, Umatilla, Warm Springs and Yakama, have been reluctant to use litigation in the past, but time is running out for the salmon.

Backup Plan

On March 5, US representatives Jim McDermott (D-Wa) and Tom Petri (R-Wi) reintroduced the Salmon Planning Act in Congress as a backup plan for northwest wild salmon and steelhead. The bill would authorize several studies to examine transportation and energy alternatives, and community transition plans in the event that dam removal is required to recover the Snake River’s wild salmon and steelhead. It would also provide the federal agencies provisional authority to remove the four Snake River dams if needed to restore salmon. “The Salmon Planning Act prepares for this decision, and would lay the groundwork for rapid action to remove dams, restore salmon, and protect communities,” the bill’s authors write.

Scientists estimate that dam breaching could lead to 80-90% species recovery within 20 years. Likewise, if nothing changes, all species of Snake River salmon could be extinct within those same 20 years.

“This must become a national issue,” argues David Liberty of the Umatilla tribe. “The administration will only respond to a groundswell of public demand that something be done.” ■

Fast Facts

Targeted Dams: Ice Harbor, Lower Monumental, Little Goose & Lower Granite dams, all in Washington state.

River system: The Snake is a main tributary in the Columbia River Basin (North America’s fourth largest, this basin drains about 250,000 square miles). Some 250 dams block the system. About 140 miles of river would be restored if these four dams were breached.

Dam Purpose: Averages 850 MW of hydropower production (less than 5% of energy in the region), enables barge transport of grain.

Dam Removal Purpose: Scientists estimate this option could lead to 80-90% species recovery within 20 years.

Built: 1961-1975

Cost of mitigation: Over \$4 billion in the past 20 years

What You Can Do

Save Our Wild Salmon (SOS), a coalition of over 50 organizations, is working with diverse partners including labor and taxpayer groups and local tribes to build public understanding and support for salmon recovery. To learn how you can get involved, visit www.wildsalmon.org.

You can also urge your Congressman to support The Salmon Planning Act (HR 1097), a bill providing the necessary studies, funding and authorization to provide salmon the safety net they need. Visit www.wildsalmon.org or contact SOS Outreach Associate Peter Ovington at peter@wildsalmon.org, 1.800.SOS.SALMON, for more information.

Missing in Action

Bank Acknowledges Possibility that Hundreds of Affected Families Were Overlooked on Brazil's Cana Brava Dam

by Glenn Switkes

In a potentially precedent-setting action, the Inter-American Development Bank (IDB) has contracted a team of independent specialists to interview more than 800 heads of families who say they lost their land or livelihood as a result of construction of Cana Brava Dam on the Tocantins River. The project's impact studies had listed only 258 families as affected by the project, which activists say leaves out hundreds of families whose livelihoods depended on the area that was submerged.

"The IDB is conducting this audit to cover up their failure to adequately supervise the project. We don't know whether or not this will bring any practical result, because the company has denied its responsibility to follow acceptable norms in dealing with the affected population," says Sidnei Andrioli, an organizer for the Brazilian Movement of Dam-Affected People in the area.

The 450 MW hydroelectric project began generating electricity in May 2002. The project is owned by Tractebel, the Belgian subsidiary of the French water services conglomerate, Suez SA. The IDB loaned more than US\$160 million for the project, whose total cost is estimated at \$550 million. An additional \$320 million in loans and guarantees was provided by Brazil's National Economic and Social Development Bank (BNDES).

Although BNDES has loaned more money for the project, it has no environmental or resettlement policies for projects it supports, other than that projects its finances have to follow national and local laws. This gives activists little leverage to protest individual projects, though increasingly they are beginning to scrutinize the government bank's overall lending, which has leaned heavily toward hydro projects. The IDB, on the other hand, has distinct environmental and resettlement policies, which were likely violated in the Cana Brava case.

The outcome of the IDB's social audit is uncertain. The consultants said they will submit their results within the next three months to an independent mediator, who will examine the results and present the findings to Tractebel, which is responsible for compensating the families. The fact that both IDB and Tractebel have expressed an interest in building more dams on the Tocantins river makes the results of this case quite

important. Some 100,000 people face forced resettlement from the 50 dams now being planned for the Araguaia-Tocantins basin.

Keeping up the Pressure

The low estimates of dam-affected people on the Cana Brava project led to an escalating conflict between the company, the bank, and Brazil's Movement of Dam-Affected People (MAB). The activist organization has twice occupied the dam site. Last May, MAB attempted to march to the dam site on the occasion of the project's inauguration, where the activists were confronted by 800 military sharpshooters. A March 14 mobilization, which was part of nationwide activities on the International Day of Action Against Dams, resulted in MAB ordering dam workers to shut down the plant's turbines, and in the company's subsequent agreement to meet with MAB representatives at Tractebel's Brazil headquarters. That meeting only

served to further muddy the waters, however, as Tractebel initially agreed to set up a fund to assist families affected by Cana Brava, but later announced it had no further responsibility. Manoel Zaroni Torres, company president, said, "Tractebel has already paid all it needed to pay. We can't let ourselves be held hostage by opportunists."

The IDB has received steady pressure from MAB and from non-governmental organizations from various countries since it began considering a loan to Tractebel in 1999. This culminated in June 2002, with a complaint being filed by MAB with the IDB's Independent Inspection Mechanism. The IDB has been broadly criticized for dragging its feet in the processing of this complaint, a fact which René Rios, head of the Inspection Mechanism office, attributes to budget limitations and internal pressures at the bank. In April, more than nine months after the complaint was filed, the Inspection Mechanism

Aluminum Dams Planned for Amazon Put on Hold

Brazil's new government is approaching the licensing of new hydroelectric projects with caution, recently taking actions that have put some large dams on hold. Some 84 hydroelectric projects are in the environmental licensing stage, and some, including Santa Isabel and Estreito dams in the Amazon, are facing serious challenges. The 1,080 megawatt Santa Isabel on the Araguaia River reportedly faces rejection by the Brazilian Environment and Renewable Natural Resources Institute (IBAMA), which evaluates applications for environmental licenses. The dam is a project of a consortium that includes the Brazilian aluminum company CVRD, the US aluminum giant Alcoa, and the multinational mining firm BHP Billiton – all huge energy users. Another "aluminum dam," the 1,200 MW Estreito Dam, is also snarled in litigation, and IBAMA has requested additional information regarding the project's impacts. Concession holders for the Estreito Dam include the Belgian energy company Tractebel, CVRD, Alcoa, BHP Billiton, and the Brazilian construction giant Camargo Correa.

Aluminum production accounts for about 8% of Brazil's total electrical energy use. Many "aluminum dams" have already been built, displacing thousands and flooding rich ecosystems. Now, Alcoa, BHP Billiton and CVRD have planned a string of new dams in the Amazon region to offset the loss of subsidized electricity they have received for their smelters in the region when 20-year contracts expire next year. The government has also announced that, beginning next year, concessions for new dams will be offered to private investors only after environmental studies are completed, public hearings held, and environmental licenses have been issued. Currently, concessions are offered before these steps have been taken, and the licensing process is compromised by political and economic pressures from the companies who win the concessions. Environmentalists feel these changes will permit more unwise dam projects to be filtered out early in the process.

