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World Commission on Dams Forced to Quit India

by Patrick McCully

The World Commission on Dams was forced to cancel a series of events in India in September following a political firestorm sparked off by the Commission's plans to visit the Narmada Valley and in particular the site of the controversial Sardar Sarovar Dam in Gujarat State. Politicians in Gujarat reacted furiously to news of the visit. The state's Chief Minister, Keshubhai Patel, accused the Commission of being one of the "well-thought out plots against the Narmada dam and Gujarat's progress" and even threatened to arrest members of the commission if they came to Gujarat.

Gujarat's Narmada Development Minister Jaynarayan Vyas, citing the experience of previous independent reviews of the dam, predicted that the World Commission on Dams (WCD) visit would "certainly show the Sardar Sarovar Project in poor light," which he said "would not be tolerated by the state government." Vyas described the WCD as "a bunch of activists representing some so-called nongovernmental organizations and other vested interests."

The commission intended to hold its second official meeting in New Delhi from September 19-20, followed by a two-day public hearing in Bhopal on "Water and Energy in South Asia: Large Dams and Alternatives." The WCD is an independent body, established under the auspices of the World Bank and IUCN-The World Conservation Union, which is mandated to review the record of dams around the world, look at alternatives and make policy recommendations. The 12 Commissioners include senior representatives from the dam industry, governments, academia and social and environmental pressure groups. The WCD is funded by aid agencies, foundations and the private sector.

The Indian central government had initially welcomed the WCD's proposed visit, but just days before commissioners were due to arrive in India the office of Prime Minister A.B. Vajpayee informed the WCD Chair, South African water resources minister Kader Asmal, that it would not be an "opportune time" for the group's visit. Vajpayee had come under strong pressure from politicians in Gujarat which is also ruled by his right-wing nationalist Bharatiya Janata Party.

The official reason for the Indian government's position was that the WCD's visit

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Photo: Patrick McCully

WCD Commissioner Medha Patkar is also India's leading activist against large dams, and a major "obstacle" in the way of the Narmada River dams.

IN THIS ISSUE

COMMENTARY

Skeletons in the Closet

Official aggression against dam-affected people – either to force them to resettle or to put an end to their protestations against a project – has been all too common throughout the latter half of the twentieth century. Yet despite the dam industry's sorry record of official violence and intolerance of public dissent, no one could have predicted the Indian authorities' vehement, irrational reaction to a recent planned visit to the Sardar Sarovar Dam by the World Commission on Dams (WCD).

As described in this issue's cover story, the Gujarat state government threatened to arrest members of the independent commission if its members attempted to visit the controversial Sardar Sarovar project in the Narmada River valley. The WCD, despite the Gujarat government's description of it as "a bunch of activists representing some so-called nongovernmental organizations and other vested interests," is in fact officially sanctioned by such dam-friendly organizations as the World Bank and the industry group the International Commission on Large Dams (ICOLD), in addition to including representatives of NGOs and dam-affected people. Ironically, ICOLD itself had scheduled a visit to the project site which did not invite the government's wrath. Presumably, whatever the government felt it had to hide about the project was considered business-as-usual to the industry representatives.

Such official shenanigans are not restricted to India. Dam-building agencies the world over have responded to criticisms by citizens with secrecy, harsh words and, in the worst cases, repression and violence. The proposed Epupa Dam in Namibia, for example, has resulted in police raids of meetings between affected people and their legal council; inflammatory comments from bureaucrats and even the nation's president, and other forms of official threats. In a public speech in June, Namibia's President Sam Nujoma threatened to "deport," "get rid of" or "deal with" foreign nationals who "disturb the peace" in Namibia, and accused unnamed "Europeans" of trying to "divide Namibia." He especially targeted the Legal Assistance Centre (LAC), which has been acting on behalf of members of the Himba community opposed to the dam. "Epupa will be good for all – black and white. If you don't like that, pack your bags and go," he said.

In a previous political lifetime, Nujoma supported the work of LAC, when its primary work was to expose human rights abuses of the apartheid regime. Now that its mission of acting for "vulnerable and marginalised individuals and communities" is creating an uncomfortable conflict for the powers that be, official tolerance for dissent seems to have blown away like so much smoke.

Both India and Namibia are democracies. In places where civil liberties are restricted, the situation is even more dire for critics of dams. The Nubian people now rising up against their fifth forced relocation for a dam in this century (see story, page 6) will certainly not find a fair forum to air their concerns nor a place at the table as the Kajabar Dam moves forward. In Laos and Vietnam (see page 3), affected people have little ability to speak out against destructive projects and their aftermath. Dam projects, it would seem, do not stand up well to independent scrutiny.

Hence, NGOs are hoping that one of the primary achievements of the WCD's work will be to scrutinize dams that have been built in a shroud of secrecy. They hope that the commission will find a way to right past wrongs, as well: to establish protocols so that civil society will be at the table when dam projects are first being planned, to find ways to provide reparations for people whose livelihoods have suffered because of dams, and to restore the environmental damage caused by dams. In other words, open the closet and shine a bright light in it, so we can all see what skeletons are inside – and then figure out what to do with them.

Lori Pottinger

Mark Your Calendars: Plan Now for Day of Action

The second annual International Day of Action Against Dams & for Rivers, Water and Life is coming to a watershed near you on March 14, 1999. Last year there were more than 50 actions in at least 24 countries, including Brazil, India, Thailand, Australia, Japan and the United States. At least 10,000 people participated in demonstrations, letter-writing campaigns, river clean-ups, picnics and canoe trips. This year, we expect over 100,000 people to join in.

There are many ways to participate and honor your watersheds. The day's themes are to celebrate the life of rivers, protest their destruction, help educate the public, and promote sustainable and equitable management of rivers. Demonstrate, educate, celebrate on March 14! International Rivers Network acts as the information coordinator for the Day of Action.

For ideas or more information, visit the Day of Action website at www.irn.org, or contact Aleta Brown at International Rivers Network at 510.848.1155; email: aleta@irn.org

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Editorial Assistance: Susanne Wong

Design/Production: Jeanette Madden

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Contact Information:
International Rivers Network
1847 Berkeley Way
Berkeley, CA 94703 USA
Tel: (510) 848-1155
Fax: (510) 848-1008
E-mail: irn@irn.org
World Wide Web: http://www.irn.org

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Villagers Affected by Lao Dam Left in Limbo by Asian Bank

by Aviva Imhof

Recent reports from the Theun-Hinboun Dam in Laos indicate that conditions are deteriorating for the thousands of villagers affected by the project. A July 1998 report prepared for the World Wide Fund for Nature (WWF) Thailand office studied the impacts of Theun Hinboun on the area's fisheries. The report estimates that 41 villages along the Hai and Hinboun rivers (around 16,400 people) are being directly impacted by the project. The dam was completed in January.

The rainy season fish migrations have been blocked and large numbers of fish have been seen swimming in circles below the dam, affecting thousands of people living upstream of the dam who now have no fish. Some upstream villagers have said they doubt whether they can continue to live there without compensation or fish to catch. In August, more than 60 cases of cholera were reported in the area surrounding the dam, adding further misery.

Meanwhile, in July more than 40 NGOs from 12 countries wrote to President Mitsuo Sato of the Asian Development Bank (ADB) expressing their disappointment over the Bank's handling of the project. The ADB gave a US$60 million loan for the $260 million project.

In April, IRN released a report by independent researcher Bruce Shoemaker which documented the project's negative impacts on thousands of people living upstream and downstream of the project site. The ADB responded by sending a team (or "mission") to the project site. The mission's report, sent to IRN in early June, failed to address the essential question of compensation for livelihood losses caused by the dam.

In its response, the ADB does not explain how the Theun Hinboun Power Company intends to assess compensation measures, nor its procedures for allocating compensation. In fact, it is not even clear whether there are sufficient funds available for adequate compensation. The ADB states that the fisheries management and rural development plans, essential parts of the project's mitigation, should be paid for by the Lao government or foreign agencies rather than the Theun Hinboun Power Company, thereby externalizing costs that should have been part of the project costs from the outset.

The mission also corroborated Shoemaker's findings about declines in fish catches, but blamed it on the delayed onset of the rainy season rather than on the dam's changes to the river ecosystem. But Shoemaker's findings about reduced fish catches were based on dry-season fisheries – a smaller but important source of food and income for villagers – which are not directly affected by the onset of the rainy season.

The WWF report called the ADB's mission report a "white wash" and said the ADB has "totally missed the point." What matters, the report states, is not whether there are more or less fish in the Hinboun as a result of the dam, but that due to increased releases of muddy water, villagers cannot catch them. The report goes on to state that "to add insult to injury," villagers reported that although they had been promised electricity from the project by the end of 1998, as of July power line work had not yet begun, making it highly unlikely that they will have electricity by the appointed time.