Glenn Switkes

For more information on Brazil's aluminum industry and dams, see the October 2001 issue of WRR, available at www.irn.org/pubs/wrr/.

“There, on the river, which today is covered with water, we struggled, panned gold, planted and harvested. We had a good life there, and a thriving community. Today, we have no work.”

Xica the Gold Miner

office finally acknowledged the eligibility of the complaint, and submitted it to IDB management for its rebuttal. The investigation would then have to be formally approved by the bank's Board of Directors. Reportedly, the IDB's weak response to this and other cases recently filed with the Inspection Mechanism office has triggered a review of the inspection process within the bank.

MAB's level of organization at Cana Brava has risen steadily since 2000, when the head of Tractebel charged in a letter to IDB President Enrique Iglesias that "MAB's local representation is composed of big landowners who neither represent low-income families nor are concerned with same. Its main goal is, while using the poor on its own behalf and of big landowners, to establish disturbance, aggressiveness and threats, thus trying to intimidate the company so as to receive more for their land."

What Was Lost

At a rally on May 9 near the shores of the Cana Brava reservoir, more than 700 people at a MAB assembly heard consultants for the IDB who will determine whether families who say they were affected by the dam qualify under the bank's resettlement policy. "This will include all families who earned their livelihood in the area now submerged," said consultant Lincoln Barros. Many of the additional families now seeking compensation were *garimpeiros*, or artisanal gold miners, who made most of their income panning for gold on the Tocantins River during low-water periods. Francisca Barroso, a forceful woman known as "Xica the Gold Miner," said, "There, on the river, which today is covered with water, we struggled, panned gold during part of the year, and planted and harvested during other periods. We had a good life there, and a thriving community. Today, we have no work."

Others whose eligibility was denied by Tractebel were day laborers on ranches or



The uncounted of Cana Brava listen to IDB consultants explain the "social audit."

Photo: Glenn Switkes

sharecroppers. IDB consultants told the assembly that each of the candidates for compensation will be interviewed by the consulting team, and will be required to show some proof that they lived or worked in the area affected by the dam, such as employment contracts, letters from employers, photos and other evidence.

Interviews by IRN and MAB at Tractebel's resettlement projects indicate that there is nearly unanimous disapproval of the company's failure to provide good quality land and adequate support to displaced families, many of whom are close to giving up on their dream of being beneficiaries of the project. At the Filó resettlement, where 26 families are settled, Leonides Batista de Souza said, "They didn't tell us anything about the resettlements. They promised us irrigation, and said we wouldn't have to pay for water, but the system provided by the company doesn't wet the soil enough."

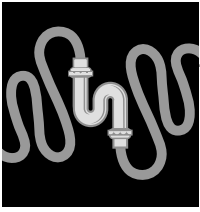
Mario do Carmo da Silva said, "On the banks of the river, we had lots of sugar cane, rice, manioc. We had all we needed. But now we have to pay for water and energy, without any money coming in, and it's very difficult." The company provided fertilizers for one hectare of land for the first year, but the farmers say they have no way to maintain the fertility of the rocky soils. Other landowners complain of gross inconsistencies in Tractebel's compensation offers. According to Sérgio Grusca, "My neighbors, who had poorer quality land and no legal land title, were offered far more per hectare than I was." A number of communities have been cut off from their access to the city of

Minaçu or from the now-submerged ranches which provided employment, and have become virtual ghost towns.

Tractebel has already announced it is postponing \$600 million in new investments in hydroelectric dams in Brazil until 2004 due to "environmental uncertainties and financing difficulties," and parent company Suez is prioritizing investments in European utilities, including the potentially lucrative Spanish electricity market. ■

On Another Front

MAB's pressure on dam builders to re-evaluate claims for compensation to dam-affected populations has had a positive impact at another problematic Brazilian dam. More than three years after the floodgates closed at Manso Dam in Mato Grosso state, officials of the state electric company, Furnas, had at press time reportedly agreed to relocate 480 families who had been resettled on poor, sandy soils. Another 1,062 families who claim to have been negatively impacted by Manso will be interviewed by the company. Many of these families have maintained a vigil at a camp two kilometers from the dam site. Manso and Cana Brava were the top two "emergency" situations presented by MAB in a January meeting with new Eletrobrás president Luis Pinguelli Rosa, and Furnas' change of heart regarding the affected families is probably a direct result of that meeting.



China's Water Crisis

by Doris Shen

Ma Jun is a former reporter for the South China Morning Post and the author of the newly translated book China's Water Crisis. Originally published in Chinese in 1999, this book is the most up-to-date and comprehensive source of information on the many-pronged crisis confronting water resources in the People's Republic of China. Of greatest concern to Ma Jun is the condition of China's three major rivers: the Yellow, the Yangtze, and the Pearl. Massive reductions in flow stemming from a variety of largely man-made problems threaten the very existence of these rivers (the Yellow has already become seasonal). Smaller but no less vital rivers are experiencing similar problems, Ma says. He talked to us from Beijing about the water crisis, and what can be done to minimize it.

WRR: What inspired you to write on the topic of China's water crisis?

MJ: As a journalist I have had many opportunities to get a firsthand look at China's water problems. In the past decade, I witnessed the drying up of the Yellow River, devastating floods on the Yangtze, hundreds of dry riverbeds in the North China Plain and the serious water pollution problems in southern China.

These rivers and the watersheds they drained were once much healthier and more beautiful, as described in the ancient poems and books I have read and the documentaries I have watched since childhood. These rivers, large and small, nurtured a splendid civilization and supported the livelihood of millions of people. It was devastating to see them dwindling and drying up, and I thought we needed to have a better understanding of how they had degenerated to such a state.

WRR: What were the most startling findings to you in researching your book?

MJ: The fact that a water crisis looms large in so many parts of the country, and that state officials are proposing projects that seem to only make this situation worse. I believe if we don't change our way of managing rivers, the water crisis will pose a major threat to our social and economic development in the 21st century.

WRR: What have been the social and economic impacts of engineering the rivers in China?

MJ: Like so many Chinese, I once believed that the water problems should and could be left to the care of officials and engineers. However, after I had the chance to study the problem more closely and interview people, I came to the conclusion that they [the offi-

cial and engineers] were trying to seize every drop of water to serve human use and development. Over time, many people came to regard the floods, dry spells, and sandstorms as some sort of evil force that could be solved with even larger engineering projects. But I saw a clear link between engineering projects and these disasters. I began to view the disasters as nature's way of retaliating for man's reckless attempt to "conquer and harness" nature.

Close to 80,000 dams and reservoirs have been built over the past 50 years in China, leaving our rivers blocked and obstructed by enough concrete and dirt to make many Great Walls. Yet this mammoth engineering effort has been unable to halt the increasingly harmful alternating cycle of floods and river dry-up. Severe deforestation has magnified the flooding and drought cycles by denuding our mountains and hillsides of vegetation and dramatically increasing the silt-flow into our network of rivers. However, vast sums of money are still being invested on huge water control and diversion projects – even on dying rivers – while reforestation and other protective programs go wanting.