Theun Hinboun Power Company is a joint venture between the Lao electricity utility, EdL; a Thai company, GMS-Thailand, and two Nordic state-owned utilities. The Norwegian aid agency NORAD gave a grant of $7 million for the project. The remainder of the financing came from export credit agencies in Norway and Sweden, and a consortium of Thai commercial banks. ■

For a copy of Shoemaker's report, contact aviva@irn.org

Vietnam Dam to Cause Hardship for Ethnic Minorities

by Aviva Imhof

Some 103,000 people, mostly ethnic minorities, will be forcibly resettled if a proposed 3600 megawatt dam in northwestern Vietnam goes ahead. The US$3.5 billion Son La Dam would be built on the Da River in the remote province of Son La, upstream from the country's largest hydropower project, the Soviet-built Hoa Binh Dam. If completed, the dam would inundate 440 square kilometers and would be southeast Asia's highest at 192 meters.

The feasibility study, produced by Russian consultants and the state-owned Electricity of Vietnam, was submitted to the government on August 6. According to the government, construction is planned to start by early 2000 and electricity generation to begin by 2010. Funding for the dam has yet to be secured, although the Communist Party's *Nhan Dan* newspaper reported in September that 70 percent of loans for the project would come from foreign sources and 30 percent from Vietnam.

The project has been shunned by the World Bank and other multilateral bodies, apparently because of its impact on local people and the environment. The approximately 16,520 households to be resettled are of the Black Tai and other ethnic minority groups. Vietnam has 54 ethnic minorities who live mainly in poor rural areas.

The disastrous consequences of unfair compensation and resettlement which followed the construction of Hoa Binh hydropower plant a decade ago have left officials wary of making the same mistakes. In that case, 130,000 Tai people were affected and 58,000 residents were relocated because vast areas were inundated by the reservoir.

The Tai Dam population was moved some distance from their homelands and provided with little compensation. As a result of the difficulties of establishing new lives in unfamiliar areas, together with conflicts over land and other resources between existing and new residents, about three-quarters of those who were resettled continue to live at or near the edge of the reservoir. These communities are facing extreme impoverishment, food shortages and greatly reduced levels of material well-being. The rapid clearing of the steep hillsides along most of the reservoir edge has resulted in deforestation and associated soil erosion, leading to accelerated siltation of the reservoir. The projected life of Hoa Binh Dam has been reduced from more than 100 years to about 50 years as a result of the increased sedimentation of the reservoir. Many observers fear that a similar situation may occur at Son La. ■

Brazilian Dam Moves Forward Despite Outstanding Social and Environmental Concerns

by Glenn Switkes

The Inter-American Development Bank (IDB) is reportedly close to funding construction of Machadinho Dam in southern Brazil, despite the fact that commitments made by the state electric company to affected populations remain unmet and contractors are circumventing federal environmental legislation in the dam's construction. The pending IDB loan, to a consortium known as GEAM, marks the Bank's return to funding large dams, and is one of the first to be awarded to private companies.

The US$695 million Machadinho Dam, on the Pelotas River (a tributary of the Uruguay River), will flood 7,177 hectares, and will have an installed capacity of 1,140 megawatts. The dam will displace more than 6,000 people, mostly small farmers of Italian, German, and Portuguese descent.

Machadinho was originally slated for construction in the late 1980s, but was shelved due to a lack of government funding. Plans for its construction were resurrected in 1995, this time by a private consortium. In return for building the dam, the GEAM consortium will receive 83 percent of the energy (approximately 394 megawatts) which will be used principally for aluminum production and other primary industries.

The GEAM consortium is made up of a number of aluminum companies, including ALCOA, Camargo Correa, Companhia Brasileira de Aluminio - CBA, and Valesul Aluminio; other industrial partners, and state electric companies. Aluminum smelters, which use prodigious amounts of electricity, have been a primary motivator for the damming many of the world's major rivers. In many of these cases aluminum companies receive heavily subsidized electricity rates or water use, while nearby towns and villages remain without electricity despite suffering from the dam's construction.

The Regional Commission of Dam-Affected People (CRAB), one of the world's oldest organizations of dam-affected people, has fought a running battle with the state electric company, Eletrosul, over the Machadinho project. CRAB says Eletrosul has failed to honor an agreement negotiated between them in 1987. Under the agreement, all social problems must be resolved before the river can be diverted, and affected families must have been resettled or indemnified, with guarantees of land as compensation for properties flooded by the dam. In addition, CRAB was to name a team to monitor Eletrosul's activities at the company's expense, and all changes in construction and resettlement schedules were to be discussed between CRAB and Eletrosul.

According to CRAB, the river has already been diverted before all families have been fairly compensated. In addition, it says that Eletrosul and GEAM refuse to provide funds for CRAB's monitoring activities, and that Eletrosul representatives refuse to meet with CRAB to discuss these issues. With respect to the "land for land" agreement, Eletrosul has introduced an option of "letters of credit" for farmers to buy new plots of land. CRAB says that this only creates pressure on other small farmers to sell their land, increasing migrations to neighboring areas and worsening social conflicts. CRAB also says that GEAM has still not purchased the lands required for collective resettlement communities.

CRAB also objects to a decision of questionable legality by GEAM to disregard a federal regulation requiring maintenance of a minimum permanent preservation area of 100 meters around hydroelectric reservoirs. GEAM plans to maintain only a 30-meter reserve, which CRAB says compromises the land-use options of the owners of land on the other 70 meters surrounding the reservoir, and says the move is intended to avoid paying further compensation. In the case of Itá Dam, this restriction was upheld by a federal court judge, and compensation was paid. In the case of Machadinho, GEAM has still made no commitment to compensate landholders in the 30-100 meter zone.

CRAB blames Eletrosul and GEAM for escalating violence against the leaders of the dam-affected movement. During demonstrations, the group says that police have beaten protestors, including a 60-year-old woman. CRAB leaders have been charged with sabotage of equipment, and are threatened with up to four years in prison. Another CRAB leader, Ademar Coelho, disappeared on December 2, 1997.

In an August 18 letter to the IDB, CRAB warned that "in the case that the IDB finances the construction of Machadinho without demanding that GEAM fulfill its commitment to mitigation of social issues, mainly the purchase of an area for collective resettlement, the Bank may be fomenting revolt and violence in Brazil, creating who knows, a new Chiapas." ■

Deforestation, Extinctions Would Result from Brazilian Dam

by Glenn Switkes

One of the most significant remaining sections of the Atlantic Coast rainforest in the southern Brazilian state of Santa Catarina is threatened by a plan to construct a hydropower dam on the Cubatão River. In September, the federal environmental protection agency, IBAMA, gave permission to the state electric company CELESC to begin deforesting the work site.

In all, 270 hectares of primary Atlantic Coast rainforest would be flooded by the dam. The Atlantic Coast rainforest is considered a priority for ecological conservation, since only 7.4 percent of the original 1.29 million square kilometers of forest cover remains in this area. In addition, the second highest waterfall in the country, which cascades 360 meters, would disappear when the reservoir is filled.

Local populations would also be affected during the dam's construction. At least 13 kilometers of the river's bed would be dried out during three years of construction, reducing by 60 percent the volume of water available for residents of the city of Joinville, who depend on the river for their drinking water supply.

Significantly, plans to build Cubatão are being revived at a time when supplies of natural gas from Bolivia are arriving in Santa Catarina, promising much more abundant

continued opposite

Dam-Affected Groups Boycott Official Yacyretá Meeting

by Glenn Switkes

People affected by Yacyretá Dam and their supporters boycotted a recent official meeting on the project, instead holding their own meeting to discuss compensation and resettlement problems and solidify alliances.

The "unofficial" meeting drew many more people than the official gathering. The dam-affected peoples' meeting drew over 700 people, while the official Yacyretá Binational Entity and the Inter-American Development Bank (IDB) meeting reportedly had less than 100 in attendance, mostly project officials.

The official meeting, called by the dam company in Paraguay, was to evaluate social and environmental mitigation measures. The boycotters, which included people affected by the dam, local authorities and environmental and human rights organizations, said the decision not to participate was driven by the fact that documents and other information were disseminated in a way which made effective participation by affected populations impossible.

Since last year's release of independent investigations by the World Bank and IDB confirmed that the dam has caused widespread environmental and social emergencies, the banks have appeared to be more open to involving affected people in proposals to correct the problems. The decision by the IDB and the Paraguayan dam-building authority EBY to go ahead with the official meeting despite the boycott appears to be a 180-degree turn away from this progress in the mitigation process.

"We were disappointed that the IDB supported the EBY meeting," said Elias Diaz Peña, environmental coordinator of Sobrevivencia - Friends of the Earth Paraguay, which has worked with people affected by Yacyretá in their struggle. "But we are hopeful that the overwhelming rejection of that meeting will now lead to broader recognition that any mitigation process will have to involve the affected populations in order to stand a chance for success."

Participating in the affected peoples' meeting were the Governor of Itapúa province; the mayors and city council of all municipalities affected by Yacyretá, with the exception of the mayor of Encarnación; members of the provincial government of Itapúa, and federal deputies, headed by Nery Pereira, a member of the National Commission in Defense of Natural Resources. "The people are never wrong, and so for that reason I decided to be where the people are," said the Itapúa governor in the opening session.

Network Comes Together

An important result of the people's meeting was the formation of a Coordinating Panel of Organizations of People Affected by Yacyretá, which will provide a common voice for a broad sector of affected peoples' organizations. The panel consists of leaders of all the Paraguayan affected peoples' organizations, mayors from the zone impacted by Yacyretá, representatives of the provincial government and Sobrevivencia.

The dam-affected communities also signed a letter to incoming Paraguayan President Raul Cubas, demanding the firing of the Paraguayan director of EBY, Joaquín Rodríguez, and his inner circle of bureaucrats. The Coordinating Panel will travel to the capital city, Asunción, to drum up political support for a full-scale investigation by Paraguay's Attorney General and General Accounting Office into misconduct and corruption within EBY.

Originally, 50,000 people were slated for relocation and compensation because of the project. Additional migrations to the area over the 20-year construction period, principally by families in search of employment and land, may increase the number of people directly affected by the dam to at least 75,000. Still, EBY refuses to consider compensating any family it did not register in a 1990 census. The dam-affected people say this census is so seriously flawed that it should be invalidated.

Another serious discussion that is taking place between the IDB, World Bank, and leaders of Argentina and Paraguay will be whether or not the reservoir level should be raised from the current level of 76 meters above sea level (masl) – where it has been since the closing of the floodgates in 1994 – to the dam's design operating level of 83 masl, which will flood out many more people. According to Sobrevivencia's Diaz Peña, "All existing problems must be solved before there is any consideration to raising the reservoir level. It will be a very costly process just to resolve the current problems, not to mention the broader impacts brought on by the higher water level. EBY should be responsible for providing the money needed for solving these problems out of the dam's revenues from electricity generation."

Dam-affected people have noticed fluctuations in the level of the reservoir which periodically flood their homes and turn their streets into lakes. They say the level of the reservoir recedes when World Bank or IDB teams come to assess EBY's performance. The Coordinating Panel has called for the formation of an independent group to monitor the reservoir level. ■

Deforestation continued from page 4

and cheaper energy, and making the electricity generated by the dam unnecessary. Cubatão Dam will have an installed capacity of 45 megawatts, but will generate just 22.5 MW – only two percent of the energy demand of Joinville. A planned natural gas generating station will have a capacity to generate 450 MW, which can be increased to up to 650 MW, 40 times more than Cubatão would generate. Itá and Machadinho Dams (see story, page 4), both in Santa Catarina and already under construction, will have a total capacity of more than 3,500 MW, fully meeting the state's energy demand.

The dam will cause irreversible harm to local fauna and flora, affecting nine endemic species and 37 species threatened with extinction. It will also affect an area of fundamental importance for preserving a rainforest corridor critical for fauna in southern Brazil, between the Serra do Mar and the Serra Geral. ■

FOR MORE INFORMATION

The following Brazilian NGO is working on the Cubatão project:

SOS Mata Atlântica; Rua Manoel da Nóbrega, 456; 04001-001 São Paulo, SP, Brasil;
email: smata@sti.com.br

Deconstructing Nubia: Kajabar Damns Entire Ancient Culture

by Arif Gamal

Some 40 years ago, an eccentric man named Hameed used to roam the streets of the city of Halfa, the capital of modern Sudanese Nubia. He wore a shouting red turban and colorful *jalabiyiha*. With his crooked stick he'd point to the limestone hill tops, formed through insistent flow of the mighty Nile for thousands of years, and he'd shout, "We are drowning. People listen, we will drown. Nation of Mohammed listen, we are all going to be flooded. The waters will reach those mountain tops. People, we are drowning."

Nobody heeded poor Hameed, and life went on as usual, until one day a delegation of public officers arrived from Khartoum. Their news that the Egyptians were building a dam at Aswan spread like fire through the Nubian villages. Many were so shocked that they could not believe their ears and ran into the streets in the hope of finding someone who could tell them otherwise. Resettlement in another far-away land was soon to be their fate. Hameed's prophecy became a reality. Today, Halfa and all the surrounding villages are under the waters of Lake Nubia (known as Lake Nassar in Egypt) due to the 1962 construction of the Aswan Dam. Overnight Hameed went from "madman" status to *Wali* (holy man), a clairvoyant.

Today, the Nubian people are again facing the fate of being flooded out – for the fifth time in this century. The Sudanese government is moving forward with the Kajabar Dam, which would be built in the middle of the only substantial population center where most of the remaining Nubians live. Because the project would have such serious impacts on their culture, the Nubian people have threatened to commit mass suicide if their lands are taken and they are forced once again to resettle.

Suad Ibrahim Ahmed, a retired academic and activist, circulated an appeal in May 1998, denouncing the building of the dam and explaining the concerns of the Nubian people. "I was shocked yesterday when the mass media announced the signing of a preliminary agreement with a Chinese company to begin building the Kajabar Dam in the heart of remaining Nubian land. This kind of disaster has fallen on us before, this is the fifth time this century" that the Nubian people have been moved for large dams, she writes.

Kajabar Dam, which is expected to produce 200 megawatts of power, will be 221 meters high. The reservoir is expected to stretch 140 km, with an anticipated storage capacity of 1.8 billion gallons of water. Government estimates show that only nine villages that will be flooded, but information on the ground indicates that at least 200 Nubian villages on the Nile will be affected, given that the reservoir is expected to rise to the 218-meter elevation line. The dam is one of two hydroelectric projects planned by the government; the other is around the Hammadab. The dam's reservoirs will also be used to "green the desert" with irrigation – a practice that has led to the destruction of large tracks of land in the region through salinization.

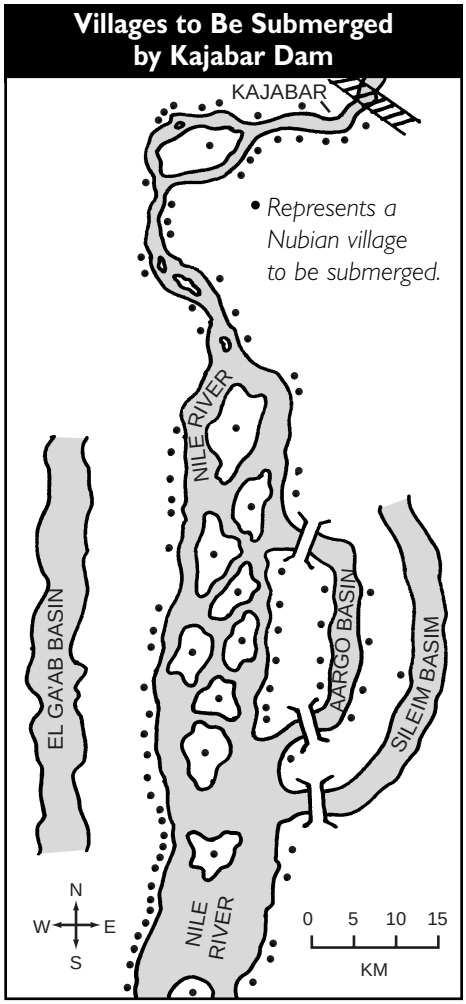
The Government of Sudan is seeking $1.5 billion to construct Kajabar, which could be a hard sell. The Democratic Republic of China is contracted to build the dam and a preliminary agreement was signed in May 1998. The Minister of Energy declared in July that the government has approached several "friendly" countries to help fund the project. There are no indications of any multi/bilateral organizational involvement, and it is unlikely that any funds will come from these sources, due to Sudan's dismal human rights record and the heavy debts the nation has already incurred.

The Dammed Nile

The Nile has always been the artery of life for the huge population living on its banks. The Nile floodplains were where the first human civilizations settled, grew and flourished. In modern times, the Nile, like many rivers around the globe, was viewed more for its potential to support large, industrial societies than as a life-force to be cared for and cherished. In this century, the Nile has been dammed and diverted to the point that it no longer supports critical ecosystems that once depended on it.

The first major dam on the Nile was built by the British at Aswan in 1902, to irrigate cotton to supply mills in England. This dam was raised twice. In 1925, the Sennar Dam was built in Sudan, to supply water for one of the world's largest cotton plantations. And in 1972 the Aswan High Dam was completed, having forced some 113,000 people off their lands.

Before the Aswan High Dam, the Nile River carried about 124 million tons of sediment to the sea each year, depositing nearly 10 million tons on the floodplain and delta. Today, 98 percent of that sediment remains behind the dam. The result has been a drop in soil productivity and depth, among other serious changes to Egypt's floodplain agriculture. The Aswan Dam has also led to serious coastal erosion, another problem stemming from the loss of sediments in a dammed river.



The new dams proposed in Sudan will add to the sorry legacy of the Aswan dams, causing new environmental damage and further reducing the river's ability to perform essential ecosystem functions. However, it is difficult to predict the exact magnitude of the environmental damage, since there is no environmental impact assessment for the project.

The storage capacity of Kajabar's reservoir is estimated to be around two billion cubic meters. There are no studies which address the project's effect on biodiversity, the downstream cumulative impacts of the dams, or the impacts to the region of the loss of huge quantities of water through evaporation from the surface of the reservoir.