For the short term, by robbing the natural environment of the resources it needs to sustain itself, we have managed to support the world's largest population and sustain a rapid economic expansion. And as machines got better and money more plentiful, humans could drill deeper and build larger dams or even be audacious enough to propose diverting water from thousands of miles away. But we seem to be reaching a limit.

Supporting both this large population and the country's rapid economic growth meant expending a lot of effort to increase water supplies. That unfortunately upset the ecological balance and caused resources to dwindle. When that conflict between

increasing demand and dwindling resources reaches a certain level, there will be a water crisis. So these plans to drill deeper and extract water that is thousands of miles away are actually a ticking time bomb.



Ma Jun

WRR: What is driving the South-North water transfer project? Who stands to gain? Who might bear the risk?

MJ: The South-North water transfer project was put forward as early as 1952. The project includes three routes that will move water from the Yangtze River to the rivers of Hai, Huai and the Yellow, over 770 miles.

Although the enormous cost delayed its implementation by five decades, the project has always been in the minds of those who plan the water supply for northern China. Local people in these areas overdrew water from rivers and aquifers because they were reassured that extra water would one day flow in from the south. Now we're finding that some cities will run out of water in 10 years. They're arguing that it is high time to kick-start the project.

Cities like Beijing and Tianjin along with a few provinces at the North China Plain have applied tremendous pressure on the central government to build the project. Water officials, hydrologists and construction firms are also in favor of the project.

People from the source area will bear most of the risks. Primary concerns on the eastern route, which will transfer water mostly through the ancient Grand Canal [an 1,800-kilometer-long manmade waterway], include how to prevent further increases in salinity at the estuary during the dry period. The middle route arouses more concerns. The biggest challenge there is to resettle around 300,000 people in Hubei and Henan provinces. In addition, the middle route's source river, the Han, is not as plentiful as the Yangtze, so transferring a major proportion of its water to the north will affect water quality downstream.

Water quality in the lower Han River has already deteriorated in recent years because of lower flows and more industrial and agricultural discharges. Local researchers say the river suffers from a build-up of exces-

sive nutrients, which kills fish and most other aquatic life. A higher incidence of algae in recent years has forced major municipal water suppliers in Wuhan to close down several times. The South-North diversion will reduce the annual flow of the Han River by one-third and leave less water to dilute pollutants. This could affect the drinking water quality of three million residents in Wuhan City.

WRR: What other options are there to meet the nation's water needs without further engineering China's rivers?

MJ: To save rivers in China, the focus of water management needs to shift from supply expansion to demand control. Water conservation is the most effective approach in demand side management. The efficiency of Chinese irrigation is barely half that of most developed countries. Chinese factories use 10 times more water than most developed countries to produce the same products. Public water supply facilities in cities have high rates of pipe leakage, and China's old-fashioned toilets use as much as nine liters of water per flush, compared to the 1.6 liter water-conserving toilets now common around the world. The poor efficiency is a result of low water prices, lack of regulations, backward technologies and most of all, lack of understanding of the scarcity of China's water resources.

China's extremely inefficient use of water means that there is big potential for



The South-North Water Transfer Project

factories, farms and cities to cut their water use. Experience in China and abroad has proved that these kinds of projects are easier and cheaper than building big infrastructure projects. Compared to large dam projects, there is still far less prestige with demand-side management. This mentality must be changed.

Better socio-economic planning could also ease the water crisis. China's water resources do not match its other resources in terms of geographical distribution. As a result of cen-

tralized planning, the drought-stricken northern regions of China, which have more land, energy and mining resources, saw rapid growth in farming and water-thirsty industries. Future economic planning should be more resource-conserving and be based on regional water constraints. ■

China's Water Crisis is available in Chinese; contact IRN. English copies will soon be available through East Gate Publishers (New York).

India continued from page 1

Development Plan set up by the government in 1996. A 1999 report of this commission expressed skepticism about the need for the project, indicating that it is unnecessary even for the projected demands in 2021.

Further fueling doubts about the quality of studies done so far is the dispute over how much water various river basins have to share. The National Water Development Agency (NWDA) has declared that a number of river basins have surplus water, but its assumptions have been contested by some states. For example, NWDA plans to transfer "surplus" water from Pampa and Achankovil rivers of Kerala to the Vaippar basin in Tamil Nadu, but the Kerala government strongly opposes the move and questions the studies. In the case of the Ganga, the treaty with Bangladesh committed minimum flows to Bangladesh. West Bengal and Bihar governments have declared that they have no water to spare from the Ganga basin. Similarly, the NWDA's assumptions about "surplus water" in Godavari and Mahanadi basins have brought rebuttals from governments in Andhra Pradesh and Orissa, respectively.

The only river basin where the claim of surplus water stands some scrutiny is Brahmaputra, but that basin, besides its international dimensions, has excess water only during the monsoon when water can be transferred to the adjoining basin of the Ganges for onward transfer to other basins. However, in the monsoon, the Ganges is also in flood most of the time and it is difficult to envisage that a flood-ravaged basin will accept a huge quantity of additional water. But such questions have not been addressed by the proponents of the project.

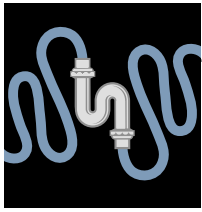
Constitutional Questions

This conflict over "surplus waters" raises crucial questions about water being a state subject in India. According to a basic tenet enshrined in the constitution, no water can be transferred from any basin until the donor-basin state agrees to the proposal. And water being such a volatile public issue, it is doubtful that any state would agree to transfer water to a non-riparian state. Questions would also arise on the

terms of transfer and what the donor basin state would get in the bargain.

There is a real danger that multinational companies, hankering for private water contracts, may here see an opportunity to in effect buy India's rivers to sell their water. That fear is reinforced by the World Bank's renewed love for big water projects, and a continued worldwide push of privatization schemes in the water and energy sectors. India has already seen a precedent of sorts when a 21-km stretch of the Sheonath River in Chhattisgarh state was sold to a private party to sell water to industries. When viewed in the perspective of India's ill treatment of some 35 million people displaced by big dams in the past 55 years, the danger grows by magnitudes. There are as yet no estimates for how many people would be displaced or otherwise harmed by this huge scheme, but India's past record on resettlement is not comforting. ■

The author is with the Delhi-based South Asian Network on Dams, Rivers and People.



Defending Spain's Ebro River

It Takes More than a Village to Stop 120 Dams

by Monti Aguirre

Pedro Arrojo-Agudo is a Spanish economist who has used his expertise to debunk the overstated benefits and understated costs of a \$25 billion river-engineering scheme planned for Spain's second longest river. In addition to teaching at a university, he is also the founder of the Iberian Congress on Water Planning and Management, and President of the Foundation for a New Water Culture. This year, Pedro was one of six recipients of the Goldman Environmental Prize. He was chosen for his activism against the Spanish Government's National Hydrological Plan, which would build 120 dams on the Ebro River, and for his work promoting sustainable water projects based on conservation, recycling and intelligent agricultural choices. We spoke with him just after he was presented with his Goldman award.

A recent poster for a march organized by the Spanish group Coagret translates, "With greater strength than ever: For the dignity of the mountains, STOP DAMS, it's a matter of justice."