Through past experiences from the Aswan dams, there are likely to be serious consequences for the river's animal species. The Aswan Dam's ecosystem changes resulted in a number of Nile fish undergoing biological adaptations which affected their economic value. For example, the Nile perch *(Tilabia nilotica)* had to adapt from the free flowing river to a lake habitat, which affected its biological cycle. This led to major changes to the taste and quality of the meat, thus lowering their value as a commercial species. Currently, there are more than 30 species of fish that garnish Nubian tables which could be affected or even eliminated by the changes to their habitat.

Social Changes

The Nubian agriculture system is a highly diversified, sustainable system based on three crops a year. The Kajabar reservoir will destroy this system, as well as some of the world's richest soils. It is here where the first wheat and barley were domesticated around 10,000 BC.

In addition to annual crops, fruit trees are an integral part of the system. Citruses are abundant everywhere. Guava, fig and other drought-resistant fruit trees are in practically every garden and along every water canal. At least five million of these fruit trees will be lost under the Kajabar scheme.

The essence of the Nubian culture evolves around the date palm. These trees are considered property: they are the Nubian stocks, their long-term investment. "I entrust for thy care and attention thine aunt, the date palm," said Prophet Mohammed of Arabia in the sixth century. The beloved tree's fruits provide sugar for a dark and steaming pot of tea, an offering to visitors and a good omen during marriage ceremonies. Rugs, mats, decorated baskets, robes, roofs and furniture are all useful secondary products of date palms. Most important, the tree is symbol of respect, peace and harmony. A great uncle of mine summarized his misery at being forced to relocate for the Aswan High Dam to the desert regions where date palms did not thrive: "We left some good dates, my son, and I miss them."

More than five million date palms will be inundated by the Kajabar reservoir. The economic and cultural aspects of this loss will be dire. Many families obtain an appreciable source of their cash income from the date harvest. These are small-scale family enterprises, mostly run by women. There is no way to compensate the social systems that have evolved around the date palm.

Health problems are also likely to increase, as evidenced by similar dam projects in the region. Schistosomiasis, which kills one million people each year around the world, has increased dramatically since the Aswan High Dam was built, due to the loss of the floods which swept the disease vector , a snail, out to sea. *Bioscience* magazine (Oct. 1998) states that schistosomiasis infection rates in the Aswan region rose from preconstruction rates of 5 percent to 77 percent after the dam was built.

WHAT YOU CAN DO:

The Nubian Alliance in the US has been a major supporter to the Nubian cause. Contact them at kcamm23063@aol.com, or oyema@aol.com. The following web site has more information as well: www.ascac/ascac/nubia.html.

Increases in malaria are likely as well. At other reservoirs in the region the increase in malaria-bearing mosquitoes led authorities to rely on the dangerous practice of spraying DDT into reservoirs. Numerous studies have shown the hazardous nature of such a program.

Loss of a Global Heritage

Timothy Kendall, an associate curator at Boston Museum of Fine Arts, came across important ancient Nubian archaeological findings while leading an expedition in northern Sudan in 1997. "The Nubians were not just vassals and trading partners of the Egyptian Pharaohs but also the creators of an ancient and impressive civilization of their own, with a homegrown culture that may have been the most complex and cosmopolitan in all Africa," he wrote in *Time* magazine (September 15, 1997). He goes on to state that Nubia, not Egypt, may have been the first true African civilization.

An international effort was made to save many of the Nubian temples and churches before the Aswan Dam flooded them into oblivion. More than 22 missions from around the world were actively excavating for the buried treasures over which the Nubians were living. Kajabar will definitely submerge the last remnants of this great civilization. There are some 24 sites in the area that are known to be of archeological importance, all of which are jeopardized. Old Dongla is known to house some of the earliest Coptic/Orthodox churches in the world. At Dabla Island some of the most ancient Christian cemeteries, dating to the sixth and seventh century, will be lost forever. Nubians are literally walking over a sand of human history.

The Need for Power

The first thing that a visitor to Khartoum will notice is the ongoing, acute energy crisis. Power cuts and water shortages, especially during the flood periods (July-August), are hellish in this extremely hot climate. The problems have persisted for more than a decade now, and efforts have been made to alleviate the situation, but to no avail.

Finding a resolution to the energy crisis is a serious issue, but solving it in a way that destroys the Nubian people and further harms the river's ecosystem is a poor bargain. Renewable energy technologies have made major advances since this project was first conceived (see p. 8), and energy conservation techniques can greatly reduce the need for destructive projects such as this one. It is time for the government and aid agencies to pursue these approaches, for the sake of Nubia and the River Nile.

Khartoum could certainly benefit from a full "demand side management" program, which uses conservation to stretch energy farther. Such programs, when fully implemented, can save huge amounts of energy, thus delaying the need for new destructive projects such as this one. The amount of waste in typical energy-generation systems is incredible: for example, just 30 percent of the energy in coal reaches electricity users. Energy conservation experts can often find savings of 30-50 percent in various sectors. According to the 1994 book *Power Surge,* "spending US$10 billion annually on efficiency improvements worldwide would lead to gross average savings of $53 billion a year through 2025."

Recent developments could offer hope for a more sustainable energy approach for the region. Egypt is in the pilot stage of a program to help it meet its goal of becoming Africa's No.1 wind-power generator. Egypt's Red Sea coastline is one of the world's best sites for wind power potential. In places, winds average 23 miles per hour for 95 percent of the year (the biggest wind power farms in Europe and the US average 16 mph winds). That 43 percent increase in wind speed delivers almost 300 percent more power.

The power from these excellent winds is also cheap: at one new site, windmills are expected to generate power at 4 cents per kilowatt hour, or one-third the average cost in Germany. Wind farms are being built in a 32-square-mile area of desert set aside by the government near Zafarana. In two years, the farms should be generating 90 MW (enough to power a town of 15,000). Egypt's renewable energy authority hopes the farms will

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Solar Power Heats Up

New Advances in Solar Thermal Electricity Prove Promising for Large and Small Applications

by Aleta Brown

Solar power in its most basic form has helped heat homes since humans began living in them. But it wasn't until the 18th century that solar technology began to take off, when a Swiss scientist invented the first "flat-plate" solar collector for heating water. In the following century, these first solar technologies gained popularity in sunny places like California, Florida and Australia. By 1897, 30 percent of all houses in Pasadena, California used the sun's energy to heat water.

A century later, three-quarters of the world's energy now comes from fossil fuels, and solar technologies are playing catch-up. Although use of small-scale photovoltaic systems is growing, solar power is still considered by many to be too costly for some applications, and too small-scale for large urban or industrial use. This situation will be harder to change as long as solar and other renewables remain as vastly underfunded compared to fossil fuels as they are today. According to Rick Heede, a researcher at the Rocky Mountain Institute in Colorado, US investments in research and development (which includes subsidies and tax credits) was 23 times greater for fossil fuels than all renewables combined for the 1989-90 fiscal year, a situation that hasn't changed appreciably since. In fact, in 1997, the World Bank spent 100 times more on fossil fuels than it did on all renewables.

Two billion people, nearly 40 percent of the world's total population, don't have access to electricity today. Fossil fuels are clearly not the answer: global warming agreements call for huge reductions in emissions, and supply is limited. In addition, fossil fuels create enormous environmental and health problems that will cost untold trillions to solve – costs that are not incurred by renewables. Large dams are also not the answer, as readers of this publication are well aware. While energy conservation offers great hope for the future, new sources will clearly be required. Although wind power is the fastest growing renewable, solar power technologies will be an important part of the energy mix of the future. One-third of those without electricity live in sunny climates. The Washington, DC-based Worldwatch Institute reports that enough solar energy strikes the earth's surface to provide 6,000 times the energy used globally by all human beings in 1990. The question is, what is the best way to harness it?

Of the current technologies, solar photovoltaic cells (PVs) have made the greatest strides. PVs are simple devices with no moving parts, making them ideal for remote areas where maintenance technicians are few and far between. In Kenya, which has a limited national electricity grid, more households now get their electricity from the sun than from the national energy grid, reports *The Economist*.

But solar doesn't have to remain small to be beautiful. A potentially promising technology, solar thermal power, could make solar power more commercially competitive and viable for larger-scale applications. Although the jury is still out on what role these systems will play in meeting the world's future energy needs, solar thermal systems are advancing technologically and economically.

Powerful Reflections

Solar thermal electric technology uses mirrors to reflect and concentrate the sun's energy up to 5,000 times its normal intensity. It is currently the least-cost solar electricity for grid-connected applications, but is still too expensive (at around 20 cents/kilowatt hour) for widespread commercial use. However, the US federal government's "SunLab" program states that the technology "has potential for further significant cost reductions." Researchers at SunLab believe the cost of solar thermal electricity can be brought down as low as 5 cents per kilowatt hour – cheaper than both coal-powered and hydroelectric plants. Another advantage of solar thermal electric systems is that their operating characteristics make them easy to integrate into a standard utility, making them good candidates to replace existing polluting power facilities.

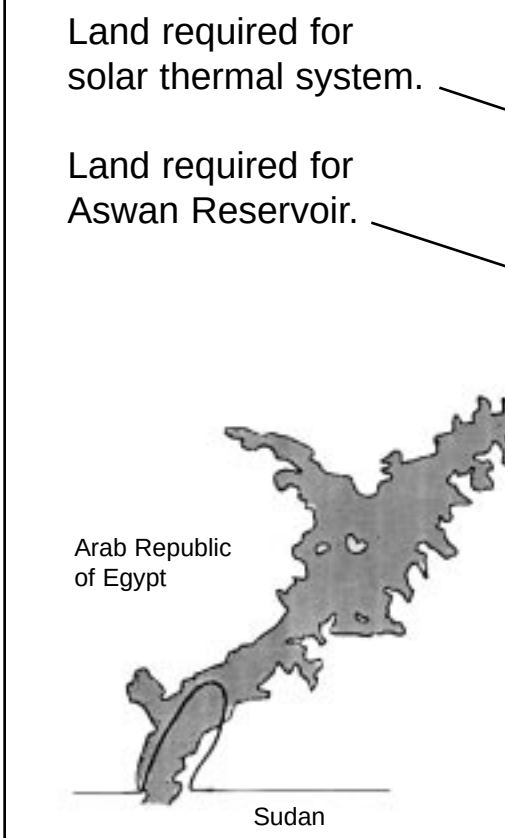
There are three main types of solar thermal technologies: parabolic troughs, central receivers ("power towers") and parabolic dishes. The solar trough system has more hours of operating experience than any other solar thermal technology, but is not the most efficient.

In the trough system, a series of curved mirrors are mounted on a tracking system that follows the sun and focuses the sun's energy onto a pipe. A synthetic oil passes through the pipe and is pumped to a central storage area where the heat is transferred to water, and flashed into steam to turn a turbine.

After successfully launching solar trough technology in Israel, inventor Arnold Goldman brought his invention to California in the 1980s. Goldman's firm, Luz International, built nine Solar Electric Generating Systems (SEGS) in the Mojave Desert. Due to a series of financial complications, Luz went bankrupt and the SEGS were taken over by several different entities. Today, all nine plants are fully operational and supply 354 megawatts (enough to supply 354,000 typical US homes) to the Southern California energy grid. Trough technology is making inroads in other countries as well. One example is a plan for a solar trough-gas combined plant in Rajasthan, India, funded par-

Comparative Land Impact

This compares the land area required for a solar thermal system with that needed for the Aswan High Dam's reservoir. Both systems can produce the same amount of power. The square represents 180,800 dish systems, at 66.5 dish systems per square kilometer. Illustration by SAIC.



lar Thermal Vs. Hydroelectric

tially by the Global Environmental Facility (GEF) of the World Bank.

One disadvantage of trough technology is that its reflective power is considerably lower than power towers or parabolic dishes. The temperature capacity of the troughs is only 300 to 700 degrees F, whereas power towers and parabolic dishes can produce temperatures in excess of 2,000 degrees. The higher temperatures increase efficiency, and thus lower energy costs. Troughs also need supplemental gas-fired boilers to provide power when the sun is not shining.

Tower of Power

Power tower technology uses mirrored surfaces to track and reflect the sun's energy onto a fixed receiver mounted on a tower. In California, a 10-MW prototype for large-scale commercial power plants is being tested. Dubbed Solar Two, this plant uses molten salt technology to store the sun's heat – a big selling point since it produces continuous power. This system stores the sun's energy in a molten nitrate salt which has been heated to 1,050 degrees F. The hot salt is used to create steam to run a turbine. The salt can store the heat for months.

One disadvantage of this type of technology, according to Christopher Flavin of the Worldwatch Institute, is that the height of the central receiver (Solar Two is 300 feet high) may provoke public opposition. Flavin says that tower technology is also costly and not as flexible as other solar systems. "It is far easier to develop and commercialize a technology that can be installed in small modular units which are gradually improved over time," he says. The parabolic dish, first conceived during the Industrial Revolution, fulfills those requirements.

Parabolic dishes allow heat to be either converted directly into electricity by a cycle-heat engine or used to heat a transmitting fluid going to a central turbine. The appeal of dishes is that they are usually built in medium-sized (typical capacity is 5-25 kilowatts) and standardized units which allow for on-site flexibility and suitability for a variety of uses.

A recent development has increased the efficiency and therefore the commercial potential of this technology. In this process, the sun's heat is directly converted into electricity through a special engine (called a Stirling or Brayton engine). Dish-engine technology requires only a small local grid. Since most of the world's people are not connected to a grid (and because long-distance power lines can cost up to $10,000 per kilometer to install), this technology offers a solution to those without hope of seeing their town or village connected to a national power grid in their lifetimes.

Barry Butler, Vice President of Science Applications International Corporation (SAIC), says that two parabolic dish-engine systems could serve a rural community of 140 people. The power derived from the system could be used for refrigeration, some lighting, water pumps and purification, or to grind grain or power a cottage industry. When the sun isn't shining, the dish-engine can also run on liquid or natural gas, such as methane gas created by fermented waste, or any available fossil fuel.

But Worldwatch's Flavin believes the technology may not be appropriate for rural applications in the developing world. "Dish-engines are sophisticated machines that need specialized maintenance. One has to be very cautious about asking the developing world to be guinea pigs for unproved technologies," he says. "PVs mixed with wind and biomass are probably a better idea for remote villages."

Research Funding Critical

There are several obstacles that stand in the way of solar thermal technology taking off in industrialized countries, besides the overriding one of the current low cost and heavy subsidies for fossil fuels.

One difficulty in the US, says Tom Williams of the National Renewable Energy Laboratory, is a result of the restructuring of the utility industry. "With restructuring, the commitment to the public good is getting lost. Instead of investing in technologies that look to the future in innovative ways, the bottom line is to provide cheap electricity." Another result of the changing utility structure, says Williams, is the risk involved when introducing new ideas in a changing business climate.

On the other hand, deregulation may have positive repercussions. Scott Sklar of Solar Energy Industries Associates (SEIA) believes that as the energy market is deregulated state by state, solar will appeal to people for a number of reasons. Most importantly, it is environmentally benign, which he believes will become an increasingly important issue for more people in the future. It is also more subject to local control, since it does not rely on a centralized distribution source.

Both Sklar and Williams agree that the largest obstacle to solar thermal technology becoming mainstream is a lack of commitment to research and development. The National Renewable Energy Lab was enthusiastically bankrolled after the oil crisis in the 1970s, but once the oil crisis was over, funding has been "like a roller coaster," says Williams.

SAIC's Butler says that once research and development money is increased, the technology will take off. He notes that the infrastructure to build solar thermal plants already exists in the United States. "You bend the metal and mold the glass the same as you do in the auto industry. That's why it fits into today's economy. It's not a capital intensive industry."

Judd Kilimnik at Solar Two agrees. Kilimnik has worked in power plants for Southern California Edison for twenty years and sees a bright future for solar thermal. "The more we build solar thermal plants, the more we get into economies of scale and the costs will be reduced," says Kilimnik.

"Our biggest roadblock is to convince investors and the public that this technology is viable for the future," says Kilimnick. "It is a renewable energy source that can provide dependable electricity to the grid. It's good for America and for the world." ■

Kariba Dam: The Tonga People's Misfortune

by Singy Hanyona

The decision to build Kariba Dam in the 1950s was as much political as it was economic. The loan the World Bank gave for Kariba was the largest the institution had given to date, and brought with it prestige in addition to dollars. The dam, sited at Kariba Gorge, flooded the whole of the Zambezi Valley upstream of it and compelled the resettlement of 57,000 people, the whole population of both north and south banks.

Little attention was paid by the World Bank and the then Federal Power Board (now the Zambezi River Authority) to the severe impacts on local people, whose numbers continued to be underestimated even as construction began. More attention was paid to animals to be drowned by the reservoir, and the ill-fated attempts to rescue them (dubbed "Operation Noah"), than to the human rescue operation.

The Tonga people living on both sides of the Zambezi have never fully recovered from the horrendous resettlement operation that uprooted them from their homes and communities. Anthrologist Elizabeth Colson describes the 1958 evacuation for Kariba reservoir:

"They rode the swaying, open lorries for a hundred miles, over rough roads, in the blazing sun of the hottest period of the year … to reach an unknown land they dreaded. The misery of the trip was increased by nausea … They emerged exhausted and sick to find themselves in what they regarded as a wilderness."

Once there, they had to build new communities from scratch, clearing the bush and constructing huts. According to the 1994 book *The People of the Great River* by Michael Tremmel, the people of the north and south banks were completely cut off from each other, and some families were never to see or hear from each other again. Many also lost highly productive alluvial fields on the edge of the river and had to take to dry land farming in the rugged foothills.

Poor Planning

Not only was there insufficient time to plan and implement a credible resettlement program for the 57,000 people who were eventually forced to move, but few resources were made available to accomplish it. The responsibility for this huge task was left to the under-staffed, under-equipped and under-financed provincial administration of then Southern Rhodesia. District personnel, though hard working and dedicated, were required to implement a crash program.

Some 20,000 resettlers were moved far inland from the future reservoir to sparsely watered, isolated areas in which minimal efforts were made to raise their living standards. For the 35,000 people on the north bank, there was insufficient land within the future reservoir basin to resettle them. As a result, 6,000 people were moved to the Lusitu area below the dam and over 1,000 to the adjacent plateau. The plateau, however, proved to be an unsatisfactory living area, with most people subsequently returning to the Gwembe Valley. As for Lusitu, available lands were insufficient to support the resettlers and the host populations under their existing system of land use.