WRR: We have followed with great interest the massive mobilizations – 300,000 people marching in the streets of Barcelona recently, for example – that have taken place in several Spanish cities to protest the National Hydrological Plan. What are the main problems with this plan?

PA: We call the plan "a drawer of disasters." There are good and bad things, but the main harm from the plan would come from the construction of 120 dams in the mountains and the channelizing of 1,000 kilometers of the Ebro River along the Mediterranean coast. In the north the water would be diverted to Barcelona, and in the south, to Almería. This project would destroy the wetlands at the delta of the Ebro River, and a bio-reserve protected by the Ramsar Treaty – one of the most important reserves in the EU. More than 200,000 migratory birds are protected by this reserve. Thousands of people would be displaced as great areas of populated valleys in the Pyrenees would be flooded in order to regulate the flow of the river. The plan is aimed at getting European Union funds and using public money to

build a gigantic system which would ultimately just profit financial speculators, luxury tourist installations, and industrial agriculture which is unsustainable in the dry climate of the south.

WRR: What do you see as the alternative to the plan?

PA: In Spain, we waste 50% of our water due to the inefficiency in irrigation; we waste 30% of our water through leaky urban water systems. Therefore the priority is to modernize those systems. Also, we should address contamination because if we pollute we are not going to have usable water. We are dealing not only with a problem of quantity, but also quality. So we need to conserve the health of the ecosystems. And last, something we state prudently, is that there is a place for the use of new technologies but we must use them intelligently and within the context of sustainable development. We could talk of desalination of water as something useful, but within the context of sustainability. We are dealing with water, energy and territory concerns.

WRR: Who would be affected by this plan?

PA: The directly affected people are the soul and strength of the movement. They live in small communities and villages in isolated areas of the Pyrenees mountains in the interior of Spain; and also communities at the delta of the Ebro River whose lands and fish catches will be harmed by the damming and river diversions. The mountain communities are very small ranching communities without much experience in community organizing. The coastal communities, such as those in the delta of the Ebro River, are bigger and more involved in social movements.

WRR: It is unusual to have so many people come together to fight something as complex as a national water plan. Talk about how this movement came together.

PA: The plan was first presented to the public in 1994, but it was never developed. The present government approved a new plan in 2000, getting full support from parliament. This is when the mass mobilizations began.

We've involved trade unions, the ecological movement, people affected by the project, people in cities, a huge coalition of people from the left and right wings. We've never seen this kind of movement in Europe. When we marched to Brussels through France, we had 15,000 people arriving in Brussels by foot, bike, bus, and train. It was raining that day, absolutely flooding, and I have never been so wet. It was incredible. The "New Water Culture" had really arrived.

It is interesting that this has become a broad movement of citizens – not just those directly affected like the farmers, ranchers and fishing communities, but the larger population coming out in defense of their territory, their landscapes. The people who are not directly affected feel that the river is not just a source of water, but also an important part of their territorial identity; it is health, it is life. The movement involves citizens who cannot conceive of their land without the river, or with a contaminated, depleted river. The right of a healthy river becomes a basic right of larger communities.

I think what this movement is saying is, we have to recover a way of thinking about water as an ecosystem of life. We began this campaign by asking for respect for the human rights of minorities threatened with flooding. Then our arguments became wider, for the right of the citizens in general to ask for respect for rivers, for our history and landscapes. There is a poet in Spain who says the river is the soul of the landscape. So



Pedro Arrojo and the Ebro River.

Photo: Robert Roll

we're asking for both a change in policy and a change in culture.

WRR: How did you become involved in this movement?

PA: The collective of affected peoples requested the technical expertise of university professors to help review the studies. We brought together a large group of professors

and under the request of the affected people's group Coagret (the Coordination of People Affected by Large Dams and Diversions), we held a meeting of academics in 1998, which became the first Iberian water congress. It was a great success. We enlisted the participation of 400 professors from all disciplines and we received the support of 50 Spanish and Portuguese universities. From then on we agreed to celebrate this congress every two years. We also created the Foundation for a New Water Culture, which is an academic entity with a special connection with the affected communities.

WRR: What is it like to win the Goldman Environmental Prize?

PA: I feel overwhelmed by the weight of a tremendous responsibility that I am still to resolve. I feel this prize is a prize for a lot of people. I want to offer the prize to those people town by town, village by village. I would like to use it to build bridges between people who have been divided by the government, and between the Spanish government and the European Commission. There is an expression in Spanish, *Hablando sintiendo la gente*: By talking, you understand the people. There are a lot of new technologies and possibilities for good management, and dialogue is the key to a more positive future.

For more information on the struggle against the National Hydrological Plan, contact COAGRET: e-mail coagret@jet.es, web: www.coagret.com

New Study: Water Transfers Worsen Water Crises

Large-volume water transfers worsen social, economic and environmental problems instead of solving them, a new report concludes. The study, by WWF, the European Environmental Bureau (EEB) and the Spanish NGO Ecologistas in Accion, examines the Tagus-Segura Transfer (TST) in Spain, which began operations in 1979.

The study documents the TST's impacts, including:

- Increased water deficit due to an increase in irrigation and tourism demands;
- Habitat destruction and promotion of unsustainable agriculture;
- Water overexploitation, chemical contamination and the deterioration of the river ecosystem, and
- Increased social inequity, as the benefits of the transfer are mainly directed toward big agribusiness and construction companies, marginalizing traditional farmers.

"The Tagus-Segura water transfer has increased the thirst for more and more water, while water resources are limited and continue to decrease. Instead, the EU water policy requires that water demands be managed and water transfers like the Tagus-Segura not be repeated," said Stefan Scheuer from EEB.

The results come as the European Commission is deciding on funding for the Spanish National Hydrological Plan, which is based on the same flawed water transfer model.

"The fiasco of the Tagus-Segura water transfer will be repeated on an ever-increasing scale if the Spanish Ebro water transfer is pushed forward by the Spanish government," says Guido Schmidt of WWF-Spain. "The Ebro water transfer goes against sustainable development, modern water and river basin management, and environmental protection, all concepts dear to the European Union."

"Tagus Segura – Lessons from the Past" is available from pagrasot@wwfepo.org or mahsoria@teletel.es

Proposed Portugal Dam Would Flood Culturally Rich, Biologically Diverse Area

by Helena Freitas and Korinna Horta

In recent decades Portugal has pursued a dam-construction strategy which was first formulated roughly 50 years ago during the time of the country's dictatorship. Since then successive Portuguese governments have built dams on nearly all the country's major rivers. These projects have flooded rich troves of irreplaceable ancient rock art, productive farmland, wildlife habitat and river canyons. The most recent example, Alqueva Dam – Europe's largest reservoir to date, which is now flooding valuable forests and farmlands – is setting in motion long-term ecological and social costs, while its economic benefits have been vastly overstated. The dam received substantial financial support from the European Union (EU), which dismissed environmentalists' concerns with promises to take "preventative measures to save the environment."