Today, the Lusitu during the height of the dry season resembles the dusty areas south of the Sahara Desert. Because virtually all arable land is under cultivation, little land remains for most young couples as they marry. In drought years, cattle waiting patiently under winter thorn trees for seed pods to drop often die of hunger unless driven elsewhere.

Though resettlers on the Zimbabwean side of the reservoir have more land per household, extreme poverty and inadequate water supplies and other infrastructure problems also exist there. A more recent threat is an influx of immigrants who are acquiring properties for a wide range of purposes, often at the expense of continued local village access to essential land and water resources.

An official keepsake from Kariba Dam.

Difficult Changes

The life of the displaced people before the devastating resettlement depended on the Zambezi River for many aspects of their livelihoods, which consisted mainly of gathering wild fruits, fishing, hunting and subsistence farming on small fields and gardens in the valley. They lived with very little intervention from colonial rule and could engage in as many occupations as they wished.

Cultivation was done throughout the year, on the floodplains when the Zambezi receded and in small gardens and fields during the rainy seasons. The people, in line with their traditions, held rain ceremonies for their ancestors. They caught fish, which provided them with a constant source of protein. They hunted as needed and could kill dangerous animals by setting traps.

They crossed freely from one bank to the other and held rituals to honor their ancestral spirits as one people. They had spiritual mediums, traditional helpers and community education systems. Their community was self-sufficient in every respect.

A survey carried out in 1995 revealed that the displaced people now survive mostly on handouts from governments. These

continued opposite

Kariba continued from page 7
people once cultivated a variety of crops; however, with the erratic rainfall patterns in their new upland communities, yields have been drastically reduced and diets have gotten very poor.

The displaced people have homes very far from the reservoir, and as a result, some displaced people are not as free to fish as they once were. The situation has been exacerbated by the influx of people from elsewhere.

The poorly executed resettlement program and the subsequent harsh displacement from the Zambezi Valley brought misery and poverty to the lives of the victims. Once a unified, self-sufficient community, the displaced people today live in an overly negative socio-economic climate caused by the forced displacement from their natural habitat.

Not only has there been a reduction in living standards among resettlers, but also a community unravelling characterized by increased alcohol abuse and crime. And while some old traditions such as worship of ancestral spirits and *ntuntu* are still upheld, most of the descendants of resettlers tend to shun these traditions in favor of "new cultures" and beliefs, including witchcraft. In addition, the dire poverty of the resettlers has in turn led to comparative illiteracy.

Environmental Problems

The inadequate planning of resettlement caused land pressures that resulted in deforestation, soil erosion and overgrazing. People were resettled among host communities, and were forced to share limited resources such as land for cultivation, firewood, building materials and pastures. This, in turn, accelerated the degradation of the environment as they grossly exceeded its carrying capacity.

The displaced people lost their fertile alluvial land. They were forced to open up new fields in poorer, drought-prone Karoo uplands which affected food security. On the Zambian side, they could no longer hunt as freely as they used to as wildlife areas were designated as national parks. Similarly, fishing could no longer be used to supplement food resources.

As a result of continually falling yields due to drought, poor farming practices and infertile fields, they resorted to selling their cattle for survival. As if that were not enough, cattle disease (bovine trypanosomiasis) took its toll on the herds. In much of Africa, cattle are often a family's primary wealth, so losing their cattle is like losing their savings.

It appears that of all the complaints relating to the displacement of people for Kariba, inadequate supplies of water was the biggest. None of the resettlement areas were provided with as much water as they were used to in the valley. In Lusitu, the piped water supply scheme delivers not only inadequate but untreated water. Moreover, resettlers had to cope with erratic rainfall patterns whose effect was less pronounced in the valley by virtue of proximity to the Zambezi River. This has greatly affected crop productivity.

"We went away with our bodies but we left our water behind," said resettler Simpongo Munsaka. "We would like the water to follow where we are today so we can plow throughout the year."

The Future

Though many government agencies have tried to improve the living standards of Kariba resettlers over the past 40 years, their efforts have not been been guided by an overall plan. More recently, the Zambezi River Authority (ZRA) has begun to show greater interest in correcting the longstanding problems created by the dam.

In April 1996, the authority conducted its own study of the situation on both the Zambian and Zimbabwean sides of the Kariba Lake Basin. The study, which reviewed the situation on both sides of the river valley between Kanyemba and Victoria Falls, was to assess living conditions 39 years after the dam was built. It verified the findings of various researchers and identified projects that could do something tangible for the good of these people.

The study also verified what the people themselves have known for decades: that the social consequences of the displacement of the Tonga were not adequately addressed during the dam's construction. ■

The author is a journalist with the Commonwealth Forestry Association in Zambia.

Kajabar Dam continued from page 7
generate 600 megawatts by 2005, which is about 3 percent of the country's needs. Regional interest in establishing an energy market could prompt Egypt to expand the farms to produce energy for export.

Popular Reaction to Kajabar

The Kajabar Dam project has been a "closed session" deal ever since the idea was first broached in Khartoum. Local people have not been consulted. There is currently no social impact study, or environmental impact assessment available. The feasibility studies were executed in Khartoum by engineers appointed by the regime to design the dam – an obvious conflict of interest. These same engineers have also been chosen to begin the compensation and resettlement process.

The first reaction to the rumors of another dam over Nubia was disbelief. With an atrocious civil war blazing in the south and bad relations with neighboring countries, the government seemed to have placed Kajabar in the back burner for a while. But as of the end of 1997, there seems to be renewed energy to go ahead with the construction of the dam, as evidenced by the appointment of a committee to start the resettlement process. This brought about an angry reaction from the local population, who were quick to voice their concerns to the local and central administrators. Thousands of Nubians in the diaspora have written letters to against Kajabar.

The most vocal of these have been the local population. The Nubian Studies Documentation Center (NDSC) in Cairo has worked long and hard on this issue. The NDSC is extremely active in following up on all the developments to this project, informing the local population and trying to rally support for their cause. In their petition to the president, dated March 18, 1998, a committee of prominent Nubians categorically refused compensation or repatriation from the region. "The Nubians have vowed not to leave their lands," they stated. They also held a "sit-in" in May 1998, to protest the arrival of a Chinese technical team coming to visit the site. Fifty demonstrators were arrested. They were eventually released, but having their names on government record for arrests is definitely not in their favor.

The words of Nubian activist Suad reflect how Nubians feel about this project: "I believe as Nubians, we have a right to remain on our ancestral homeland, a right which is being brutally violated. We are being denied the right to organize or hold unfettered public meetings to oppose the project or demand proper, scientific and comprehensive studies by independent consultants." Suad on her own cannot stop the project. But all of us together have a greater chance to deconstruct Kajabar, not Nubia. ■

The author is an associate professor in African-American Studies at UC Berkeley. His family was relocated for the Aswan High Dam in 1962. He wishes to thank Abubaker Sidahmed, the spirit of Nubians in the diaspora.

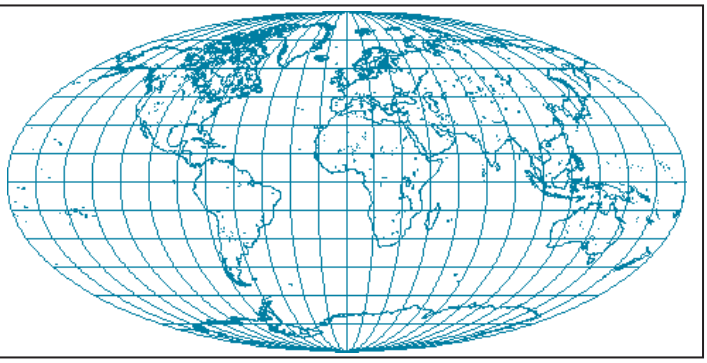
SHORTS

Exploding blooms of the aquatic weeds hydrilla and water hyacinth are choking the flow of water down the Rio Grande in the US. An almost solid mat of these exotic weeds covers the Rio Grande from top to bottom in a six-mile stretch just north of Brownsville. Valley farmers have suffered below-average rainfall for years and urgently need irrigation water, which is now difficult to deliver. The supply could be choked off entirely if the weeds are not controlled. To get enough water to push down through the thick weed mats on the Rio Grande, water managers must release up to 30 percent more from Falcon Reservoir. The weeds are interfering with gauge stations, making it tough for water managers to see how much water is in the river and how much they need to release from reservoirs.

Rebel forces in the Democratic Republic of Congo seized the Inga Dam in August, knocking out power to the capital city of Kinshasa for nearly two weeks. The rebels threatened to blow up the dam unless they were allowed to retreat safely, according to a Reuters story (Aug. 28). The rebels were allowed to leave shortly thereafter.

Five months after a federal court order halted the closing of the floodgates on Brazil's Porto Primavera Dam, the legal issues surrounding the project are no closer to a solution. Even the granting of an operating license by the federal environmental authority has not changed the situation. The judge responsible for the process says there is no rush, because "there is no irreparable damage involved in waiting." The dam has taken 19 years to build, at a cost of US$9.3 billion. The Sao Paulo state electric company, CESP, says it is losing $600,000 per month due to the legal delays. The next step will be naming a technical commission to verify whether CESP is meeting agreed-upon mitigation programs.

News Briefs



MINING

BULGARIA: Water tainted with radium and uranium has been leaking from the Byalata Voda (White Water) uranium mine at Dolna Banya village in Bulgaria's Sofia region, contaminating river water that eventually reaches the Aegean Sea. The Bulgarian newspaper *Demokratsiya* reported August 10 that the level of pollution in the tainted water is 100 times higher than the Bulgarian Ministry of Environment's safety norms. The contaminants are entering the River Ochushnitsa, which then flows into the River Maritsa, the largest river basin in Bulgaria. Environment officials warned residents of nearby villages not to drink the river water or use it for irrigation, Environmental News Service (ENS) reported on August 17. Ministry of Environment sources also warned local residents not to eat the river's fish or animals which have drunk the water.

SPAIN: Environmentalists are decrying the slow pace of the clean-up of mining pollution along the Guadiamar River, according to *BBC Wildlife* magazine (September 1998). A mine tailings dam at Aznalcallar burst in April, spilling the heavy-metals-laced waste over more than 5,000 hectares of farm land and threatening the Guadiamar River and Doñana National Park. Officials contend that the clean-up will be complete before autumn rains begin, which could leach the toxics into soil and groundwater.

But environmentalists believe the job could take another year due to a lack of coordination between central and regional governments. *BBC Wildlife* reports that an extra 1,500 workers were brought to the site to begin removing the dried-out mining sludge by hand – a more effective method than using heavy machinery, which can release toxics into the air and soil. Scientists report that the rapid oxidation of the heavy metals in the sludge has increased fifteenfold, which could result in groundwater contamination if rains begin before the sludge is removed.

SURINAME: A Maroon community recently petitioned the country's president to intervene in the bauxite mining operations of Suralco, a subsidiary of Alcoa of the United States. Suralco "has destroyed our environment and our ability to feed our families," the petition states. The Maroon people are descendants of African slaves who now live a traditional lifestyle in the rainforests.

Bauxite mining, which provides the feedstock for aluminum production, has been a mainstay of Suriname's economy since the 1930s, providing 76 percent of export earnings in 1994. Alcoa commenced operations in Suriname four decades ago, securing most of the known bauxite reserves. Alcoa constructed the Afobaka hydroelectric dam in 1963 to provide power for its smelter at Paranam. The dam inundated 1,500 square kilometers of tropical forest and forced the relocation of some 6,000 Maroons from their ancestral territories.

The communities were moved to "transmigration villages," which still lack basic services such as electricity, even though the power lines to Alcoa's smelter run nearby. The communities were not provided with secure land rights in the new areas. These once-forested communities now live in a virtual moonscape, surrounded by blasted rock and covered in dust and debris. They are subjected to high intensity lights that allow mining to take place around the clock, seven days a week.

Nearby, toxic chemicals have been buried in unlined pits. Local newspapers report that Suralco is now planning to bury more chemical waste at the site as well as waste from the parent company Alcoa in Pittsburgh, and may expand operations into West Suriname in coming years. *Sources: Suriname Information Update, Project Underground*

ALTERNATIVES

CANADA: Despite its cold climate, Canada is going solar with help from the federal government. Ralph Goodale, Minister of Natural Resources Canada, recently inaugurated the

first installation of a solar air heating system, called Solarwall®, under the government's Renewable Energy Deployment Initiative (REDI). Solarwalls are metal solar collectors mounted vertically on the south-facing walls of buildings. The collected solar energy preheats ventilation air, which is distributed inside with a fan and a system of flexible ducts. The system is now considered to be the world's highest-efficiency solar air collector. Recent improvements in technology have made these systems more cost-effective. A Solarwall recently installed at a major carpet manufacturer cost about C$175,000 (US$115,700). The company will save C$35,000 annually in reduced gas costs, while cutting its carbon dioxide emissions about 500 tons a year.

REDI is a three-year, C$12 million initiative which aims to promote investments in renewable energy systems for heating and cooling, and help reduce Canada's greenhouse gas emissions. The program will run until 2001.

THE WORLD: Removing water subsidies for those who can afford it would be a major step toward reducing excess consumption, according to a new report on global consumption patterns and problems by the UN Development Programme (UNDP). While the world is consuming more goods and services, one billion people live on less than a dollar a day, deprived of basic commodities such as water and sanitation, the 1998 Human Development Report states.

The money Europeans spend on ice cream each year (US$11 billion) nearly equals the cost of providing universal access to water and sanitation ($12 billion). The report presents a seven-point agenda for action for sustainable consumption which includes the removal of subsidies for energy, water and other natural resources which usually benefit the rich, not the poor, and therefore contribute to waste. Removing water subsidies (which amount to $42-47 billion in developing and transition economies, according to the report) would reduce water use by 20-30 percent – and by as much as 50 percent in parts of Asia. That would make it possible to supply safe drinking water to most of the 1.3 billion people now lacking it, while avoiding the construction of large, environmentally destructive water development projects. The Human Development Report is available on-line: http://www.undp.org/undp/hdro/98.htm)

ITALY: Renewable energy production in Italy could be doubled by 2010, the government announced in early October. Unveiling a green paper on renewables, Environment Minister Edo Ronchi described the proposals as an opportunity to cut carbon dioxide emissions, create jobs and promote technological development. State funding from a new "carbon tax" will be made available to support the program, the minister said. The government estimates that the program could help create about 100,000 new jobs.

Drafted by research agency ENEA, the green paper concludes that Italy could double its current rate of renewable energy production, from 12.7 million tons oil equivalent (mtoe) currently to 24 mtoe by 2010. Doubling production would not double Italy's percent of energy derived from renewable energies, however, due to projected growth in total energy consumption, the government admitted. But the Environment Ministry stressed that it could contribute 15 percent of Italy's commitment under the Kyoto protocol to cut emissions of all greenhouse gases by 7 percent by 2012. Unlike many other European nations, Italy currently produces almost no energy from solar or wind energy. Under the green paper's proposals, the government is now looking to increase wind capacity to 3,000 MW by 2010, which is equivalent to over half the total currently installed across Europe.

Surprisingly, given Italy's southerly latitude, the green paper does not project any significant future contribution by photovoltaic solar energy. However, it did suggest that 80,000 square meters of solar panels could be installed on public buildings before 2001.

NAMIBIA: When fully operational, the Kudu natural gas fields are expected to effectively cut the profitability of the government's proposed Epupa hydropower scheme, Shell officials said in July.

Shell officials said the proposed 750-megawatt gas-fired power station would supply gas and power to South Africa's Western Cape, which effectively takes the market that was earmarked for the Epupa Dam, *The Namibian* reports. About 50 percent of Kudu's gas and power is expected to be exported to South Africa.

The project's first phase is expected to make Namibia energy self-sufficient by the year 2002, if it goes ahead as planned. This would mean that Epupa (which, if it moves forward, would only be ready several years after Kudu was up and running) would have to find its own export markets to be viable. The Kudu gas field is located some 170 km offshore from Namibia near the border with South Africa. The life span of the gas field is 20 years. At press time, the governments of Angola and Namibia were expected to meet to discuss the Epupa project's future, if the ongoing civil conflict in Angola did not force a delay in the meeting.

DAMS IN THE NEWS

CHILE: Twelve people were detained and then released October 5 after a confrontation in the upper Biobio where the Ralco Dam project is leading to resettlement conflicts. The incident occurred after supporters of the eight indigenous families who refuse to sign land-swap contracts with the utility Endesa occupied a bridge, stopping all traffic to the site. The construction of the US$500 million Ralco Dam would flood 600 hectares of land, forcing the relocation of 91 families. The governor of the province, Juan Carlos Coronata, said the regional government will not tolerate violence as progress is being made in the search for improved living situations for the affected inhabitants. However, a study released Oct. 5 by the agriculture ministry shows that the land Endesa is offering for relocation has poor soil and lacks firewood. The NGO GABB, which has been working against the dam for years, argues that the land cannot support even half the people that Endesa plans to relocate there.

Construction on Ralco is currently stalled due to the controversy over the project. The opposing families have said they will not meet with the new director of the National Indigenous Development Board (Conadi) Rodrigo Gonzalez until he makes an official announcement of his position on the project. *Source: Chile Information Project*

BRAZIL: Federal police are calling the September 13 bombing of a 40-meter-high transmission line tower from Itaipu Dam, the world's largest hydroelectric dam, an apparent act of sabotage. The police say they also found unexploded bombs which would have taken out two more of Itaipu's three other major transmission lines. The bombed lines carried 750 KW from the dam to population centers in south-central Brazil. The explosion took place near the town of Nova Tebas, in Paraná state. According to police, the bomber used sophisticated materials whose sale is controlled by the Ministry of the Army. Federal police bomb expert Aggeu Bezerra said that the unexploded bomb, containing between 8 and 10 kilograms of explosives, was difficult to deactivate. "The bomber knew his stuff," he said. Brazilian electrical sector authorities have promised to increase surveillance and to reinforce transmission towers. Earlier this year, high winds were responsible for downing seven Itaipu transmission towers, blacking out large parts of the state of São Paulo.