Now the government plans to build another controversial dam, this time on the Sabor River, one of Europe's last wild-flowing rivers. The Sabor Dam would be located in a biologically diverse region protected under national and European environmental agreements. There are better methods to provide the services the dam would supply. It is likely that the EU will be asked to support the project. In the case of the Alqueva dam, the EU's decision to provide funding was based largely on rhetoric about regional development and not on careful consideration of the economic viability and the full range of ecological impacts of the dam. The experience of the Alqueva dam holds critical lessons for the future and must be fully assessed before embarking on yet another scheme whose benefits are questionable indeed. What is at stake is the credibility of the EU's commitment to protecting natural habitats in the territory of EU member states.

The Mediterranean Basin is considered one of the Earth's hotspots for biodiversity, and it includes Europe's richest ecosystems. Yet Mediterranean ecosystems are ranked among the world's most endangered biomes. In response to the threats to these and other ecosystems, the European Council in 1992 established a European ecological network known as "Natura 2000" whose goal is to protect biodiversity within EU territory. This network comprises "special areas of conservation" and lists priority habitats or species in need of particularly strict protection.

A dam on the Sabor River would destroy one of Europe's few remaining regions of extraordinary biodiversity, and one that is home to unique cultural traditions. Much of the Sabor valley in northeastern Portugal is part of the Natura 2000 network, and several habitats along the river are classified as priority conservation areas. The region contains some of the few remnants of ancient Mediterranean native forest ecosystems, interspersed with low intensity agriculture of olive and almond trees. The Sabor valley is rich in endemic plant species and a critical habitat for endangered bird species such as the Bonelli's eagle, the golden eagle and the black stork, which nest on the steep cliff formations alongside the valley. The valley itself is a migratory corridor for wolves and other wildlife and the Sabor is the spawning ground for fish species, such as the barbel, which annually swim up-river to reproduce.

In addition to its unique ecosystems, the Sabor region is also home to an ancient culture. Notwithstanding the recognized need to improve the quality of life for the region's sparse agrarian population, there is also recognition of the importance of preserving the region's links to the historic past. A traditional agriculture which is more reminiscent of Europe's Middle Ages than modern agribusiness is still practiced in the Sabor valley. Local cultural groups keep alive ancient customs, annual festivals and other

traditions. But it is hard to make a living, and many young people have emigrated from the region in search of work in urban centers and abroad. A lot can be done to assist the remaining population with better access to health care, education and other social infrastructure. Yet, as the track record of Portuguese dams shows, current promises that construction of a hydroelectric dam will bring development to local communities are highly questionable.

Two years ago, 200 leading Portuguese scientists signed a petition to the government stating that in view of the unique value of the Sabor valley, the river should be protected from the construction of dams.

However, plans to go ahead with construction of the dam gained new impetus in the fall of 2002. In a twist of irony, a senior environmental official of the Portuguese government declared upon his return from the World Summit on Sustainable Development in Johannesburg that Portugal could only meet the European Union target of generating 39% of electricity from renewable sources by the year 2010 by building more large-scale hydroelectric dams. He cited a dam on the Sabor River as a first priority and, unhappily, presented the dam in terms of an ecological benefit in the fight against climate change.

What is missing from current plans for the project is a serious analysis about alter-



A kingfisher surveys the Sabor River.

Photo: José Alves Teixeira



The old ways are still alive in the Sabor valley.

natives to the dam. Portugal has not adopted the guidelines of the World Commission on Dams, and it seems unlikely the government will follow its recommendation to first fully assess the nation's energy needs and the range of options for meeting those needs before settling on a dam project such as the Sabor. But it is well known that Portugal's electricity sector is very inefficient, and that much could be done in the areas of energy efficiency and conservation which could help Portugal meet the European targets in renewable energy and postpone building the dam. Portugal has one of the worst energy efficiency rates as related to GDP in Europe, yet measures for energy efficiency and conservation have not been given the attention they deserve. The dam on the Sabor River would only contribute about 0.6% to annual energy production while the annual growth rate of energy consumption is about 5%. Demand-side management measures would ensure a more affordable and ecologically sustainable energy supply.

Pedro Ferraz de Abreu, who heads an independent research organization based in Lisbon, said the recommendations of the World Commission of Dams provide a valuable tool to move forward: "We are encouraging all major stakeholders to take into consideration the rich experience of the WCD and adopt a more transparent and comprehensive procedure."

Portuguese environmental organizations have now formed a coalition opposing the building of the dam. Their work is supported by some of the country's leading scien-

tists who have studied the Sabor valley for many years. According to Barbara Fráguas, who has spent the past 8 years studying the valley's endangered eagles, the 50-km-long reservoir will flood not only the vital hunting ground of the eagles and other birds of prey but also scarps where the rare birds build their nests. "Combine all this with the inevitable increase in human disturbance that construction of the dam would entail, and these rare and endangered birds will face an uncertain future indeed," she says.

One of the Sabor valley's most distinctive characteristics is its wealth in plant species, many of which are endemic to the region. Botanist Carlos Aguiar who is known to be Portugal's leading authority on the flora of the Sabor valley, has joined hands with the opponents of the dam. "A dam on the Sabor would destroy the river's floodplains and the unique plant communities which have developed there," Aguiar says. "An ecological loss of this kind cannot be mitigated."

Professor Paulo Santos from the University of Oporto, who studies the fish diversity of the Sabor, warns of the impact of the dam on fisheries. The use of fish passes to mitigate the blockage of migratory fish has not been successful on Portuguese dams, he states, and the large numbers of fish which swim upstream in the late spring to reproduce will drastically decrease if the dam goes forward.

In view of the magnitude of the damage which a dam on the Sabor would inevitably cause, why is the Portuguese government pressing ahead with it? According to Santos, the dam-building industry has a strong lobby

in Portugal and politicians favor the construction of large infrastructure projects as a highly visible means of creating jobs. The local authorities are selling the idea of the dam to the affected population as a stepping stone to progress and development. However, other large dams in northern Portugal have broken this same promise. Despite the region's numerous dams, there has been little benefit to local communities who continue to be among the poorest in the country. "What this region needs is investment over the long term in infrastructure for eco-tourism and in an agriculture which promotes high quality regional products, such as the exceptional olive oil produced here," says Santos.

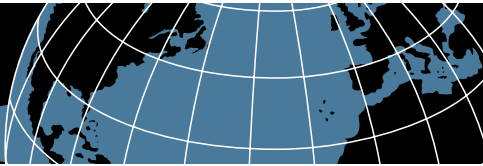
Scientist José Teixeira, who has for years researched the Sabor valley's biology and ethnography and documented the beauty of this unique region in a photographic collection, could not agree more. "We have to get rid of the simplistic idea that dams mean progress and that the Natura 2000 network represents a constraint to local development. What we really need are development schemes which are compatible with protecting the environment. Indeed, the Sabor valley should become a model of implementation of sustainable development practices."

There is hope that this vision will ultimately prevail. Allegations of corruption led recently to the resignation of the Portuguese minister for the environment and little is publicly known about the current status of project preparations for the dam. The European Commission has not taken a position on the dam yet and as of now it is unclear which institutions will be asked to finance the project. There is still time to abandon the outdated idea of large-scale dams as being synonymous with economic progress and to replace it with a new approach in which full knowledge and understanding of the impacts of large dams and alternative options are available to all concerned parties. ■

Helena Freitas is a professor at the University of Coimbra and Korinna Horta is with Environmental Defense.