WCD continued from page 1
could interfere with the ongoing case on the Sardar Sarovar Project before the Delhi Supreme Court. The WCD's Vice-Chair, L. C. Jain, described this as "the flimsiest of arguments." Jain noted that the Sardar Sarovar case has been in the courts for almost five years. Shortly before the Prime Minister's Office wrote to Asmal, the WCD had informed the Indian authorities that it would drop the Sardar Sarovar visit from its field trip and exclude mention of the project from its public hearing – to no avail.

The WCD quickly rescheduled its Delhi meeting to South Africa (where it is headquartered), but reaffirmed its commitment to hold a South Asia public hearing at a later date. Asmal noted that the "turn of events in India showed the need for the Commission's work because it highlighted the highly charged issues associated with dams."

"The reason for selecting South Asia for the first hearing," Asmal continued, "reflects the Commission's collective view that the subcontinent has had extensive experience with dams and the debates surrounding their planning and construction. Any Commission that does not make the effort to understand and learn from this experience would have little credibility in the eyes of the world."

Harsh Words

In the days before the cancellation of its visit, Gujarat politicians heaped abuse on the WCD. Chief Minister Patel denounced Commission members as "people of dubious background" and "known project-baiters." The team to visit Gujarat was to have included Medha Patkar, India's best known anti-dam activist, but also two strong dam proponents: Shen Guoyi, a senior official in China's Ministry of Water Resources (a government bureau that is responsible for oversight of dam projects) and Jan Veltrop, Honorary President of the International Commission on Large Dams, the professional association of the world's dam builders.

On September 11, the Gujarat State Assembly held a special one-day session on the WCD and unanimously adopted a resolution expressing strong resentment against the "conspiracy" by developed countries "to thwart developmental activities in Third World countries." During the debate on the resolution, opposition leader Amarsinh Chaudhary claimed that some of the members of the Commission were "CIA agents." The resolution also expressed Gujarat's resolve to "crush all obstacles" in the way of speedy implementation of the Sardar Sarovar Project. Construction work on the dam has been at a standstill for almost four years due to legal action and the mass-based opposition to the project led by the Narmada Bachao Andolan (Save the Narmada Movement).

Citizen's groups in India expressed outrage at the central government's acquiescence to pressure from Gujarat. The Narmada Bachao Andolan described the government's decision as "shameful, undemocratic and anti-national." Himanshu Thakkar of the International Committee on Dams, Rivers and People, a network of NGOs established to coordinate input into the WCD, called the cancellation of the WCD's visit a "black day for Indian democracy" which showed the "fascist tendencies" of the government.

In the Narmada Valley, villagers had gone to great lengths to prepare for the Commissioners' visit, news of which had been spread from village to village by activists traveling on foot and by boat in an area with few roads and fewer telephones. One village slated to be flooded by the Sardar Sarovar Dam was even preparing to build a new road so that commissioners would be able to get to their village in vehicles and hear their reasons for opposing the dam.

Numerous activists, researchers and government and company officials from India, Pakistan, Nepal, Sri Lanka and Bangladesh had been slated to give testimony at the public hearing and had to cancel their trips. Their presentations were selected from the more than 150 submissions made to the WCD on dams and alternatives in South Asia.

Following an invitation from the Sri Lankan authorities, the Commission has decided that its next meeting, and the postponed South Asian public hearing, would be held in Sri Lanka in December. However, Kader Asmal has promised that future hearings will be heard in India. "We owe it to democracy in India to have a session there," Asmal said. ■

WCD to Review Major River Basins and Dams

The WCD Commissioners agreed at their September meeting (held in Cape Town, South Africa) on a basic work program for the next two years, which will focus on reviews of "at least 10 of the world's major river basins with significant dams," states a WCD press release issued after the meeting. The Commission will also do audits of the performance of a larger number of individual dams, and undertake a number of thematic studies on issues such as non-dam options for water management and energy supply, dam decommissioning, the record of predicting and mitigating the social and environmental impacts of dams, and dam economics.

The complete list of basins and projects to be studied, the methodology for the audits, and the detailed terms of reference for the thematic studies are yet to be finalized.

"We are happy to announce that the Commission is now fully on track," said the Commission's Chair, Kader Asmal, at the end of the Cape Town meeting. He added that "the WCD Secretariat is now in place with the appointment of most of its staff completed – and the implementation of its work set to start within a few days."

The Commission will seek public input through forums, panels and hearings. According to the Commission, "through these activities, the WCD will look at both the development effectiveness of and the alternatives to large dams, and the future context for large dams and their alternatives in meeting the immense challenges for water resource development in the coming decades. Environmental sustainability and social equity for project-affected people will be one of the paramount themes considered along with other aspects of water resource management and development."

The Commission will conduct hearings on all five continents. Provisional plans have been made for a hearing in Europe in March and in Brazil in August 1999. The next meeting will take place in Sri Lanka in December 1998 after the South Asian public hearing.

For more information on the WCD, see the group's official web site: www.dams.org and IRN's web site: www.irn.org.

Available from IRN

Regular Publications

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

Reports

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

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) •Pangue Dam / Biobío River (Chile) • Arun III Dam (Nepal) • Nam Theun 2 (Laos) • Xiaolangdi Dam (China) • Lesotho Highlands Water Project (Lesotho) • Mekong Hydroelectric Development (Southeast Asia) • Hidrovia Dossiers I-5 (South America) • Bakun Dam (Malaysia) • Epupa Dam (Namibia)

Other Resources

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, $5. 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 Center for the Book.

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

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 a detailed list of the items on file in the IRN library. It is updated twice a week. 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 IRN, 1847 Berkeley Way, Berkeley, CA 94703; Tel.: (510) 848-1155: Fax: (510) 848-1008: e-mail: von@irn.org

About IRN

IRN was formed in 1986 by a group of hydrologists, engineers and environmentalists to address a common concern: the worldwide prevalence of unsound, destructive freshwater management projects. We devote much of our organizational resources to stopping the construction of large dams and promoting viable alternatives. Our work is intended to reflect the environmental and human rights implications of river development in an effort to redirect the practices of international finance institutions, commercial financiers and the dam-building industry. Please become a member by sending in the coupon below.

Support IRN

IRN exposes the myths behind high dams and other destructive river development projects. We defend the people, land, forests and animals that depend on rivers wherever we can: in the offices of government, the board rooms of business and the streets of our cities. Please join us by becoming a member.

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News from the Decommissioning Front

NEW COALITION: In July, activists from seven countries came together to discuss opportunities for river restoration through dam decommissioning at an IRN-sponsored workshop. They agreed to form "Living Rivers: the International Coalition for the Restoration of Rivers and Communities Affected by Dams" as the seed for growing a global movement on these issues. IRN is helping to service and build this coalition in a number of ways:

- We are encouraging organizations around the world to join Living Rivers by endorsing the Walker Creek Declaration, which was produced during the workshop and appeared in the last issue of *World Rivers Review.* To sign on to the declaration and join the coalition, contact IRN's Decommissioning Coordinator via email: rani@irn.org or at the address below.
- IRN is now distributing the proceedings from the decommissioning workshop. The booklet contains discussion outcomes, participant information, and a list of articles, press releases and publications on the topic of dam decommissioning. Copies are available for $10 and may be ordered through IRN's Library Coordinator: von@irn.org.
- IRN is also operating both an e-mail listserv and a web page on dam decommissioning (see www.irn.org or contact rani@irn.org for information on how to sign up).

For more information on any of the above items, contact IRN at: 1847 Berkeley Way, Berkeley, CA 94703; Tel: 510.848.1155; Fax: 510.848.1008 or visit our web site: www.irn.org.

RESTORING GLEN CANYON: The Glen Canyon Institute has been working to restore Glen Canyon in Utah by allowing the river, long since stoppered by the 168-meter-high Glen Canyon Dam, to flow once again. The group has a new publication, *Hidden Passage,* that describes the science behind their struggle. The first issue includes information on the siltation of the dam, the problems caused by the dam and how restoring the river's flow would affect them, and a story on the Institute's "Citizen's Environmental Assessment" project. For more information contact: The Glen Canyon Institute, P.O. Box 1925, Flagstaff, AZ 86002; web: www.glencanyon.org.

EDWARDS DAM REMOVAL: On September 16, the Federal Energy Regulatory Commission (FERC) gave its blessing to the groundbreaking settlement signed last May to removed Edwards Dam on Maine's Kennebec River. The settlement followed a November 1997 decision by FERC ordering the dam owner to remove the dam at its own expense to protect and restore seven species of migrating fish. FERC's decision paves the way for the dam to be removed next July. Also in September, the State of Maine completed its engineering plan for removing Edwards Dam. The plan calls for controlled demolition of portions of the dam in order to drain the reservoir, and then demolition with mechanical equipment of the remainder of the 917-foot-long structure. ■

International Rivers Network
1847 Berkeley Way
Berkeley, CA 94703
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