For more information, see www.saborlivre.org and www.citidep.pt/act/sabor.html.

Sabor Transmontano, José Alves Teixeira's book of photography documenting the environment and ethnography of the Sabor Valley, is available from the author (jteixeira@mail.icav.up.pt) or from IRN (lori@irn.org).



UPDATES

CHINA: Dam safety monitoring in China is hampered by a severe shortage of funds and personnel, reports the *China Economic Times*, a daily newspaper overseen by China's State Council. The newspaper warned in mid-April that the system is "in chaos."

With a meager annual budget of less than US\$100,000, the Beijing-based Dam Safety Monitoring Center can barely manage its day-to-day operations and pay its 37 staff members, let alone function as an effective inspector of China's dams. The financial situation has deteriorated with the dismantling of the State Power Corporation.

Most of China's 84,000 dams were built hastily in the 1950s and '60s, and many are considered at risk of collapse. Over 3,000 dams, most of them small-scale, have already collapsed in the past 50 years. Dam failures have brought about "unforgettable nightmares," said the paper, involving "huge loss of life and tremendous devastation to areas below the dams, where nothing can be grown for many years afterward."

"It has been said that of all manmade disasters, the degree of destruction associated with dam collapses is second only to that of nuclear bombs," the newspaper said. It cited the 1975 disaster, when 230,000 people are thought to have died after two large dams in Henan province broke during a typhoon; and the 1993 Gouhou dam failure in Qinghai province, which claimed about 300 lives and caused economic losses of \$18.5 million, a huge sum in a poor area.

Dam safety inspections, which are supposed to take place every five years, are "not going very well. Critics contend that the inspection is usually organized by the operator of the dam rather than by a more independent organization such as the Dam Safety Monitoring Center."

The Beijing monitoring center is drafting a series of laws aimed at bolstering dam safety, but without more funding, it is unlikely the situation will improve dramatically.

US: Adding insult to injury, federal dams on the Columbia and Snake rivers in the Northwest have been spilling oil directly into the rivers they block. The dozens of documented spills have been as little as a trickle to as

much as 1,000 gallons. Some of the dams in the watershed require as much as 200,000 gallons of oil to function. Most were built without modern pollution controls.

The dam operators, the US Army Corps of Engineers, has been uncooperative with the states affected by the spills, telling state officials they have no authority over what goes on inside federal dams and refusing to release information about the dams' inner workings in the name of national security. State officials tracking compliance with the Clean Water Act and fish habitat quality have been forced to file Freedom of Information Act requests to learn more about the spills, according to *The Portland Oregonian*.

The affected rivers are home to numerous species of endangered fish, many of which are close to extinction (see page 3). As a federal agency, the Corps is exempt from fines that could have amounted to thousands of dollars. But it must comply with federal Endangered Species Act protections for migrating salmon.

Some of the oil leaks have been potentially very harmful to fish. For example, 750 gallons of oil spilled from the Corps' Lower Monumental Dam on the Snake River in Washington, where it flowed into fish ladders during last summer's salmon migration, according to a Corps report filed with the state of Washington. Workers had pumped what they thought was water from a full collection pit into the river for two days because they lacked procedures to identify it as oil.

"There's no question, had this been a private industry, there would have been significant financial penalties issued for these spills, and the penalties would be continuing," said Ron Holcomb of the Washington Department of Ecology.

BELIZE: A little over a year after environmentalists in Belize temporarily blocked construction of the proposed Chalillo Dam in the Macal River valley, Fortis Inc., the Canadian corporation behind the dam, has contracted with a Chinese construction company and is preparing to begin construction. According to the US group NRDC, the company brokering the deal between Fortis and the Chinese builder is AMEC, the engineering company that conducted the so-called independent environmental assessment of the dam. AMEC had claimed it would not seek contracts to

design or build the dam, but now the Chinese company contracted to build the dam states that it negotiated its contract as a subcontractor of AMEC.

Fortis's latest push to start building followed a Belizean appeals court's refusal to overturn government approval of the dam. But Belizean environmentalists are appealing the decision further, arguing that AMEC's assessment was flawed and downplayed warnings by its own consultants about the dam's impacts. NGOs working on the campaign are now upping the pressure on Fortis, readying another legal challenge, and pressing AMEC to end its involvement in the project. With the rainy season fast approaching, delays by AMEC or the contractor or imposed by the court would forestall construction for months.

The dam would flood the upper Macal River Valley, devastating 22 miles of the last intact rainforest in northern Central America. It would destroy a habitat for rare jaguars, tapirs, crocodiles and a subspecies of the scarlet macaw – of which only 1,000 remain in the wild, 200 of them in Belize.

To take action on the Chalillo Dam visit www.savebiogems.org

DAM BAD DEALS

GHANA: In attempting to negotiate with Kaiser Aluminum to get a fair-market price for power from the Akosombo Dam, the government has raised hackles in corporate-friendly Washington, DC.

The disagreement, involving Houston-based Kaiser Aluminum and its Ghanaian subsidiary, Valco, has led to a suspension of all lending to Ghana by the Overseas Private Investment Corporation (OPIC), a US government agency that provides political risk insurance and loans to American businesses investing abroad.

"Ghana is being seen as not acting in a commercially reasonable manner that would ensure investor confidence," OPIC President Peter Watson stated in a letter to Ghana's ambassador early this year. As a result of Ghana's actions, he said, "All applications for investment support in Ghana will remain under review."

The Ghanaian government has asked Valco to pay an electricity rate more reflective of power production costs. It currently pays 1.1 US cents/kWh, just one-sixth of the electricity's generating cost. The government has proposed a rate of 3 cents/kWh, a price that would still effectively require Ghanaian taxpayers to subsidize the smelter. Kaiser claims the price hike would push the cost of produc-

ing aluminum above the world market price.

The company is unhappy because of reduced power allocations to its aluminum smelter due to a drought that has drastically cut energy output from Akosombo. The smelter currently operates at only 25% capacity and some 1,250 of the plant's workers have been laid off. The company claims that Ghana's insistence on receiving a fair price for electricity produced at Akosombo amounts to expropriation, a charge that has angered the government.

"Valco cannot continue to be insulated from the true costs of producing power in Ghana. Ghana can no longer subsidize Valco's power consumption at the expense of its citizenry when such funds are critically needed for our national development," said a recent government statement.

The World Bank-funded Akosombo Dam was constructed almost 40 years ago with the primary objective of supplying power to the Kaiser smelter. It displaced an estimated 84,000 people.

US: Private companies operating hydropower projects on federal land have been paying less than 2% of fair market value for using the land, a new congressional study says.

The GAO reported that the fair market value for using all the land in the 24 projects it studied nationwide is at least \$157 million annually (and millions more under some market conditions), but in 2002, the Federal Energy Regulatory Commission collected only \$2.7 million from those projects for the land's use.

The agency recommended that FERC develop a new way of assessing annual charges that is more in line with the benefits going to companies that operate hydropower projects. It also said FERC needs to improve its system for accounting for the use of the federal lands, noting that the agency, in some cases, didn't know for sure how much land is being used.

The report was issued as the Senate considers action on the Energy Policy Act, which would strip federal agencies of their ability to protect the environment at utility-owned hydropower dam sites.

The 24 projects that were sampled by the GAO for its study were drawn from a list of 56 projects that account for roughly 90% of the private hydropower produced on federal lands. All but two of those projects were in the American West.

Source: Richmond Times-Dispatch

ETHIOPIA: The government imposed two-day-a-week power cuts in late May, which experts say could cost the economy US\$200

million a year in lost output. The country-wide move, which follows months of daily rationing, is blamed on serious water shortages in Ethiopia's hydroelectric dams because of a severe drought. The Ethiopian Economic Association (EEA) warned that the blackouts would have a catastrophic effect on the economy, estimating it would shave 3.4% off the GDP. The capital city is also facing a serious shortage of water. The economy was already expected to shrink this year by more than 3% due to a massive slump in agriculture.

According to the Ethiopian Electric Power Corporation (EPPCO), four dams across the country have been hit by serious water shortages. The Koka, Melka, Wakena and Tis Abay power generation dams have seen water levels slump by more than six meters compared to previous years. The government decision comes after experts from EPPCO, the Meteorological Services Agency and the Ministry of Water Resources said current volumes of water could not meet demand. Power cuts were expected take place on different days in separate parts of the capital and country.

A BETTER WAY

US: Habitat for Humanity, the national volunteer organization that builds and finances homes for lower-income families, has built a highly energy-efficient home in Tennessee. The 1,057-square-foot house, designed by the US Department of Energy's Oak Ridge National Laboratory, has 48 solar panels on the roof and a high-tech water heater in the closet.

A Tennessee chapter of Habitat for Humanity partnered with the energy lab with the aim of helping Habitat homeowners save money on power bills. Poor families spend as much as 14% of their income on heat and air conditioning, so it's a natural fit, said David Garman of the Department of Energy's energy efficiency unit.

The walls, floor, and roof of the home were constructed from prefabricated insulated panels, making the house up to eight times more airtight than conventional construction. Energy-efficient appliances, windows, and doors were used. Air ducts were built into living spaces to reduce loss of heated or cooled air. And the heat-pump water heater does double-duty, dehumidifying the crawl space and venting cool air behind the kitchen refrigerator.

The electric bill over a colder-than-normal winter was less than half as much as a comparable house across the street, said Jeff Christian, director of the Oak Ridge lab's building technologies center. Those bills are

expected to fall even more when the solar energy panels begin generating electricity full-time.

TAKING STOCK

US: This spring's crop of shareholder meetings revealed the growing clout of shareholder activists, as resolutions filed by religious orders, environmental groups and others made waves at some of the world's biggest producers and users of fossil fuels.

This year, shareholders filed 31 global-warming and renewable energy resolutions with 23 companies in the US and five in Canada.

Perhaps the most jolting to the corporate world was at ChevronTexaco, where a third of shareholders voted for a resolution that would force the oil giant to adopt a plan to invest in renewable energy. Doug Cogan of the Investor Responsibility Research Center said, "This is the highest vote ever for a renewable energy or climate change-related proposal. No company the size of ChevronTexaco has ever had that many votes cast against management on an energy proposal. History was made today."

Around the same time, almost a quarter of the shareholders of Southern Co., one of the largest utilities in the US, voted to require the company to analyze and report on the financial risks of global warming. And shareholders of Exxon Mobil Corp., the world's biggest oil company, gave a similar level of support to resolutions on renewable energy and the risks of global warming.

"It is a trend that I don't think is going to disappear," said Sister Barbara Aires, coordinator of corporate responsibility for the Sisters of Charity of St. Elizabeth in New Jersey, who introduced the resolution at Southern. "I think more institutional investors are looking for assessments of the triple bottom line – social, environmental and financial – not simply financial."

Last year, global-warming resolutions won about 18% of shareholders' support at a dozen or so companies, according to the US Public Interest Research Group, which has helped organize efforts for the resolutions. This year, they have averaged more than 25% at more than twice the number of companies, the group said.

The United Nations Environment Programme projects that rising sea levels, increased incidence of tropical storms, and loss of water and agricultural resources will result in annual worldwide costs to exceed \$300 billion annually by 2050.

For more information about shareholder actions, visit <http://shareholderaction.org/>

Geothermal Energy: A Hot Option for Uganda

by Frank Muramuzi & Geoffrey Kamese

Uganda has one of the lowest per-capita uses of electricity in the world. Most Ugandans do not have access to electricity, but instead burn wood as their primary source of energy. In recent years, the government has proposed a number of large dams to increase the nation's access to electricity, but critics have resisted these projects because they would be too costly, environmentally harmful, and socially disruptive.

A recent workshop organized by NGOs in Uganda revealed that geothermal energy could help Uganda meet its energy needs. The April workshop, organized by the National Association of Professional Environmentalists (NAPE), Joint Energy and Environment Projects (JEEP) and Uganda Wildlife Society, drew participants from civil society organizations, government, and geothermal energy experts from Uganda and other parts of the world.

Fernando Echavarría of the US State Department told the workshop that the benefits of geothermal are many. "It is clean, renewable, uses little land, decreases deforestation, increases energy diversity, and provides local jobs for construction, operation and maintenance." It is also modular, he noted, meaning it can be brought on-line incrementally. This would be an advantage for Uganda, which does not yet have enough energy demand to justify large new additions to the grid all at once. Geothermal can also provide power in rural areas where it's too costly to extend the national grid, as is the case in Uganda.

The geothermal potential in the Rift Valley is tremendous. Neighboring Kenya has developed 67 MW, according to one of the speakers, and has plans for an additional 576 MW by 2019. Uganda's geothermal potential has been estimated at 450 MW.

Geothermal is an established energy source. Some 8,300 MW of geothermal electricity has been developed in 21 countries supplying 60 million people – mostly in the developing world, according to Steve Hirsch, one of the workshop's speakers and a geothermal consultant working with the United Nations Environment Programme (UNEP).

Godfrey Bahati, a geothermal expert from the Ugandan Ministry of Energy, revealed that Uganda currently consumes 20 million tons of wood and 430,000 tons of oil products per year. Electricity is almost 100% hydropower (Uganda's dams currently produce about 317 MW). He said that renewable energy is a priority for the government, and

that results of geophysical surveys in the two geothermal prospect areas will soon be available. More detailed investigations are required before the private sector will be interested in developing projects.

Another energy expert in the Ministry of Energy, John Tumuhimbise, said that although Uganda is richly endowed with renewables, apart from biomass (whose contribution is already enormous, at more than 91% of the total energy consumption), renewables currently play an insignificant role in the country's energy balance.

Tumuhimbise is heading up a team that is studying renewable energy alternatives in Uganda. The study, funded by the African Development Bank, is meant to formulate an Alternative Energy Resource Development Programme for rural electrification in Uganda. The study will be finalized later this year.

Speaker Steve Hirsch said he believes the East African Rift Valley countries should expedite the development of their abundant geothermal energy resources. "The NAPE

conference underlined the importance of geothermal energy as a complement to hydropower in Uganda to ensure energy diversification, energy security and minimize environmental impacts."

The Ugandan NGO workshop followed on the heels of a regional geothermal workshop in Kenya the previous week. That workshop, organized by UNEP and the Business Council for Sustainable Energy, led to a pledge to boost geothermal power generation in 10 African countries to reach a combined 1,000 megawatts by the year 2020.

Geothermal power in these African countries has remained underdeveloped despite

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Geothermal power in the raw.

Photo: Geothermal Education Office

Geothermal Basics

What is geothermal energy?

Geothermal heat originates at the earth's core, where temperatures may reach over 9,000 degrees F. Melted rock or magma from the core moves continuously up toward the crust, where it heats nearby rock and rainwater that has seeped into the earth. Some of this hot geothermal water travels back up through cracks and reaches the earth's surface as hot springs or geysers, but most of it stays trapped underground.

How is geothermal energy tapped?

Wells are drilled into geothermal reservoirs to bring the hot water to the surface. Geologists, geochemists and engineers test to locate underground areas that contain geothermal water, to learn where to drill wells. The wells bring the hot water and/or steam to the surface, where it is used to spin turbines and produces electricity. The used geothermal water is then returned down an injection well into the reservoir to be reheated, to maintain pressure, and to sustain the reservoir.

What are some of the advantages of geothermal-generated electricity?

- Clean:** Geothermal power plants do not burn fuels, or result in dams, mines, open pits, waste heaps or oil spills. Because they are so clean, they can be built in the middle of agricultural land.
- Conserves land:** Geothermal requires less land per megawatt than almost any other type of power plant.
- Reliable:** Since they are built atop their fuel source, geothermal plants are resistant to interruptions of power generation due to weather, natural disasters or political rifts.
- Flexible:** Geothermal power plants can have modular designs, with additional units installed in increments as needed to fit growing demand for electricity.
- Economically stable:** Geothermal "fuel" – like the sun and the wind – is always where the power plant is, so the economic benefits remain in the region. There are no fuel price shocks or export of money to import fuel.

Geothermal Education Office

For more information, see: <http://geothermal.marin.org>

Kali River Beseiged

A Seventh Dam Proposed for India's shortest river

by Dr Sudharendar Sharma

"It is perhaps our last chance to save the River Kali," says local environmentalist Pandurang Hegde. Hegde shot into fame for launching the Appiko Movement (or "hug the tree" movement) in Western Ghats in the '70s. Announcing the launch of a peoples' campaign to save the severely stressed and widely manipulated river in Bangalore recently, the seasoned campaigner pointed out the need to stop the building a seventh dam on the Kali and the disposal of untreated effluents from a paper mill into the river.

With alleged abduction of the two local activists by the henchmen of the mill owner and the local politician, the battle lines for the peoples' campaign against further manipulation of the Kali have gotten sharper. Though the activists were later released, it became apparent that vested interests are hand-in-glove with the powers that be. Since then, people have demonstrated against the paper mill and are demanding a complete halt to the discharge of untreated effluents into the river.

"No other river in the country has been under as much ecological stress as Kali," contends Hegde. The river is already burdened with six hydro projects, whose production capacities range from 100 to 855 megawatts. Because of these obstructions, the Kali flows uninterrupted for just about 18 kilometres of its 184 Km course in the Western Ghats. Also on its banks is the notorious Kaiga Nuclear Power Project and a paper factory, both of which discharge polluted water into the river.

If the proposed seventh dam is built at Mavalangi, downstream of the first reservoir at Supa, the river will virtually cease to flow. Already, the existing reservoirs have had a dramatic affect on the river's flow. Erratic rainfall patterns in the past few years have worsened the problem. Power generation at all the hydropower dams on the Kali has been severely affected, draining the state economy in the process.

An official of the Karnataka Power Corporation (KPC) who asked to remain anonymous said some in the KPC question the plans to build yet another hydro project, especially at such high cost.

But the government seems bent upon impounding the waters of Kali yet again (this time with a 38-meter-high dam) to enhance the installed capacity of 1700 MW – this time by just another 18 MW. Once

completed, the joint venture between the KPC and the Murdeshwar Power Corporation (a private player) will produce power at the incredibly high cost of Rs 110 million per MW compared to Rs 7 million per MW currently charged by the KPC.

Activists have questioned the wisdom of building a project whose power will cost 15 times the prevailing rate. "Who do they think can afford such power? And for what reasons is it so costly?" asks Hegde. He thinks that the government will agree to a power purchase agreement in advance to help the investor – one that will come at high cost to the taxpayers.

Some suspect a hidden plan to siphon off profits from the Rs 2 billion dam project. However, nearby villages such as Barade will no doubt continue to grope in darkness. Says one local resident, "If six projects could not get us electricity, we doubt if the seventh will!" Ironically, the total electricity requirement in the district through which the river flows is a meager 17 MW.

Originating at Kushavali, on the border of Karnataka and Goa, the Kali derives its name from the dark color of its manganese-rich waters. The river meanders through the unique biodiversity of the Western Ghats along its course before joining the Arabian Sea at the port-town of Karwar.

The river is the lifeline to some 40 million people in the district and supports the livelihoods of tens of thousands of people, including fishermen on the coast of Karwar. Among other fauna, the Kali offers an important natural corridor for wild elephants and black panthers. The proposed dam will not only submerge this corridor but also 210 hectares of lush forest habitat.

The authorities contend that no forest areas will be submerged. Rafting along the course of the river to the proposed site, however, reveals that rich forest and its unique biodiversity will disappear in the process. Already, the six projects on the river have submerged over 32,000 acres of forests in the region.

In addition to the proposed dam, the river is threatened by the continued discharge of untreated effluents from the West Coast Paper Mill at Dandeli. The reduction in the river's flow by dams and diversions has allowed pollutants from this factory to accumulate, harming nearby farming and the fishing communities.

Many farmlands irrigated with Kali waters near Dandeli are left littered with layers of paper pulp upon drying. Farmers have not been able to get an audience with local authorities to discuss this problem. So agitated are the farmers and people living around the paper mill that they have threatened to block all the pipes that discharge untreated effluents into the river.

Kali is lesser-known than some of India's more famous rivers, but it is no less significant in terms of the contribution it makes to local people's livelihoods and the ecosystems it sustains in the Western Ghats.

Researchers have confirmed that this short west-flowing river, whose farthest point as the crow flies is no more than 32 kilometres from the sea, cannot withstand any more external pressures, both to fulfill its ecological functions and also to ensure livelihood security to people who depend upon it. However, current developments along the river may eventually choke off the annual flow of 9,000 million cubic metres in the Kali. "Only through such misadventures can the megaproject of river interlinking be justified," argues Hegde. ■

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Geothermal continued from page 14 its untapped potential of 7,000 MW, mainly because of the high initial costs required to assess the commercial viability of a geothermal resource, UNEP says. "Part of the plan is to get additional funding from many organizations and to do exploration and initial drilling," said Peter Omenda, a senior geologist with KenGen, Kenya's state-owned electricity producer.

The Uganda workshop was officiated by Daudi Migereko, State Minister for Energy, who submitted that geothermal energy could increase access to modern affordable and reliable energy as a contribution to poverty eradication. He called upon development partners and civil society organizations to work with government to solve Uganda's energy crisis. ■

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